



<http://researchspace.auckland.ac.nz>

ResearchSpace@Auckland

Copyright Statement

The digital copy of this thesis is protected by the Copyright Act 1994 (New Zealand).

This thesis may be consulted by you, provided you comply with the provisions of the Act and the following conditions of use:

- Any use you make of these documents or images must be for research or private study purposes only, and you may not make them available to any other person.
- Authors control the copyright of their thesis. You will recognise the author's right to be identified as the author of this thesis, and due acknowledgement will be made to the author where appropriate.
- You will obtain the author's permission before publishing any material from their thesis.

To request permissions please use the Feedback form on our webpage.

<http://researchspace.auckland.ac.nz/feedback>

General copyright and disclaimer

In addition to the above conditions, authors give their consent for the digital copy of their work to be used subject to the conditions specified on the [Library Thesis Consent Form](#) and [Deposit Licence](#).

Note : Masters Theses

The digital copy of a masters thesis is as submitted for examination and contains no corrections. The print copy, usually available in the University Library, may contain corrections made by hand, which have been requested by the supervisor.

**Core self-evaluations as a moderator of the
stressor-strain-satisfaction relationships among
farm managers in New Zealand**

Huat Bin, Ang

**A thesis submitted in fulfilment of the
requirements for the degree of
Doctor of Philosophy**

The University of Auckland 2011

ABSTRACT

Aim

This research seeks to determine the role of core self evaluations in understanding individual differences in the stress-strain-satisfaction process. The research also seeks to determine whether farm managers who report positive core self-evaluations are more resilient towards stressors and, therefore, less prone to strain and more satisfied with their job and life in the farming context.

Design methodology

A national representative and cross-sectional survey method is used by utilizing an adapted version of Deary's Edinburgh Farming Stress Inventory, the twelve-item Core Self-Evaluations measure, General Health Questionnaire-12, and Job and Life Satisfaction measures. The sampling frame consists of farm managers in New Zealand.

Findings

The twelve-item core self-evaluations measurement scale was validated and a six-item farm stressors scale was established. The research supported the hypothesis that high levels of strain are related to job dissatisfaction. In addition, this research confirms that New Zealand farm managers experience relatively low strain as a result of the low impact of farm stressors. Finally, the results showed support for a significant relationship between strain and job and life satisfaction. Results also indicated that higher core self-evaluations buffered the negative influences of farm stressors on strain, and strain on job satisfaction.

Contributions/implications

The contributions of this research are both methodological and theoretical. The twelve-item core self-evaluations measurement scale has been tested for robustness as a higher-order latent construct. This research has also enabled comparisons of the different levels of psychological strain experienced by New Zealand and Australian/European farm managers. The low core self-evaluations individuals are not able to tolerate increased work pressure, and experience reduced job satisfaction and, consequently, reduced life satisfaction when compared to the high core self-evaluations individuals. These results will be of particular interest to policy-makers, farming organisations, and contractors interested in identifying individuals who have the potential for career success.

Originality

This study extends research on core self-evaluations as a moderator. It establishes a new paradigm in work stress research, in particular, solidifying the stressor and strain, and strain and job satisfaction relationships in the workplace, and establishing Core Self-Evaluations as a moderator of those relationships.

ACKNOWLEDGEMENT

My deepest gratitude to Professor Marie Wilson for her critical and profound comments on every draft submitted and for all her understanding and support throughout the process of completing my PhD. Prof Marie Wilson undertook supervising my PhD while juggling an exceptionally heavy workload, including her appointment as Dean (Academic) at Griffin University in Australia. In every respect, I would not have asked for a better mentor.

I would also like to extend my deepest appreciation to Ass. Prof. Felicity Lamm for not only bringing me on board the PhD programme, but also for her encouragement and support over the course of doing my PhD. Also I would like to thank Dr. Rupert Tipples for his advice in the early phase of my PhD journey, in particular dealing with farming organizations.

I am thankful to Ass. Prof. Siah Ang and visiting Ass. Prof. Arran Caza for their help in statistical analysis, and Ass. Prof. Tiru Arthenari for his support in the early phase of the analysis. Their suggestions and thoughtful comments challenged me to think more critically. Thanks also goes to Dr. Giles Burch and Dr. Barbara Plester for their contribution to this research.

I would also like to acknowledge the fullest cooperation from Federated Farmers of New Zealand, Ministry of Agriculture and Forestry, Fonterra, Landcorp, HortResearch, AgriResearch, Horticulture NZ, Dexcel, New Zealand Primary Institute and Management

and my heartfelt gratitude for supporting me on this journey. This study would not have been accomplished without their help.

Although there are numerous individuals to whom I am indebted to for their support throughout the course of my PhD program, I would like to take this opportunity to express my gratitude to Dr. Susan Carter and the DEAL volunteers for suggesting the appropriate words to use. Many thanks to Ms Lynn Spray for editing my thesis.

Friends, too many to name them all, have helped me maintain some semblance of sanity. Many thanks to my friends Zaidah, Lizzie, Robert Whitbourne, and Chin Boo who invested time in sharing their experience in the final stage of my PhD journey.

Finally, but most important, my family: who help me remember that there is a world outside of dissertation life. In particular, my Mother and my wife, Siew Tin who helped me in even the toughest situations and has endured my PhD journey. Many thanks to my wonderful three daughters, Chew Sze, Yuin Sze, and Lhee Sze who inspired me to complete the PhD. My study was greatly facilitated and inspired by their persistence.

TABLE OF CONTENTS

ABSTRACT.....	i
ACKNOWLEDGEMENT.....	iii
TABLE OF CONTENTS.....	v
LIST OF TABLES.....	ix
LIST OF FIGURES.....	xi
CHAPTER 1 – INTRODUCTION.....	1
1.1 Introduction.....	1
1.2 Significance of the Research.....	2
1.3 Research Problem.....	3
1.4 Occupational Stress in Farming.....	6
1.4.1 Economic factors.....	7
1.4.2 Adjusting to government regulations.....	7
1.4.3 Labour shortage.....	8
1.4.4 Effect of trade globalisation.....	9
1.4.5 Climatic conditions.....	10
1.4.6 Size of the farm.....	10
1.5 Organisation of the Research.....	13
CHAPTER 2 – LITERATURE REVIEW.....	15
2.1 The Nature of Job Stress.....	15
2.2 Model of Occupational Stress.....	21
2.2.1 Holistic Stress Model.....	22
2.2.2 Job Strain Model (Job Demands-Control Model).....	23
2.2.3 Structural Model of Job Stress.....	28
2.3 The Impact of Stressors.....	30
2.4 Stress, Stressors, and Strain in Farming.....	34
2.4.1 Stressors in farming.....	34
2.4.2 Strain in Farming.....	36
2.5 The Impact of Job Stress on Job Satisfaction.....	38
2.6 Job and Life Satisfaction.....	42
2.7 The Impact of Personality Factors on the Stress-Strain-Satisfaction Relationship.....	47
2.8 Core Self-Evaluations as a key personality construct.....	56
2.8.1 Self-esteem.....	57
2.8.2 Generalised Self-efficacy.....	58
2.8.3 Locus of Control.....	59
2.8.4 Neuroticism.....	60
2.8.5 The Role of Core Self-Evaluations.....	64
2.9 Theoretical Links in the Model.....	69
2.10 Research Questions.....	73
CHAPTER 3 – METHODOLOGY AND RESEARCH DESIGN.....	75
3.1 Introduction.....	75
3.2 Research Methodology.....	75
3.2.1 Research Strategy.....	77
3.2.2 Research Design.....	79

3.3	Participants.....	83
3.4	Data Collection Procedures.....	85
3.5	Instrumentation.....	88
3.5.1	Stressors.....	88
3.5.2	Strain.....	89
3.5.3	Job Satisfaction.....	90
3.5.4	Life Satisfaction.....	90
3.5.5	Core Self-Evaluations.....	91
3.5.6	Demographic Variables.....	91
3.6	The Pilot Study.....	92
3.7	Methodological Limitations.....	94
3.7.1	Issues of Validity.....	95
3.7.2	Issues of Reliability.....	96
3.7.3	Controlling for Common Method Variance.....	98
3.7.4	Ethical Considerations.....	100
3.8	Managing the Data.....	101
3.8.1	Missing Data Treatment.....	103
3.9	Statistical Analysis of the Model.....	104
3.9.1	Stem-and-Leaf Plot.....	104
3.9.2	Descriptive Statistics.....	105
3.9.3	Factor Matrix.....	106
3.9.4	Multivariate Correlations.....	108
3.9.5	Analysis of Variance (ANOVA).....	108
3.9.6	Moderated Multiple Regression Analyses.....	109
3.9.6.1	Outliers.....	110
3.9.6.2	Multicollinearity.....	110
3.9.6.3	Non-normality of the dependent and independent variables.....	111
3.9.7	Structural Equation Modelling (SEM).....	114
3.9.7.1	Measurement Model Analysis.....	115
3.10	Summary.....	117
CHAPTER 4 – RESULTS.....		119
4.1	Introduction.....	119
4.2	Sample Size.....	122
4.3	Missing Data.....	124
4.4	Descriptive Statistics.....	125
4.5	Demographic Variables.....	127
4.6	Factor Analysis.....	131
4.6.1	Core Self-Evaluations.....	132
4.6.2	Job and Life Satisfaction.....	135
4.6.3	Edinburgh Farming Stress Inventory (EFSI).....	138
4.6.4	General Health Questionnaire-12 (GHQ-12).....	145
4.7	Assessment of Normality.....	147
4.7.1	Examination of General Health Questionnaire-12.....	150
4.8	Correlation Analysis.....	154
4.9	Analysis of Variance (ANOVA).....	156
4.10	Hierarchical Multiple Regression Analysis.....	158

4.11	Structural Equation Modelling (SEM)	165
4.12	Summary of Key Quantitative Findings	171
CHAPTER 5 – DISCUSSION		173
5.1	Overview of the study	173
5.2	Stressors in farming	174
5.3	Strain in Farming	176
5.4	Stressor and Strain relationship	176
5.4.1	Gender and farming stress.....	178
5.5	The Role of Core Self-Evaluations	179
5.5.1	Core Self-Evaluations as a Moderator between Stressors and Strain Relationship	181
5.5.2	Core Self-Evaluations as a moderator between Strain and Satisfaction Relationship	184
5.5.3	The Moderating Effect of Core Self-Evaluations on Stressor, Strain, and Satisfaction Relationships	188
5.6	Theoretical Implications.....	193
5.7	Methodological Implications	196
CHAPTER 6 – Conclusion		199
6.1	Introduction	199
6.2	Implications for Policy and Practice	199
6.2.1	Implications for farm managers.....	200
6.2.2	Implications for farming organizations	203
6.3	Limitations of the Study.....	205
6.4	Recommendations for Future Research	209
6.5	Final Remarks	212
References.....		215
Appendix I		239
Appendix II		241
Appendix III.....		245
Appendix IV.....		247
Appendix V.....		249

LIST OF TABLES

Table 1: Percentage of Workforce in the Agricultural Sector in the Developed Countries ..5	5
Table 2: Differences between Quantitative and Qualitative Research.....79	79
Table 3: Advantages and Disadvantages of Cross-sectional Design versus Longitudinal Design.....81	81
Table 4: Sample Accessibility Approach for the Self-completion Questionnaire84	84
Table 5: Limitations and Delimitations in the Issues of Reliability.....97	97
Table 6: Limitations and Delimitations of Common Method Variance.....100	100
Table 7: Codes for Demographic Variables103	103
Table 8: Logarithmic transformation of the items113	113
Table 9: Responses by Sector124	124
Table 10: Mean, Standard Deviations, and Internal Consistency Reliability126	126
Table 11: Characteristics of Sample Distribution by Frequency and Percentage.....130	130
Table 12: Sample Distribution by Demographic Characteristics130	130
Table 13: Factor Loadings Principal-Component Factor Analysis (confirmatory factor analysis): Core Self-Evaluations Scale.....134	134
Table 14: Factor Loadings from Principal Axis Factoring: Job Satisfaction Scale136	136
Table 15: Factor Loadings from Principal Axis Factoring: Life Satisfaction Scale137	137
Table 16: Factor structure: Severity of stress141	141
Table 17: Stress Factors: Frequency142	142
Table 18: Factor Loadings Principal-Component Factor Analysis (confirmatory factor analysis): Edinburgh Farming Stress Inventory Scale144	144
Table 19: Factor Loadings from Principal Components Factoring (confirmatory factor analysis): General Health Questionnaire-12146	146
Table 20: Assessment of Normality148	148
Table 21: Results Assessment of Non-normality of Items150	150
Table 22: Internal Consistency Reliability and Intercorrelations156	156
Table 23: Intercorrelations between Demographic Variables156	156
Table 24: Results of the one-way analysis of variance tests for differences in age groups, gender, and farm type on strain.....158	158
Table 25: Moderated Regression Results for Core Self-Evaluations as a Moderator of Stressor-Strain relationship.....161	161
Table 26: Moderated Regression Results for Core Self-Evaluations as a moderator of Strain-Job Satisfaction relationship.164	164
Table 27: Summary of Goodness-of-Fit Indices.....169	169
Table 28: Values of Hypothesised Model171	171
Table 29: Summary of Hypotheses Testing.....172	172

LIST OF FIGURES

Figure 1: Structure of the Thesis	13
Figure 2: Hypothesised Theoretical Model	72
Figure 3: Structure of the Methodology	76
Figure 4: Overview of Analytical Pathway	121
Figure 5: Core Self-Evaluations as a Unidimensional Construct (Judge <i>et al.</i> , 1997).....	134
Figure 6: Box Plot of the General Health Questionnaire-12	152
Figure 7: Stem-and-Leaf Plot of General Health Questionnaire-12	153
Figure 8: The Relationship between Strain and Job Satisfaction as Moderated by Core Self-Evaluations.....	165
Figure 9: Empirical Test of the Structural Equation Modelling of the Hypothesised Model	170
Figure 10: Adapted from Karasek's Job Strain Model (1979, p. 288).....	191
Figure 11: Job Demands-Core Self-Evaluations Model.....	192

CHAPTER 1 – INTRODUCTION

1.1 Introduction

The agriculture sector contributes more than 53% of New Zealand's merchandise exports and, in 2006, generated 26% of New Zealand's Gross National Product (GNP) (Ministry of Agriculture & Forestry, 2007). Although the average size of a New Zealand farm is only 215 hectares, the sustainable growth of this sector has provided employment opportunities, created wealth and provides a good lifestyle for farm managers¹. However, the restructuring of agricultural economies globally, which began in the mid-1980s, imposed severe adjustment pressures on all farm sectors in various countries. Since 1984, the New Zealand agricultural sector has not been subsidized at all which has led to increased stress among farm managers and many bankruptcies (Wilson, 1995). As with the North American farm managers, New Zealand farm managers are experiencing one of the highest levels of occupational stress as a result of the current world economic crisis and the uncertainties in the markets (Lobley, Johnson, Reed, with Winter, & Little, 2004). Meanwhile, European farm managers are also encountering a period of significant socio-economic transition, largely as a result of the mechanisation of farming practices and the demands brought about by the Common Agricultural Policy (CAP) (Booth & Lloyd, 2000). Taken together, the impact of agricultural policy reforms, as well as market uncertainties, have been linked to increased injuries and illness, including occupational stress (Smith & Saunders, 1995).

¹ "Farm managers" refers to farm owners, or those who manage a farm that does not belong to them.

The proposed study will examine the job and life attitudes of New Zealand rural farm managers in order to understand the extent of occupational stress in the primary sector, and to determine whether farm managers who report positive core self-evaluations are more resilient towards stressors and, therefore, less prone to experiencing occupational strain and job dissatisfaction.

1.2 Significance of the Research

There is a need to understand how the farm managers' job and life on the farm are affected by the various stressors that cause emotional strain and illness (Pollock, Deaville, Gilman, & Willock, 2002). A review of the literature suggests that job and life stress can lead to serious mental health problems that have an immense impact on individuals (Fraser, Smith, Judd, Humphreys, Fragar, & Henderson, 2005).

Cooper, Liukkonen and Cartwright (1996) suggest that among the typical outcomes of stress are decreased job satisfaction and increased propensity for accidents and mental illness. The dissatisfied worker who is not adaptive to work conditions would experience greater physical and mental health symptoms than workers who have successfully adapted (Miller & Rosse, 2002). Understanding how New Zealand farm managers adapt to a range of stressors, such as government deregulation and unpredictable weather, is important in designing mental health interventions not only applicable for farming communities but also possibly for the general population.

Thus, the findings from this study will add to the existing knowledge as to how the characteristics of farm managers may provide a buffer against stressors and assist them to develop resilience. In addition, the findings could help individuals in their choice of career so that those with inappropriate personalities for farming are aware of its potential hazards.

Aside from gaining a better understanding of the role that personality may play in accommodating stress, the collection of empirical data on diverse sectors in the farming industry can be illuminating. Differences can be revealed between job demands which in many other respects are similar, and similarities in job demands which otherwise are different and, thus, help to reveal stressful issues facing farmers (Bean, 1995). Hence, the data will be useful to identify areas where these sectors can make improvements in understanding the ongoing impact upon New Zealand farmers' businesses and their well-being.

1.3 Research Problem

Occupational stress is a widespread problem that is costly and destructive at both individual and organizational levels (National Institute for Occupational Safety and Health, 2002). According to Burrow (2002), the negative impact of occupational stress on health and well-being is on the increase. As such, identifying workers involved at high risk of occupational stressors and strains has been the focus of attention among some researchers (Grant & Langan-Fox, 2007; Kinman, 2001). In addition, researchers have attempted to identify potential buffers that reduce the negative impact of stressors, thereby making workers more resilient (Bliese & Britt, 2001).

One of the reasons that occupational stress in the primary sector has been receiving so much attention is that it is causing billions of dollars of losses per annum to the New Zealand

economy. A study by Coggan, Fanslow and Norton (1995) estimates that the New Zealand economy loses the equivalent of NZ\$30,000 per person per year from loss of production due to injury². Every year, as much as 10 percent of GDP was reported lost in Western countries from the various effects of job stress (Arnold, Cooper, & Robertson, 1998). Further, the International Labour Organization (ILO) reports that the cost of stress-related illness and injury may account for approximately 2 percent of GDP per year in OECD countries (Hoel, Sparks, & Cooper, 2001).

Most recently, there has been growing recognition that farmers experience high levels of stress compared to their counterparts in the service or manufacturing sectors (Federated Farmers of New Zealand, 2006). Research also shows that farming in New Zealand is inherently more dangerous than other occupations as it entails coming in contact with heavy machinery and livestock as well as often working alone, frequently in isolated, rugged terrain (Morgaine, Langley, & McGee, 2006). Farmers also become stressed with their traditional farm work due to financial pressure, poor time management, lack of self-management skills, employee turnover, and the managing of inefficient workers (Tipples, 2005).

Over the last decade, among the developed countries, New Zealand has had the highest percentage of its workers employed in the primary sector (International Labour Organization, 2003; World Development Indicators, 2010). According to the International Labour Organization report (2003) and World Development Indicators (2010), the agricultural sector in New Zealand employs less than 10 percent of New Zealand's workforce and, even though the labour force engaged in agriculture has declined since the mid-1900s,

² Statistics New Zealand no longer produce an estimate cost of production lost to industry due to work-related injury, instead Accident Compensation Corporation reports all work-related claims of NZ\$518 million in the 2008/09 financial year (Anna McDowell, Statistics New Zealand, 2011).

Table 1 shows that, in the 2000s, New Zealand had the largest proportion of its workforce among the developed countries working in the agricultural sector.

Table 1: Percentage of Workforce in the Agricultural Sector in the Developed Countries

Country \ Year	NZ	AUS	CND	USA	UK	JPN	SWED	GER	ITAY	SWITZ
2007°	7.2%	3.4%	2.5%	1.4%	1.4%	4.0%	2.2%	2.2%	4.0%	3.9%
2006°	7.1%	3.5%	2.6%	1.5%	1.3%	4.3%	2.0%	2.2%	4.3%	3.8%
2005°	7.1%	3.6%	2.7%	1.6%	1.3%	4.4%	2.0%	2.3%	4.2%	3.8%
2004°	7.5%	3.8%	2.7%	1.6%	1.3%	4.5%	2.1%	2.3%	4.2%	3.8%
2001*	9.7%	4.9%	2.9%	2.4%	1.4%	5.3%	2.3%	2.6%	5.3%	4.2%
2000*	8.7%	4.9%	3.3%	2.6%	1.5%	5.3%	2.8%	2.7%	5.4%	4.5%

Source: °World Development Indicators (2010); *International Labour Organization (2003)

On a regular basis, farmers are exposed to a variety of physical, chemical, biological and psychosocial factors making it a hazardous occupation (Firth, 2001). Overseas studies have shown that psychological injuries and distress have been associated with increased rates of strain and job dissatisfaction (Burton *et al.*, 2005; Cooper & Bramwell, 1992). Moreover, this issue is not confined to New Zealand farmers, and there is emergent international interest in the impact of stress on farmers and the wider implications for their families and rural communities.

1.4 Occupational Stress in Farming

Farming is a complex way of living that creates stressful life conditions among farmers (Melberg, 2003). Occupational stress contributes not only to life stresses, but has an impact on health and, thus, on the quality of farm life experienced by farm managers (Pollock *et al.*, 2002; Walker & Walker, 1987).

Since the early 1980s, the study of occupational stress in farming has received increasing attention from researchers (Eberhardt & Pooyan, 1990; Schellenberg, Olson, & Fuller, 1985). Research involving farm managers has focused primarily on associations between the external environment and health outcomes such as depression, anxiety, and heart disease (Smith & Saunders, 1995). There is a large body of research related to stress among New Zealand farm managers (Alpass, Flett, Humphries, Massey, Morriss, & Long, 2004; Firth, Williams, Herbison, & McGee, 2006; Tipples, 2005).

Occupational stress is not the specific problem of one sector but pervades the whole agricultural industry, although some groups are better able to handle stressful situations (Lobley *et al.*, 2004). The National Institute for Occupational Safety and Health (2002) has reported that farm managers are in the top category of stress-related illness by occupational group. Further, Sayetta and Johnson (1980) reported stress-related symptoms are higher among farm managers than other occupational groups. They differ significantly from the rest of the workforce in regard to occupational health and safety issues (Hope, Kelleher, & Hennessy, 1999). Occupational stress pertinent to the New Zealand agriculture sector includes: (i) economic factors, (ii) adjusting to government regulations, (iii) labour shortage, (iv) effect of trade globalisation, (v) climatic conditions, and (vi) size of the farm.

1.4.1 Economic factors

New Zealand farm managers are involved in diverse types of farming, including dairying, horticultural, beef production, venison, forestry, feed grains and cropping. The economic circumstances in agriculture may well affect different groups of farmers at different times. Although these farming industries have different seasonal patterns, they are facing similar problems and circumstances throughout the country, such as industry restructuring and economic trends in the post-war era, and the deregulation of employment relations (Shadbolt & Martin, 2005).

Walker and Walker (1987b, 1988) found that stress levels vary among farmers who operate on different types of farms. For example, livestock farmers reported significantly higher stress compared to crop farmers. In addition, the financial status of farmers varies across sectors due to the impact of the world economy (such as competitive global markets and high interest rates) (Olson & Schellenberg, 1986; Reynolds & Moore, 1990). More recently, the impact of the global recession has reduced profits in the dairy industry, whereas the beef/sheep industry reports a higher profit (Hembry, 2009). Further, the simultaneous shifts in macro-economic policy have a direct impact on farm manager income, such as carbon tax, compliance costs, increasing user-pays charges, research and development policy and border security (Horticulture New Zealand, 2010).

1.4.2 Adjusting to government regulations

According to Booth and Lloyd (2000), occupational stress may be predicted to continue in the foreseeable future due to the continuing changes in farming practices which are influenced by government deregulation and the external environment. The primary

industry sector in New Zealand has changed significantly in terms of deregulation of the agricultural sector and as a result of the wider economic reforms introduced since 1980 (Wilson, 1995). Changes in government policy regarding sustainability have had a major impact on the process of restructuring in the rural sector. Since 1984, New Zealand farmers have been exposed to the full force of free market conditions, as well as substantial changes in government policy (such as environmental law), and the removal of subsidies (such as fertilizer and pesticide subsidies). Subsequently, the New Zealand farm manager has shown significant physical and emotional symptoms related to these changes in circumstances and the simultaneous shifts in macro-economic policy (Smith & Saunders, 1995). Further, the burden of compliance with the Employment Relations Act, 2000, enacted to provide better conditions in the rural labour market, can also be a real problem, especially when employing students to overcome labour shortages (Tipples, 2005; Tipples & Martin, 2006).

1.4.3 Labour shortage

Since the demand for workers fluctuates in almost all agricultural sectors, a genuine skill shortage occurs when the farm managers are having considerable difficulty in finding workers to work on the farm, coupled with insufficient job seekers (Baker, 2002). Skill shortages can incur a high cost to the economy because they constrain the output of agricultural production. The availability of labour is most stressful among the farm managers during the peak of the picking or cropping seasons, for instance, because employing the right people at the right time ensures that returns are maximized (Tipples, 2001). Further, these sectors have trouble in recruiting and retaining labour because of the generally poor remuneration and employment practices, which make some less-skilled jobs unattractive

(Baker, 2002). In contrast, employers who possess positive attitudes towards their staff experience lower staff turnover and improved job satisfaction (Tipples, 2001).

1.4.4 Effect of trade globalisation

Legislation and regulation by government has also been found to interfere in the daily farm work and can increase farmers' workloads (Swisher, Elder, Lorenz, & Conger, 1998). Like other self-employed managers, farm managers can be isolated in their work with long working hours. Their social contact and business knowledge is crucial to remaining solvent in the face of declining terms of trade in export, and the supply constraints of world trade and worldwide competition (Brenmuhi, 2007; Burgess, 2007; Lawrence & Vanclay, 1993).

The increasing globalisation of the New Zealand economy means that farm managers are now more economically exposed to events taking place in other countries. Globalisation has meant increased competition as well as more opportunities for the New Zealand farming industry. The successful farm businesses are those that can best adapt in response to the competition and changes in the world economic situation. Those who react negatively to changes in the competitive environment will experience distress in the form of anxiety and depression, decreased job satisfaction, and reduced job performance (Collins, 1998).

The trade globalisation that farm managers will have to deal with in the future will increase the need for diversification in farming, leading to another potential source of strain on farm managers' mental health. To be a good producer, farm managers will have to be specialised and motivated to produce the most profitable products. A high level of capital is necessary to expand. For these reasons, there has been huge investment in automation and robotics in the horticultural industry where it is essential for growers to achieve economic

sustainability. This could advantage the affluent customers in less-developed markets and, thus, contribute to future earnings for the horticultural industry (Horticulture New Zealand, 2008).

1.4.5 Climatic conditions

The four trends discussed (economic factors, adjusting to government regulations, labour shortage, and effect of trade globalisation) are magnified by some of the other possible sources of stress, such as the weather. Weather is an uncontrollable event. The advent of bad weather during the peak production season may have a major impact on the success of a business (Deary, Willock, & McGregor, 1997). For example, drought-stricken Hawkes Bay and Waikato farmers were reported to have experienced increased states of emotional distress (Anderson & Gerbing, 1988; Pedersen, 2007). Again, in 2008, the farming community was reported to be in crippling drought conditions in addition to a serious shortage of stock feed for cows and sheep. The resulting downturn in dairy production is estimated to cost dairy farm managers half a billion dollars (Fonterra, 2008). Similarly, in the horticultural industry, ideal harvesting weather and suitable temperatures for growth in fruit and vegetables are the most important requirements for success (Thorn, 2010).

1.4.6 Size of the farm

The New Zealand agricultural sector is more dominated by smaller, family-owned farm businesses than in most other countries. As self-employed workers, they are at greater financial risk than employees (Cryer & Fleming, 1987). A large number of New Zealand

small farms are managed by family members, and farm workers are normally not employed to overcome the labour shortage in the dairy, sheep, and cattle sectors. For example, in the period 1994-2002, strong growth in the national dairy herd resulted in the average dairy farm increasing in size from 102 to 146 hectares. There were 14,000 farms engaged in dairy cattle farming in 2002 and they occupied 2.1 million hectares of land. Horticultural farm sizes increased by 95 percent from 1994, reaching an average farm size of 18.4 hectares in 2002. Total land area occupied by fruit, flower and vegetable growers was 231,580 hectares in 2002 (New Zealand Department of Statistics, 2005). Overall, the size of horticultural farms has increased by 95 percent, and by 43 percent for dairy and cattle farms. Since most farm managers are also the owners in New Zealand and are usually sole proprietors, they frequently suffer from stress. However, the effects of stress on those working in the agricultural sector have traditionally been overlooked or minimized. The farm managers who own relatively small farms experience greater stress and they are at a greater risk of suicide than the large farm entrepreneurs (Hawton, Fagg, Simkin, Harriss, Malmberg, & Smith, 1999). Little research has been done on the effects of stress on New Zealand's small-to medium-size farm owners. The experience of stress is especially problematic as most farm managers who own farms, employ few staff, thus requiring them to work harder. In essence, the primary responsibility for running the entire farm rests on the shoulders of the farm owner/manager. Thus, farm owners require a unique way of working on the farm with a leadership style different from that of the managers of large firms and organizations. Many farm managers perceive their managerial role as a life-style, rather than as an entrepreneur leading and controlling a firm (Olsson, 1988).

Recent research has found that certain personality factors can act as buffers for farm managers against stress-related symptoms (Judd, Jackson, Fraser, Murray, Robins, & Komiti, 2006). Thus, inclusion of the disposition construct is essential in occupational stress research, as it maintains that external events can influence an individual's appraisal of both his/her job and life in general (Best, Stapleton, & Downey, 2005). In addition, the proposition that personality factors moderate the effects of stressors and strain is important in order to understand *why* an individual manifests symptoms of stress in a specific work environment (Smith & Tziner, 1998). Likewise, work environments affect different individuals in different ways, and, if personality factors were shown to moderate the effects of work stressors, this would have important implications for work and health (Fletcher, 1989).

Hence, this study examines the ability of core self-evaluations in moderating the link between stress and the dependent variables. Core self-evaluations is a broad personality trait comprised of four lower-order traits: self-esteem, generalized self-efficacy, locus of control, and emotional stability (Judge, Erez, Bono, & Thoresen, 2003). The individual core traits have effects on one's behaviour and attitudes toward work (Johnson, Rosen, & Levy, 2008). Although previous research has identified various contextual effects of core self-evaluations, relatively few attempts have been made to gather a more psychosocial perspective on the etiology of the emotional states of New Zealand farm managers.

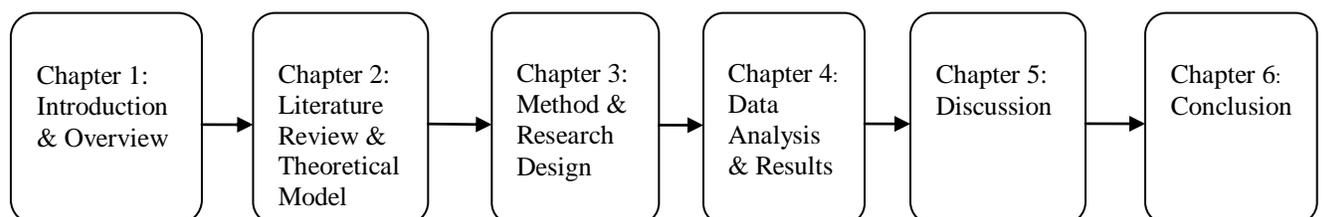
This study seeks to accomplish two objectives. The first objective is to develop and test a psychological model to understand the attitudes and personality of farm managers in the farming community. In particular, this study will examine the extent of occupational stress in the primary sector. Second, is to determine whether farm managers who report

positive core self-evaluations are more resilient towards stressors and, therefore, less prone to stress and more satisfied with their life and job on the farm.

1.5 Organisation of the Research

The organization of the study is shown in Figure 1 below. Chapter 1 presents a problem statement and the background of the study, including a general overview of occupational stress in the farming sector. This chapter reveals the importance of this study. Chapter 2 reviews the importance of theoretical concepts drawn from the relevant stress-strain and job-life satisfaction literature which informs the research. The impact of stressors is discussed, as well as the rationale behind the inclusion of job stress, job-life satisfaction, and core self-evaluations in the network. Additionally, the relationships between the specific dispositions of core self-evaluations are explored in more detail. Further, a theoretical framework linking the effect of core self-evaluations on the stressor-strain and strain-job satisfaction relationship is discussed. Chapter 3 presents the method and research design developed for this study to test these relationships. Chapter 4 sets out the data analysis and results. Chapter 5 provides a discussion of the overall research findings and presenting models developed from the research. Finally, Chapter 6 draws conclusions and setting out implications for both research and practice.

Figure 1: Structure of the Thesis



CHAPTER 2 – LITERATURE REVIEW

Chapter 2 reviews the literature on strain, stressors, job and life satisfaction research with a view to highlighting specific underdeveloped areas which the present study is designed to address. There is a large body of literature related to stress in general, but there is a limited body of research on how it relates to occupational stress in farming.

Discussion in this section is intended to establish the nature of job stress and to understand the impact of job-induced stress on workers. Also discussed are traditional models of life and job satisfaction, the impact of stressors on strain and the impact of strain on job satisfaction, as well as the importance of core self-evaluations. Next, the literature relating to moderating variables of personality traits on stressor-strain, and on strain-job satisfaction relationships is reviewed. The chapter concludes with the introduction of an expanded integrated psychological model of New Zealand farm managers.

2.1 The Nature of Job Stress

Since the early nineteenth century, researchers have developed a range of definitions of stress. “Stress” is a term that is widely used and is not easily defined. The classical definition of stress is “... a state of psychological and physiological arousal in response to some stimulus perceived by the individual as threatening” (Selye, 1976, p.16). This response is associated with strain where it has a potentially harmful effect on individuals (Kahn & Quinn, 1970). Strain is observable when the individual experiences distortion in the cognitive (such as impaired memory), behavioural (such as avoidance), physical (such as cardiovascular disease) and psychological domains (such as low self-esteem) (Kinman,

2001). Further, different kinds of stress have been linked to the work environment. Thus, there are no two individuals who respond in a similar manner to a stressful stimulus and their response may change over time in the work environment (Sulksy & Smith, 2005).

Based on an approach by Vila (2001), stress is defined as the sustained activation and continuous responses of the brain's defence motivational system that can result in a poor physical state and mental strain. Early research on job stress primarily focussed on the physical environment where it has a significant impact upon individuals. Within the workplace environment, specific work-related and organisational factors can increase health and safety issues in stressful surroundings. Workers have a tendency to experience long-term health-related effects when they are exposed to risks and hazardous environments (Bohle & Quinlan, 2000; Devereux, Rydstedt, Kelly, Weston, & Buckle, 2004; Spector & Jex, 1998). For example, farm managers may be exposed to work-related injury due to the nature of their work and their heavy workload (such as handling heavy machinery or piloting a helicopter to spray insecticide on a large orchard or farm) which could result in some degree of psychological distress and illness. In fact, farmers' health outcomes have received much attention in the stress literature, due largely to increasing health care costs (Morgaine *et al.*, 2006).

According to Beehr and Newman (1978), job stress is a condition arising from the interaction of people and their jobs, and is characterised by changes within people that force them to deviate from their normal functioning. This definition is best understood by considering that the body and mind of a person are in a state of equilibrium at the outset of a job experience but, as a result of an occurrence related to work, the person's equilibrium can

be disrupted. In attempting to recover from this disturbance and imbalance, the person functions differently.

Similar to Beehr and Newman's (1978) perspective, other researchers have defined stress as an individual stimulus-response approach (McGrath, 1976; Quick, Horn, & Quick, 1987). McGrath (1976) defined stress as a result of the individual's interactions between environmental stressors that may affect the individual response to his/her psychological condition. If these environmental stressors persist over time, long-term or chronic undesirable outcomes in the form of psychological strain may result (Sulksy & Smith, 2005). In self-reported occupational stress, Jex, Beehr and Roberts (1992) found 245 employees interpreted stress as strain or reactions to their work environment.

Thus, it would seem that the various definitions offered by researchers differ semantically although their meaning is basically similar (Jex, Beehr, & Roberts, 1992; O'Driscoll & Cooper, 1996). In this light, Beehr (2001) and, Cooper, Dewe and O'Driscoll (2001) unified these views of stress by simply suggesting that "stressors are stress-producing events ... strains are the individual's response to stressor stimuli that are deemed harmful to themselves ... and stress is a more general term describing situations where stressors and strains are present" (Beehr, 2001, p. 6), contributing to an overall meaning of stress. Therefore, stress can be described as an overall dynamic process incorporating the function of stressor(s), psychological appraisal, short-term stress outcome(s) (such as a stomach upset), characteristics of the individual and long-term outcomes or strain (Sulksy & Smith, 2005). Thus, for example, if farm managers learn that their crops were destroyed by a severe flood, they may experience a short-term increase in blood pressure (physiological outcome) and later become anxious (psychological outcome), and find it difficult to focus on their farm

work responsibilities. Consequently, they may begin to experience longer-term outcomes such as serious illness. However, the farm managers' stress responses and outcomes may depend on his or her personal and situational characteristics, such as age, type of farm, and gender. From a practical stand point, stress is viewed as complex phenomena composed of the individual appraisal of the external stimuli or stressors, which can lead to undesirable outcomes, depending on the contextual and personal factors.

The earliest breakthrough in experimental research on stress was conducted by Hans Selye (1956) when he developed his theory of the "general adaptation syndrome" or GAS (p. vii). Selye suggests the human body is exposed to three stages of physiological stress responses in the continuous changes of the external environment, which are alarm reaction, resistance, and exhaustion. When confronted with stressful situations, individuals either fight or flee depending on the nature of the situation, which Selye called the alarm stage. It is at the resistance stage that an individual body may recover from the physiological strains of the fight or flight response and return to its pre-alarm state (Selye, 1976). However, there is a health risk if sympathetic nervous system reactions are maintained for long periods resulting in the exhaustion stage. However, with constant exposure to changes in the external environment, individuals are continually exposed to potential stressors. Research has shown that the relatively simple model of GAS is complicated with many intervening variables (Holt, 1993). For example, individual responses to environmental stressors depend on the number and strength of the stressors encountered and the individual's cognitive appraisals. If the individual views the situation as being irrelevant, no stress appraisal will result. The threat appraisal will occur when the individual perceives that his or her ability to cope with the demands of the situation is inadequate (Lazarus, 1990).

The development of stress theories by Selye and Lazarus have diversified. The researchers have assessed stressful life events as well as the benefits of stress from individuals' psychological perspectives. In fact, Selye's contribution to stress research is explicitly regarded as increasingly important in the diverse occupational realm (Theorell, 2003). Like Selye (1976), Pulkkinen (2002) suggests that experiencing stress can lead to the development of various overt and covert maladaptive behaviours. Maladaptive behaviour occurs when there is an accumulation of risk factors, where the individual would be vulnerable to negative outcomes that occur under high-risk conditions. In the workplace, maladaptive behaviours could result in decreased productivity and a lower sense of well-being (Kendall, Murphy, O'Neill, & Bursnall, 2000).

While we normally consider stress to be harmful, Weick (2001) argues that the effect of stress on performance is curvilinear. Whilst work may sometimes result in a stress effect for some workers, it may also have a positive effect on health. For some workers, an increase in stress leads to improved task performance. Similarly, Selye (1976) and Quick *et al.* (1997) argue that stressful job demands or work circumstances lead to "eustress", which is the positive and healthy effect of stress. Although the physiological effects of eustress and distress are similar, eustress has been found to be a positive motivating force (Selye, 1982). The positive aspect of stress suggests that stress can serve a constructive purpose in the working environment to enhance job performance, work motivation, development, and stimulate creativity. At optimal levels of stress, a change in stress has no effect on an individual's performance. If stress continues to increase, performance begins to deteriorate. Further, Harvey and Drolet (1995) acknowledge "the importance of a moderate amount of

stress as a progenitor of ideas and possibilities” (p. 22). Positive and negative responses can occur simultaneously as a result of the same demands.

Individuals differ in their ability to handle stressful situations (Tugade & Fredrickson, 2004). Some can overcome stress, while others become incapacitated (Flett, Biggs, & Alpass, 1995). Tugade and Fredrickson noted that “cognitive broadening” may be shaped by significant events experienced in the formative years of life (p. 366). Individuals who possess a positive outlook which provides pleasant subjective experiences are capable of handling stressful encounters by demonstrating a concept known as resilience. Werner (1993) reports that resilient individuals are able to manage multiple risk factors in many situations. Resilience refers to healthy individuals who are competent in coping with risk and are apparently successful. Masten (2001) considers resilience as “an ordinary rather than extraordinary process which offers a more positive outlook on human development and adaptation” (p. 231).

To summarise, the stress process is rather complex, but perspectives from various researchers are very similar (Beehr & Newman, 1978; Cooper, Dewe, & O'Driscoll, 2001; McGrath, 1976; Quick *et al.*, 1987; Sulksy & Smith, 2005). In fact, stress is not detrimental to many aspects of an individual's work-life, depending on the diverse contextual and personal factors. Specifically, individuals differ in their ways of handling stress when confronted by environmental stressors. When individuals perceive stressors as a threat, they are likely to demonstrate maladaptive behaviour and stress-related illness.

2.2 Model of Occupational Stress

Stressful work activity has been associated with specific occupations. Any type of occupation has been found to cause some negative effects on workers, but certain work activities are more likely to be more stressful than others (Koslowksy, 1998). Early research on stressful occupations mainly concentrated on policing and nursing, and viewed stress as a simplistic causal relationship between stressor and strain. Recently, there have been attempts to expand the research on occupational stress to include other industries and incorporate other disciplines (Lo & Lamm, 2004). The stressor measurement found in most of the literature concerns job stressors among employees in an organization. These studies focus on employed staff in a range of occupations, such as in universities, churches, factories and schools (Chen & Spector, 1991), as well as fire and police employees (Schaubroeck, Ganster, & Fox, 1992), and academic staff (Kinman, 2001).

These numerous studies on work-related stress provide a broader understanding of occupational stress and its consequences. One of the main issues in occupational stress research is concern with the way individuals' protective factors (such as personality and coping styles) attempt to deal with stressors in order to avoid the effect of psychological strains (Beehr, Johnson, & Nieva, 1995). There are three models of occupational stress put forth to describe the psychosocial effects of work environments: the Simmons and Nelson Holistic Stress Model (2007), Karasek's Job Strain Model (1979), and Beehr and Newman's (1978) model of the Structure Dimensions of Job Stress.

2.2.1 Holistic Stress Model

Simmons and Nelson's (2007) Model of Holistic Stress incorporates an illustration of how the effects of work stressors or demands result either in positive or negative responses. These responses will ultimately affect individuals' performance at work and health outcomes. Further, Simmons and Nelson (2007) outlined the central principles of the model as follows:

- i. The stressors or demands are inherently neutral. However, when individuals encounter stressors, they will evaluate the threat with respect to its significance for their well-being.
- ii. The individuals' perception of the specific events or situations creates the potential for both challenge and constraint, which simultaneously leads to positive or negative responses.
- iii. Negative or positive responses toward stressors are manifested in the form of psychological and behavioural indicators. For example, in an unhealthy working environment, employees may experience increased job dissatisfaction and reduced levels of performance.
- iv. Individuals' personality traits affect the way in which stressors are cognitively appraised. The personality traits moderate the stressors and responses relationship. In a similar manner, the stress outcomes depend on the individual evaluations of the stressors and not the inherent characteristics of the stressors. For example, individuals with low self-esteem may manifest more negative responses when exposed to stressors. Conversely, the same demands may elicit a more positive response for

individuals with high self-esteem. Individuals will eliminate or alleviate their negative responses by coping or reinforce their positive responses toward the stressors.

- v. Individuals' work outcomes depend primarily on the potentially interactive nature of their positive or negative responses towards the stressors.

Simmons and Nelson's (2007) Holistic Stress Model offers considerable value to the understanding of work stress, which provides a balanced view of the positive and negative responses from the effect of the demands. Recent research has shown that the Holistic Stress Model may offer the opportunity to understand the significant impact of positive and negative responses as a buffer between individuals' attitude and performance (Simmons, Gooty, Nelson, & Little, 2009). For example, managers can provide mentally distressed employees with critical resources, such as training and development for achieving better performance.

2.2.2 Job Strain Model (Job Demands-Control Model)

Robert Karasek's (1979) Job Strain Model of occupational stress is based upon the concept that mental strain is the result of the interaction of psychological demands and the personal control required to meet the demands of the job. Strain is highest when job demands are high and job control is low. Conversely, growth and development occur when job demands and job control are high. Further, an individual who has no personal control may not experience psychological strain but may lose interest in working activities during periods with low job demands. The job demands are psychological stressors present in the work environment, such as the perceived need to work fast and hard. In the Job Strain Model, a

high demand job coupled with an individual who does not have the capacity to make decisions and is unable to perform a variety of skills will lead to a state of psychological strain. Hence, the framework of job demands and control will predict the level of psychological strain and the risk of physical illness (Karasek & Theorell, 1990; Kristensen, 1996). Karasek (1979) demonstrates that individuals with less job control will experience symptoms of ill-health, such as coronary heart disease and hypertension, from the high demands at work. Evidence demonstrating that control in the workplace is associated with health consequences has come from several survey studies (Ganster, Fox, & Dwyer, 2001). Conversely, individuals are motivated to perform extremely well under the condition of high control and demands. For instance, orchardists are motivated to work harder if a range of skilled workers (high job control) are available to prune, harvest, and pack the fruit during the peak season (high job demands). They believe they have control which determines their affective responses, such as job satisfaction and strain.

In effect, strain results from a mismatch between the demands of a job and the personal abilities of individuals to perform (Lazarus & Folkman, 1984). Strain is an unpleasant outcome that may result in negative consequences that include poor physical health, mental health problems, bad behavioural symptoms and lowered productivity (French, Caplan, & Van Harrison, 1982; Koslowksy, 1998). According to this theory, individuals who work in a highly demanding environment with low personal control over their job-related activities, experience negative effects and psychological and physiological outcomes. However, too much control can be damaging for the individual, just as too little control is harmful. Similarly, increased control in one's job may imply additional responsibility for outcomes and, for some individuals, increased responsibility may be a

burden rather than a challenge (Spector, 1998). According to Xie, Schaubroeck and Lam, (2008), typical job demands or stressors are constituents of the complexity and size of the workload perceived by workers, whose workloads are supervised by their superiors. Hence, there was considerable support for the Job Strain Model, where control buffers the negative effect of demands which may lead to strain (De Lange, Taris, Kompier, Houtman, & Bongers, 2003).

However, despite the fact that Karasek's (1979) Job Strain Model has provided a theoretical basis for understanding the field of occupational stress, it has received criticism. Numerous studies failed to prove the validity of this theory in the workplace. For instance, job control was found to be insignificant in repetitious or monotonous work (Karasek, 1979) or skill utilisation (Sauter, 1989). There is little evidence of an interactive effect between job demands and job control, as predicted by the model (De Rijk, Le Blanc, Schaufeli, & De Jonge, 1998). Interestingly, Sulksy and Smith (2005) suggest the conceptually narrow Job Strain Model "represents perhaps a promising area of contemporary research" (p. 39). In fact, according to Cooper *et al.* (2001), the moderating effect of personal control in the Job Strain Model is based in the stressor-strain relationship.

Despite the criticisms of the Job Strain Model, it continues to contribute to much contemporary research and practice. First, the most fruitful research on the extension of the Job Strain Model is the effect of efficacious individuals. Schaubroeck, Jones and Xie (2001) demonstrate that job demands are positively related to ill-health among high self-efficacy individuals who perceive low control. However, low self-efficacy individuals who perceive high control and experience high job demands will suffer illness. They also experience compromising of their immune system. Second, Karasek's Job Strain Model has been

expanded to include social support (Johnson & Hall, 1988; Theorell, 2003). According to this theory, depending on the level of social support, individuals whose jobs are high in demands and low in control are likely to report varying levels of health symptoms. Specifically, Johnson and Hall (1988) predicted that increased control buffers high demands most effectively under conditions of high social support. However, it is still unclear whether the measure of social support applies to perceptions of support levels or to actual contextual differences in support, or both.

One of the major reasons for inconsistency of social support as a moderator is the methodology in testing the job demands and control model in predicting strain (De Lange *et al.*, 2003). Furthermore, different major variables have been used to test the model (such as, job demands, control, and strain). Specifically, Karasek (1979), Karasek, Triantis, & Chaudhry, (1982), Parkes, Mendham, & Von Rabenau, (1994), and Landsbergis, Schnall, Deitz, Friedman, & Pickering, (1992) have used a variety of ways to measure job demands, control, support and strain to draw conclusions about the validity of the job strain model or job demand-control-support model. Second, researchers have attempted to reduce this consistency by adding third variables to the model. To address the problem of inconsistent findings on the “buffering effect”, Demerouti, Bakker, Nachreiner, and Schaufeli, (2001) proposes the job demands-resources model to broaden the job strain model (Karasek, 1979) and the demand-control-support model (Johnson & Hall, 1988). The model includes the dependent measures which focus on psychological health, in the form of burnout. More specifically, the model is designed to understand the negative outcomes or strains when the specific forms of resource and specific forms of job demands are misaligned in a working condition. For example, an individual who is working in an environment with high job

demands environment such as high physical workload with low job resources such as low social support may be experiencing job strain. Finally, the job strain model has failed to recognise the differences that exist in the makeup between different types of jobs (Van Der Doef & Maes, 1999). A significant interaction between high job demands and high control was found to lead to more satisfaction in the health care service, but not in other professions (de Jonge *et al.*, 2000). This may be particularly important for the farming sector since the model was developed to assess stress in the human service sector.

In summary, the job strain model appears to be static and over simplistic which focuses on two dimensions of the work environment: job demands and job control. Thus, researchers have explored further the variations of the Job Strain Model by including either additive or interactive influences of job characteristic (such as social support), and dispositional characteristics (such as personality traits) (Demerouti *et al.*, 2001; Parkes, Mendham, & Von Rabenau, 1994; Tetrick & LaRocco, 1987). The Job Strain Model has incorporated a new perspective on social support to explain the work control and health relationship (Theorell & Karasek, 1996). Although previous research was directed towards conceptual expansion of the Job Strain Model to include personality traits (such as self-efficacy), it has failed to provide convincing results (Jimmieson, 2000). In the light of these findings, it is suggested that the interactive effects of other personality traits be established and developed in the Job Strain Model.

2.2.3 Structural Model of Job Stress

Beehr and Newman (1978) categorised the Structural Model of Job Stress under four main dimensions of potential work stressors (Trenberth & Dewe, 2006). Environmental stress comes from the individual work environment. Individuals may normally respond to the social-psychological and organisational aspects of the environment without being cognitively aware of the consequences. As such, they may interact via cognitive processes of the mind to produce fatigue/strain that lead to lower productivity. The four main dimensions of work stressors identified by Beehr and Newman (1978) are:

- i. An individual's role demands and expectations (role overload and role conflict).
- ii. The job demands and characteristics of the task (work schedule and workload).
- iii. The organisation's characteristics and conditions (size of the organisation and hours of work), and
- iv. The organisation's external demands and conditions (weather), government laws and regulations, geographic location of the organisation, technological and scientific development.

The various demands of the environment may lead to stress because of individual's different perceptions. McGrath (1976) supports Beehr and Newman's dimensions of stress as a very effective process in understanding work stress:

The potential for stress is when an environmental situation is perceived as presenting a demand which threatens to exceed the person's capabilities and resources for meeting it, under conditions where they expect a substantial differential in rewards and costs from meeting versus not meeting demand (p. 1352).

Along similar lines, Sulksy and Smith (2005) identified macro-level work stressors and micro-level work stressors. Sulksy and Smith categorized the work stressors in terms of occupation, work roles, organisational environment covering the interaction effects of environmental stressors, and health issues, and contemporary sources of stress covering technology development and work-family conflicts. These different work stressors have different impacts depending on the individual's experiences and how they perceive them. Individuals differ in their experience and expectation of work stressors and may adapt differently to circumstances. Those unable to adapt to stressors experience certain levels of stress that may lead to psychological strain and/or poor health outcomes.

As evident in this section, all the variables used in the models can be divided into two theoretical frameworks: an epidemiological model and a cognitive model. The model has been developed to assess the role of situational influences or individual influences. The social support plays an important role as a moderator of the job demands-control-support model in cross-sectional studies. Relatedly, the individual differences could have an impact on perceptions of job demand which is not taken into account in the Job Strain Model (Kain & Jex, 2010; Van Der Deof & Maes, 1999). This suggests that personality characteristics could moderate the relationship between stressors and strain, which is in relation to psychological well-being in the workplace.

Overall, the Holistic Stress Model, Job Strain Model, Job Demands-Control-Support Model, Job Demands-Resources Model, and the Structural Model of Job Stress have been included in this study because this theoretical conceptualisation of occupation stress is relevant to understanding the complex nature of job stress in the farming industry and its implications.

2.3 The Impact of Stressors

Research on work stressors has been built on structural stress models which emphasise the influence of environmental factors that have the potential to cause strain on individuals in the workplace. For instance, organisational and environmental factors or stressors, such as excessively high work demands, have been widely-recognised as contributors to ill-health (Bohle & Quinlan, 2000; Devereux, Rydstedt, Kelly, Weston, & Buckle, 2004; Spector & Jex, 1998).

Many researchers have attempted to link stressor, strain, and health-related symptoms in order to understand the assessment of job stress (Hurrell, Nelson, & Simmons, 1998; Smith & Tziner, 1998). Consistent with job-stress literature, significant correlations are found between stressors and strain ($r = .30$) (Chen & Spector, 1991; Semmer, Zapf, & Greif, 1996), and a reciprocal relationship has been found in a longitudinal study (Kohn & Schooler, 1982). In addition, strain is demonstrably a negative response to stressors (Beehr, Jex, Stacy, & Murray, 2000; Jex *et al.*, 1992).

According to Koslowsky (1998), stressors are classified into three groups: (i) individual, (ii) group/organisational, and (iii) extra-organisational:

- i. Viewed as a *subjective stressor*, when he/she is not capable of controlling the task. It is related to the individual's cognitive and emotional processing. There is likely to be considerable individual variation in perceived stressors from the impact of the environment. In fact, the individual stressors classification is part of Karasek's Job Strain Model. Conversely, the *objective stressor* is not related to one specific individual's perception, but to the physical and social characteristics of the environment. As Frese & Zapf (1988) noted, "the objective stress situation has to be perceived in order for it to have a psychological effect on the individual (although it does not necessarily have to be conscious and reportable" (p. 378). For example, a farm manager's perception to react swiftly to save livestock from a flash flood on the farm.
- ii. Individuals may experience stressful situations at the *group or organisational level*. For example, when there is a change in organisation structure and working conditions due to trade globalisation, the individual may experience a stressful situation. For instance, farming institutions may introduce new technology to their members to increase farm output so they can compete with their overseas competitors.
- iii. *Extra-organizational stressors* refer to environmental stimuli in the workplace and in the general environment. For example, weather is particularly prominent for successful farming. The degree of stress generated by unpredictable weather is dependent on individual assessments of this event. When this stimulus exceeds the threshold value, the individual is likely to experience stress and possibly a negative strain response.

As noted, the determinants of strain are environmental factors as well as individual factors (Cooper *et al.*, 2001). In the work place, the sources of stress are the demands, interpersonal demands, physical demands, workplace policies, and job conditions (Quick, Quick, Nelson, & Hurrell, 1997). However, different studies have used a variety of organisational factors to assess stressors, including organisational demands (such as work conditions) (Sutherland & Cooper, 1990), extra-organisational demands (such as work-family balance), and, to a lesser extent, the characteristics of an individual (such as age) (Alpass *et al.*, 2004).

Fletcher (1991) suggests that stressors are the source of non-work and work-related stress that influence mental and physical health outcomes. There is evidence that individuals experience several stressors concurrently from the individual effects and the impact of job-related environmental factors (Cooper *et al.*, 2001). For instance, a farm owner may simultaneously experience geographical isolation (perhaps due to lack of interaction with the neighbours) and other stressors, such as time pressure (due to lack of farm workers to help) and unpredictable weather (such as drought and flood). The combined impact of these stressors leads to physiological, psychological, and/or behavioural outcomes that may affect an individual's well-being and his/her job performance (Cooper *et al.*, 2001; French *et al.*, 1982). Furthermore, if the behavioural outcome is in the form of behavioural strain, it may "impose substantial costs on work organisations, and their effects are manifest both on the job and away from it" (Kahn & Byosiére, 1992, p. 610). This form of strain may not necessarily be influenced by work-related stressors. Other factors such as off-the-job stressors and even dispositional tendencies may operate in an individual's life (Cooper *et al.*, 2001).

Frese and Zapf (1988) described several plausible patterns of change in the effect of stressors in the work environment. Since objective stressors are not influenced by an individual's cognitive and emotional processing, they are not conceptualised to cause a stress-reaction. On the other hand, subjective stressors involve the psychological processes of an individual's perception and self-appraisal of the situation. Therefore, the perceived stressors are seen to be stressful and can cause strain, if they exceed the individual's capacities or are threatening or aversive. For example, in a study by Moyle (1995), strain has been found to be significantly associated with organisational stressors, such as perceived workload. The perceived workload is the difference between perceived and actual demands, depending on an individual's assessment in their environment. The work environment may lead to strain if a stressor is perceived as a threat, but another individual may perceive it as a challenge (Cooper *et al.*, 2001). As Koslowsky (1998) argues, "the person's perception of the situation is the stressor and their response is a reaction to this stressor" (p. 34).

Taken together, stress research has typically conceptualised objective or subjective stressors to understand work situations experienced by individuals. When individuals are exposed to stressful working conditions, these conditions are perceived and finally they exhibit strain. As noted, perceptions are an important component of most occupational stress theories (Spector & Jex, 1998). An individual's perceptions of a demanding situation are essential in the study of the stress process, and this study has emphasised the use of self-appraisal by individuals. As subjective stressors involve the cognitive processes of individuals, the impact of stressors is derived for the individual's self-appraisal of the situation.

2.4 Stress, Stressors, and Strain in Farming

2.4.1 Stressors³ in farming

Farm managers encounter government regulations, poor weather conditions, fluctuating yields, uncertain economic events, crop and animal diseases, accidents, long hours of hard physical labour, production fluctuations that affect supply-demand and family problems, which are all stress producers in farming (Deary *et al.*, 1997; Page & Fragar, 2002). However, the three consistently cited farm stressors in the literature are isolation, government bureaucracy, and financial pressures (Lobley *et al.*, 2004).

In the early 1980s, the study of stressors in farm environments began to receive attention from researchers (Eberhardt & Pooyan, 1990; Schellenberg *et al.*, 1985). The lack of sources of job stress instruments has led Deary *et al.* (1997) to construct their own farm stress questionnaire. By using some of the stressor items from the Walker, Walker, and MacLennan (1986) study and the Eberhardt and Poonyan (1990) study, Deary and his colleagues constructed the Edinburgh Farming Stress Inventory (EFSI).

EFSI examines job-related stress among farmers including geographical isolation, unpredictable factors, farming bureaucracy, finances, personal hazards, and time pressure. Three-hundred-and-eighteen British farm managers reported the highest incidence of stressors is associated with complying with and adapting to governmental regulations. The assessment of both the severity and frequency of occurrence will capture the total impact of stressors among the farm managers (Alpass *et al.*, 2004).

By adopting a revised Edinburgh Farming Stress Inventory, Alpass *et al.* (2004) examined stressors among New Zealand dairy farm managers (n = 945). They reported that

³ The term stressors in this study refers to the large number of work-related conditions in the farm environment that have an impact on the health and well-being of farm managers.

sources of stress are high for time pressure, machinery, weather and government policies but less in relation to new technologies, suggesting that “personality factors may be facilitating the adoption of new technologies” (p. 279). Similarly, Firth *et al.* (2006) found that the commonest sources of stress among New Zealand farm managers (n = 1015) were time pressure (such as increased seasonal workload), government policy and procedures (such as complying with health and safety legislation) and unpredictable factors (such as bad weather). These sources of stress in the New Zealand agriculture sector have remained relatively constant since the early nineteenth century. Taken together, Firth *et al.* (2006) highlight that the Edinburgh Farming Stress Inventory “appears to be a valid instrument in farming communities” (p. 56).

Research on these stressor factors among New Zealand farm managers is found to be similar to other British and Australian studies (Booth & Lloyd, 2000; Deary *et al.*, 1997; Fragar & Franklin, 2000; Pollock *et al.*, 2002). The majority of farm managers in Australia work long hours, 90.3% worked more than 40 hours per week and 4% worked more than 100 hours (Fragar & Franklin, 2000). Goodland and Daly (1993) have found 9 out of 12 farmers experienced significant symptoms related to the stressors generated by economic problems. Further, Sparks, Cooper, Fried and Shirom (1997) noted that there is a linear relationship between the number of hours worked and strain-related symptoms. Individuals working more than 48 hours per week are more likely to experience health-related symptoms.

In summary, Deary *et al.* (1997), Firth *et al.* (2006), Olson and Schellenberg (1986), and Pollock *et al.*'s (2002) studies reported empirical findings on farm stressors. Previous research on farm stressors identified that farmers have encountered some stressors that are specific to farming and not common to all occupations. Farmers' personal resources that

inadequately meet the demands of the environment (e.g., stressors), will react with personal distress (Walker & Walker, 1987). Additionally, research also found that psychologically healthy farmers possess a higher state of positive affectivity and lower levels of strain (Alpass *et al.*, 2004; Booth & Lloyd, 2000).

2.4.2 Strain in Farming

Almost 80% of the farm managers reported that psychological and physical symptoms are commonly associated with farm stressors. They reported a moderate to high frequency of occurrence of symptoms such as anxiety, fatigue, loss of temper, forgetfulness, concentration difficulties, back pain, and sleep disruption (Walker & Walker, 1988). A study by Wallis, Dollard and Ranzijin (2003) on dairy farm managers in South Australia has revealed that 30 per cent of dairy farm managers showed a high level of psychological strain that would justify assistance from a mental health professional. Further evidence of significant levels of psychological strain amongst the farm managers in Europe has been reported. First, Olf, Koeter, Haaften, Kersten and Gersons (2005) found almost 50 per cent of Dutch farm managers suffered a high level of psychological strain that required professional help during the epidemic of Foot and Mouth Disease. Although agriculture crisis, such as Foot and Mouth Disease infected only animals, its consequences are severe for the farm managers. Next, according to Booth and Lloyd (2000), British farm managers reported the high impact of stressors, and also reported greater psychological strain. The poor coping skills among British farm managers to deal with new government policies and bureaucracy, and media criticism could lead to ill-health. Thus, there are increased

psychological distress symptoms among farmers that are significantly correlated with the farm stressors.

Walker and Walker (1987b, 1988) found that the strain levels vary among farm managers who operate on different types of farms. Those farm managers who work in mixed farms (livestock and grain) ($M = 36.59$, $SD = 11.93$, $t(520) = 2.39$; $p < .02$), and dairy farms ($M = 37.75$, $SD = 10.84$) showed significantly higher strain levels than those who operated in grain farms ($M = 34.34$, $SD = 10.56$).

Moreover, most research on strain has reported that female farm managers suffered a higher degree of strain. For example, more than 50 per cent of United States females engaged in dairy farming described symptoms of strain compared to their urban counterparts (Berkowitz & Perkins, 1984). They reported strain associated with role overload between home responsibilities and farm workloads. Further, Walker and Walker (1987) reported that Canadian men and female farm managers are experiencing a different variety of occupational stressors that can lead to a mentally distressed state. Female farm managers report significantly higher levels of strain than men farm managers ($t(673) = 5.16$, $p < .001$) (Walker & Walker, 1987b). Female farm managers reported overload roles coupled with high job responsibilities to be completed in a short time as the major sources of strain. Women's multiple roles in farm workloads and performing additional off-farm duties often produce feelings of anxiety and psychological strain, whereas men farm managers are more concerned with farm-related work, financial concerns, geographical isolation, lack of labour, and the viability of the farm. Similarly, according to Alpass *et al.* (2004), New Zealand female dairy managers reported more strain than males because of their multiple roles.

As noted, past research has found that stressors can cause strain on an individual's emotions, thoughts, and their physical condition (Hurrell *et al.*, 1998; Margolis, Kroes, & Quinn, 1974; Spector, Dwyer, & Jex, 1988). For instance, when farm managers' personal resources inadequately meet the demands of the environment (such as stressors), they will react with personal distress (Walker & Walker, 1987). This can have spillover effects into other aspects of farming life, and on their satisfaction with the job and farming life.

2.5 The Impact of Job Stress on Job Satisfaction

Job satisfaction is an outcome variable linked to occupational stress (Decker & Borgen, 1993). When defining job satisfaction, Weiss and Ilgen (2002) focussed on evaluative judgement of affective response about one's overall experience of a job and found performance on task is central to the job. According to Motowidlo (1996), evaluative judgement depends on an individual reaction towards the work environment. If work stressors cause the individual to feel uncomfortable, the environment is perceived as negative and the individual will report low job satisfaction. Hulin, Roznowski and Hachiya (1985) proposed that:

Job satisfaction is a function of the balance between work-role inputs (such as education, time, and effort) in comparison with work-role outcomes, or what is received (such as pay, status, working conditions, or intrinsic factors). As outcomes received relative to inputs invested increase, work-role outcome satisfaction is hypothesised to increase (p. 246).

As in Judge and Watanabe's (1993) study, the more hours worked and effort put forth (such as with high inputs relative to outcomes), the lower the predicted level of job satisfaction. It has been noted that:

Since job stress may have a physiological or psychological impact on workers, job satisfaction is assessed to provide a comprehensive strain. The inclusion of strain measures is important given that the effect of personality may differ depending on the outcome variable (Grant & Langan-Fox, 2007, p. 21).

Lazarus and Folkman (1984) define work-related stress as the product of an imbalance between an individual's potential and environmental strains. The individuals who experience a high level of stress report job dissatisfaction (Barnett, Marshall, Raudenbush, & Brennan, 1993). Margolis *et al.* (1974) found that lack of authority at work is the most consistent and significant predictor or indicator of strain and excessive workload. They surveyed over 1,400 workers in a national representative sample, and found that excessive workload has a significant relationship with several health risk factors such as poor physical health, low job satisfaction, low life satisfaction, and low self-esteem. The consequences of prolonged high periods of stress could lead to increased national health costs.

Hulin *et al.* (1985) have further proposed that employees' direct costs and opportunity costs exert an effect on job satisfaction. In periods of labour shortage, employees will perceive their inputs as more valuable because there is insufficient staff in the labour market willing to contribute their inputs for a given level of outcomes, and the opportunity cost of employees' work roles subsequently increases (such as current work-role membership is

more costly relative to other opportunities). Therefore, the subjective utility of input increase, increases the perceived value of input relative to outcomes and, thus, reduces job satisfaction.

Finally, Hulin *et al.* (1985) theorised that an employee's frame of reference, which is defined as past experience with relevant outcomes, is expected to influence how an employee perceives and receives current outcomes. In other words, workers become accustomed to a certain level of outcomes, and those experiences influence how he or she evaluates the outcomes. Thus, behaviour is motivated by the desire of a worker to adapt and interact over time with his or her work environment.

According to Pugliesi (1999) in a diverse sample of 1,114 public university employees, the survey found a modest association of -0.40 ($p < .001$) between job stress and job satisfaction. Pugliesi concluded that the impact of job-related stress decreases their job satisfaction and, thus, increases psychological distress.

Similarly, job satisfaction has important consequences for 153 full-time workers of a voluntary organisation. Fogarty, Machin, Albion, Sutherland, Lalor and Revitt (1999) reported that in unfavourable working conditions, employees experience high strain which results in low satisfaction with the job. Fogarty and colleagues reported a strong link between job satisfaction and strain ($r = -0.51$), and stressors ($r = -0.46$). This relationship demonstrates that strain and stressors have a direct negative impact on job satisfaction.

Further, a study by Decker and Borgen (1993) reported that the diverse sample of workers ($n = 249$) from 75 occupations (such as universities, hospitals, government, and insurance) experience slightly lower levels of strain (mean = 19.52 and SD = 6) compared with the norm group (mean = 21.40 and SD = 7.43), represented by Osipow and Spokane's (1987) finding. However, the result reflected the expected direction, with higher stressors

related to higher strain ($r = .36$) and lower job satisfaction ($r = -.52$). Subsequent research by Kivimaki and Kalimo (1996) as well as Chen and Spector (1991) has also reported similar results. They found significant correlations of stressors and strain with workers from a wide range of occupations, where the relationship is considered stronger with job satisfaction.

A longitudinal survey of 23 large New Zealand organisations (average $n = 553$) conducted by Kalliath, O'Driscoll and Brough (2004) revealed that workers who experienced a higher level of job satisfaction reported a reduced level of strains ($r = -.32$). Conversely, the respondents from a wide diversity of New Zealand industries who experienced an increase in psychological strains, reported an increase in physical ill-health symptoms ($r = .36$) and lower job satisfaction ($r = -.34$). Overall, the psychological strains mean scores are relatively low at 16.1 ($SD = 9.0$). Further, research by Booth and Lloyd (2000) indicates that the mean strain score of 4.0 (highest strain score is 7.0) suggests higher levels of perceived stressors amongst the 312 UK farming community survey, compared with the general population mean score of 3.42 drawn from a study by Duncan, Jones and Moon (1995). The individual characteristics have shown to have greater importance than the regional variation in determining psychiatric disturbance associated with stress (Duncan *et al.*, 1995).

A great deal of research has focussed on the relationship between job stress and job satisfaction across work settings. The findings are consistent which indicates that job stress and job satisfaction are inversely related. Bhagat, McQuaid, Lindholm and Segovis (1985) studied employees' experience in work and personal domains by asking subjects to rate the impact that particular events had on their lives, from extremely positive to extremely negative. Bhagat *et al.* (1985) reported a correlation of $-.39$ ($p < .01$) between job stress and job satisfaction.

There is growing literature about the impact of stress in various occupational fields. In particular, there is a heightened awareness by researchers of the impact of job stress on the job satisfaction of workers. The consequences of job and life stress can lead to serious mental health problems that have an immense impact on individuals. Mental health problems are the strongest risk factors for suicidal behaviour (Ministry of Youth Development, 2004). Among the common mental health problems are depressive disorder, substance abuse disorders, personality disorders (such as paranoid, avoidant, dependent, obsessive-compulsive, histrionic, and antisocial behaviours) and psychotic disorders (such as schizophrenia) (Beautrais, Joyce, & Mulder, 1998).

In summary, previous research has demonstrated that a stressful job has dysfunctional consequences for employees' behavioural outcomes. There is evidence that the effect of job stress has a detrimental effect on workers' well-being in the workplace. In contrast, pleasant working conditions may result in satisfied and effective workers. As a result, there is heightened awareness by researchers and psychologists regarding the impact of job stress on both workers behavioural and attitudinal outcomes.

2.6 Job and Life Satisfaction

Life satisfaction has come to be labelled as happiness or subjective well-being (Diener, 1984, 2005). The term happiness is used to denote the preponderance of positive effects over negative effects. It stresses a pleasant emotional experience. The degree of psychological well-being or happiness of individuals can be viewed as the quality of life experienced. Life satisfaction is derived from numerous domains of life. It is more global and is affected by many aspects of a person's life. People differ in the degree of importance they

place on the work domain as a source of life satisfaction. Placing a heavy emphasis on the work domain does not necessarily mean that the quality of their working life experience will be high (Diener, 1984).

Previous research has demonstrated a strong positive relationship between job and life satisfaction. The relationship between job satisfaction and life satisfaction has been the subject of empirical research (Judge & Watanabe, 1993; Rode, 2004; Tait, Padgett, & Baldwin, 1989) as well as qualitative reviews (Heller, Watson, & Ilies, 2006; Keon & McDonald, 1982). This relationship appears to be of interest to a wide variety of scholars, as shown by the fact that studies relating job and life satisfaction have been reported in journals devoted to psychology, sociology, counselling, management, leisure, and other disciplines.

There are many theoretical models put forth to describe job and life satisfaction. Heller, Judge and Watson (2002) suggest a positive relationship exists between the two variables and most individuals are classified into the spillover model. Traditionally, many researchers have developed and tested the spillover model regarding the job satisfaction and life satisfaction relationship. According to Wilensky (1960), the spillover model implies that the individual's cognitive processes of job and life satisfaction are inter-related and influence one another. He states two mechanisms in the study of relationships between work and life domains. The model proposes that experiences and/or feelings associated with work will directly spill over to life away from work, and vice versa. Gilner (1971) points out that "people do not function alone in their industrial environment; inevitably, their problems at work are shared with their family. Feedback from the family, in turn, affects their work" (p. 241).

Rice, Near and Hunt (1980) conducted a qualitative review of the job satisfaction-life satisfaction relationship and concludes that these two variables have a modest positive relationship. Tait *et al.* (1989), in a meta-analysis of 34 studies (combined $n = 19,811$), reveal the best estimate of the population correlation between job satisfaction and life satisfaction to be .44. They conclude that there is a strong positive relationship between job satisfaction and life satisfaction. Judge and Watanabe (1993) suggest that the .44 correlation uncovered by Tait *et al.* (1989) clearly supports the spillover model as the most accurate means of explaining the job satisfaction and life satisfaction relationship.

According to Hulin *et al.* (1985), job satisfaction may influence life satisfaction because jobs are such a central part of people's lives. Job importance, however, is only one of the many psychological processes that underlie the effect of job satisfaction on life satisfaction. According to Cranny, Smith and Stone (1992), general job satisfaction is one of the components of life satisfaction. Furthermore, life satisfaction is made up of other satisfactions such as marriage, family, leisure, and other non-work satisfactions.

Judge, Boudreau and Bretz (1994) tested a model of executive attitudes involving job satisfaction, life satisfaction, job stress, and work-family conflict. By using data from 1,300 male executives, the researchers found a significant correlation ($r = .49$) between attitudes toward the job and those toward life. Male executives who were satisfied with their job were more likely to be satisfied with their life in general, and vice versa. The results of the study also indicated that male executives who were satisfied with their job were significantly more likely to report that their job was less stressful.

From another perspective, Heller *et al.* (2002) suggest an alternative explanation for job and life satisfaction – based on a top-down (dispositional) model of satisfaction - where a third variable, personality, leads to overlapping variance between the job and life relationship. Heller and colleagues quote, “job and life satisfaction should be examined in the broader context of the emotional life of individuals” (p. 830). Further, recent research by Heller *et al.* (2006) highlights that life satisfaction can be understood by the individual’s systematic intra-personal variation in his daily life. The individual’s behaviours will unfold in different situations which are influenced by his or her personality traits (Mischel & Shoda, 1998). Moreover, personality factors have been found to play a significant role in determining individuals’ life satisfaction (Heller, Watson, & Ilies, 2004). Similarly, according to Wallis, Dollard, and Ranzijn, (2003), most dairy farmers in Australia reported being satisfied with their occupation. Their job satisfaction is associated with well-being and may, as a result, have an impact upon farmers’ psychological health.

To conclude, the support for the spillover model between job satisfaction and life satisfaction has been extensive (Rain, Lane, & Steiner, 1991). Most of the researchers believe that the spillover model is a real phenomenon, where job experiences spill over onto other spheres of life, and vice versa (Hulin *et al.*, 1985; Judge & Watanabe, 1993; Near & Sorcinelli, 1986). Further, recent studies have found it likely that personality constructs may confound the job and life relationship (Heller *et al.*, 2002; Heller *et al.*, 2004; Rode, 2004). Researchers such as Brief, Butcher, George and Link (1993), and Diener, Suh, Lucas and Smith (1999) support the idea that life satisfaction is not a dispositional factor by itself, but is influenced by other personality factors.

As Rode (2004) notes:

Empirically, satisfaction with major life domains (such as work, leisure, health, and family) explains about 50 per cent of the variance in overall life satisfaction, with the remaining 50 per cent presumably the result of measurement error and individual differences (such as personality) (pp. 1208-1209).

This is consistent with the broader stress literature which has noted the impact of individual differences. As strain is part of the causal chain for job satisfaction in the work environment, certain individuals experience strain through their own cognition or behaviour as a consequence of personality (Fogarty *et al.*, 1999). In this study, the causes of occupational strain and its link with job and life satisfaction have become a high priority because most farm work is the central life activity of farm managers.

Although previous studies have adequately explored the various issues encountered by farmers, such as the psychosocial and environmental stressors, few have examined the relationship between stress and the *individual farmer's personality*. The challenges for farm managers are to recognise the common negative aspects or the causes of stress. The negative health and safety effects of stress are complex and vary greatly between individuals (Bohle & Quinlan, 2000). To summarise, farm managers have to encounter the impact of farm stressors, such as government regulations, poor weather conditions, fluctuating yields, uncertain economic events, crop and animal diseases, accidents, long hours and hard physical labour. Farm stress researchers have identified a range of stressors that may contribute to mental health problems among farmers.

When in a stressful environment, personality factors can influence an individual's mental well-being (Judd *et al.*, 2006). They found that “psychologically healthy” farmers possess a higher state of positive affectivity and lower levels of distress (p. 7). Since farmers experience several sources of stress on the farm, the challenges for farm managers are to recognise the causes of strain and how their personality traits can overcome those stressful events. This leads me to explore, within this research, the possible individual differences that influence strain and overall stress in the farming environment.

2.7 The Impact of Personality Factors on the Stress-Strain-Satisfaction Relationship

The effect of changes in an individual's environment, perception, feeling, and behaviour can determine one's level of satisfaction (Heller *et al.*, 2006). One particular significant aspect of assessment in the work environment is the impact of stress that is related to the individual's satisfaction at work.

The negative relationship between stressors and psychological strain may not simply be due to certain occupations which are exposed to a greater level of stressors. Rather, prior research has shown that negative affectivity is related to a variety of stressors and strains (Moyle, 1995). Further, Spector and Jex (1998) suggest a more specific relationship between stressors and strain, in which “most of the stress models can serve as a mediating role between the environment and health” (p. 365). Kessler and Cleary (1980), for example, suggest the significant impact of stressors on strain is due to differences among the workers in response to stressors. However, there is evidence to suggest that different strain levels are associated with the type of stressors encountered (Trenberth & Dewe, 2006).

Overall, based on the existing literature, the differences between stressors and psychological strain responses may be due to the workers' responses to the types of stressors they encounter in the work environment. Likewise, when individuals are exposed to stressful working conditions, the personal characteristics play an important role in determining the psychological and physiological states.

A large amount of research has examined stressors, consequences of stress (strains), satisfaction, and the role of third variables as moderators in solidifying these relationships. A moderator is a variable that affects the direction and/or strength of the relationship between a dependent and an independent variable (Baron & Kenny, 1986).

The first potential moderators are individual factors (such as personality traits), and the second are social or contextual factors (such as organisational characteristics and culture). For example, previous research has studied the individual differences and organisational characteristics as moderators or buffers to stresses and effects on workplace (Hochwarter, Perrewe, & Kent, 1993; Karasek, 1979; Newton & Jimmieson, 2008; Westman, 1992). Research on the buffering effects of contextual factors requires various levels of analysis (such as group-level constructs), whereas research on the buffering effects of individual differences tends to model the stressor, buffer, and strain at an individual-level of measures (Klein, Dansereau, & Hall, 1994). Of these two broad categories, individual factors have received the most attention (Bliese & Britt, 2001; Harris, Harvey, & Kacmar, 2009).

Job related affect, such as perceived organisational support has been studied in relation to stressors, job security, autonomy, pay, training, and job satisfaction (Rhodes & Eisenberger, 2002). For instance, Casper and Buffardi (2004) have demonstrated the importance of perceived organisational support to understand the job-life benefits in

organisations. Although perceived organisational support has a strong effect on employee stresses and work outcome relationships, few researchers have directly examined this possible moderation effect (Stamper & Johlke, 2003). Subsequently, investigating the role of organisational factors in the farming context would not address this oversight because the working environment and nature of work-related activities in farming differ from other types of occupations.

From another perspective, Fletcher (1989) and Sikora, Beaty and Forward (2004) have suggested exploring individual differences to understand workers' reactions to stress in the workplace. Individual differences are factors which will likely affect the normal stressor-strain-satisfaction relationship in the work environment. Brief, Burke, George, Robinson and Webster (1988) found that the individual differences factor (negative affectivity) explained a significant amount of variance in the stressor-strain relationship. Brief and colleagues argued that "the dispositional construct *negative affectivity* (NA) would be related to self-report measures of job stress and job strain and that observed relationships between these stress and strain measures would be *inflated* considerably by (NA)" (p. 193). Conversely, Chen and Spector (1991) found insignificant affect on the stressor-strain relationship in a study of white-collar workers. Further, a confirmatory factor analysis revealed that individual differences did not appear as a factor in common with measures of stressor or strain (Schaubroeck *et al.*, 1992). Schaubroeck *et al.* (1992) and Kinman (2001) acknowledged that stressors do not inevitably lead to strains, as individual differences such as personality traits may moderate this relationship. However, comparisons of previous research are difficult to access because of differences in stressor (occupational specific vs. broad band), and strain

(psychological vs. physiological; self-report vs. objective assessment), and measures of individual differences (traits, negative and positive affectivity) (Hurrell *et al.*, 1998).

An individual who has a low tolerance threshold to stressors may experience acute (short-term) or chronic (long-term) strain. An individual who experiences any degree of strain provides only the tip of the underlying problems because of contamination by secondary stressors (Fletcher & Payne, 1980). These secondary factors arise when the individual threshold has been breached by the strain arising from the primary stressors. Both the primary and secondary stressors are external to the individual and can originate from within the individual and may cause either physiological or psychological strain. The primary stressors are the first condition, or instance, which produces strain on an individual. Consequently, an individual with a low tolerance threshold may encounter secondary stressors from the effect of the environment and individual factors which are not stressors in the first instance.

The situational personality approach theory proposes that individual personality traits will influence and change in response to situational changes (Davis-Blake & Pfeffer, 1999). Conversely, the classical personality theory proposes that individuals with different personality dispositions will not change in an environment that corresponds best to their life experience (Allik, 2002).

On a similar line to classical personality theory, the individual differences in personality disposition are considered to be stable across the life span in adults (McCrae, 2002). Although personality is immune to the influence of environment and life experience, the neurophysiologic brain processes can affect the personality (Allik, 2002). The neuro circuits work interactively between the emotional and cognitive brain. Evidence indicates

that brains may experience positive and negative emotions concurrently, when the individual experiences stressors (Davidson, 2000; Tomarken, Davison, Wheeler, & Doss, 1992).

One general class of moderator variable that has been examined over the years is personality traits. Previous research has investigated neuroticism, self-efficacy, locus of control, and self-esteem as moderators. For instance, Spector, Zapf, Chen and Frese, (2000) reviewed empirical evidence of neuroticism, and found it moderated the effect of perceived stress on strain, regardless of the type of stressors. Next, Moyle (1995) and Kammeyer-Mueller, Judge and Scott (2009) demonstrated that negative affectivity plays a significant moderating role in the stressor-strain relations, but not for stressor-job satisfaction relations. A comparable negative affectivity-moderation on work stressor and General Health Questionnaire (strain) has been reported by Parkes' (1990) study on 157 trainee teachers. The results show a strong interaction between stressor and negative affectivity on strain ($F(8, 148) = 9.49, p < .001$) and the percentage of variance explained was 33.9%. Judge, Van Vianen and De Pater (2004) noted that the component of negative affectivity may indicate anxiety and a depressive self-concept of core self-evaluations. Thus, the anxiety component of neuroticism may relate more strongly than the depressive component in the stress and strain relationship in the Kammeyer-Mueller *et al.* (2009) finding. For instance, high neuroticism individuals are more pessimistic when encountering a crisis rather than challenging it.

However, research suggests that disposition factors have an appreciable effect on strain, which, in turn, has an effect on satisfaction (Fogarty *et al.*, 1999; Westman, 1992). There is empirical evidence that individual differences, such as positive or negative affectivity and self-efficacy play an important role as a moderator in the stress process (Brief

et al., 1988; Jex & Bliese, 1999; Parkes, 1990; Schaubroeck *et al.*, 1992; Watson, Pennebaker, & Folger, 1987). Based on survey data collected from 2,273 U.S. army soldiers representing 36 companies, it was found that self-efficacy moderated the stressors and strain relationship (Jex & Bliese, 1999). Individuals who reported low levels of self-efficacy reacted more negatively to stressors than individuals who reported high levels of self-efficacy. The high levels of self-efficacy individuals may cope more effectively with stressors. This relationship suggests that individuals react negatively when they perceive that they are not capable of achieving a high level of performance. Such individuals may also experience a high level of psychological strain, as well as low levels of job satisfaction. Jex and Bliese's (1999) finding is found to be congruent with Bandura's (1997) generalized self-efficacy theory.

Regardless of which personal taxonomy is assessed, personality matters in various domains of satisfaction and life satisfaction evaluations. Individuals make metaphysical evaluations of themselves which subconsciously affect specific appraisals of people and events (Packer, 1985). For example, Cozzarelli (1993) notes:

Chronic beliefs about self, control, and outcomes reflect key components of an individual's view of the world and of his or her ability to function successfully in that world, and thus should be especially potent in shaping reactions to stressful life events (p. 1224).

On the basis of existing theory and research, it appears that the nomological network of core self-evaluations can be expanded by examining its effects on work-related outcomes. Interestingly, Judge *et al.* (1997) argue that although existing measures of personality traits (such as negative affectivity or neuroticism) are a unique predictor of work-related outcomes,

they did not fully measure work behaviour compared with core self-evaluations in the work context.

Recently, several studies have introduced core self-evaluations into the job stress literature as a moderator, mediator or coping variable (Best *et al.*, 2005; Brunborg, 2008; Judge, Locke, & Durham, 1997; Kammeyer-Mueller *et al.*, 2009). Although core self-evaluations is reflected as a common construct, its stability has not been well-documented compared with each of the core self-evaluations traits (Dormann, Fay, Zapf, & Frese, 2006). However, previous studies have found core self-evaluations to be more consistent predictors of job behaviour than each of the four core traits of core self-evaluations. The traits can result in incorrect conclusions when used in isolation (Judge *et al.*, 2003). Taken together, Dormann *et al.* (2006), and Judge, Erez and Bono (1998) conclude that the core self-evaluations construct affects individuals' cognitive processes which is relatively stable across their life span.

Empirical research has provided some support for the moderating effects of core self-evaluations, although there has been some inconsistent support for core self-evaluations as a moderator. In Kammeyer-Mueller *et al.*'s (2009) meta-analysis review, core self-evaluations provides an integrative framework for understanding individual differences in the stress process. Although core self-evaluations do not act as a moderator in the stress reaction process, Kammeyer-Mueller and colleagues found evidence that "all elements of core self-evaluations would function in the same direction with similar effect sizes for all relationships" (p. 183). Similarly, in Judge *et al.*'s (2009) study, core self-evaluations does not buffer the stressor and strain relationship. Conversely, previous studies have found that core self-evaluations is a significant moderator for the variables examined (such as Bono &

Colbert, 2005; Judge & Hurst, 2007). To expand the knowledge in this field, Harris *et al.* (2009) explore the moderating effect of core self-evaluations on the social stressors and job outcomes relationship on a sample of 144 full-time employees. The results indicate that higher core self-evaluations buffered the negative influence of social stressors on job satisfaction and turnover intention.

The previous core self-evaluations research on moderating effects is inconsistent which may possibly be due to three factors. First, researchers have used different methodology techniques in self-report measures (for example, meta-analysis vs. daily diary studies) (Kammeyer-Mueller *et al.*, 2009): First, the primary problem is that cross-sectional studies estimate all relationships at the person level of analysis, while daily self studies investigate how within-person variation in perceived stressors relate to variations in personality and strain over time. On a statistical level, failing to distinguish between within- and between-persons levels of analysis will result in incorrect error terms (Raudenbush & Bryk, 2001). Since Kammeyer-Mueller *et al.*, (2009) studies only produce correlation matrices of variables and not correlations between their interaction terms, this means that they cannot test individual differences related to reinterpretation of self-expression that affects potential stress for high or low core self-evaluations individuals. Secondly, the meta-analytic results demonstrated that there is a consistent role for core self evaluations as a moderator in the stress reaction process. On the other hand, the multivariate daily diary results suggest that it is only emotional stability that drives this result. This result may reflect differences in methodology too. The contemporaneous relationships of the variables, core self-evaluations and emotional stability were looked at in the meta-analysis, whereas the relationships between day-to-day core self-evaluations and emotional stability were looked at

in the daily diary study after factoring out the relationship between daily stressor levels. This result is sensible when one considers that those higher in CSE reported fewer stressors in the daily diary survey.

A second possibility, however, is simply that the effect of the potential third variable makes the relationship spurious (Judge *et al.*, 2003). For example, there is evidence of correlation between personality and general cognitive ability (McHenry, Hough, Toquam, & Hanson, 1990).

A third possibility is that the failure to detect more evidence of moderator effects may have simply been due to low statistical power (Aguinis & Stone-Romero, 1997). Since previous research on occupational stress models utilized relative small sample sizes, it is unlikely that the moderating effects of power can be detected. For example, Chay's (1993) studies on 117 small business owners and employees failed to find any evidence of synergistic buffering on the job demand-control-support model, compare to Karasek *et al.*, (1982) studies of 1,016 US workforce participants.

Taken together, to improve the explanatory and predictive power of the model, stress researchers interested in dispositional characteristics of the individuals to take into account the higher sample size, and appropriate research methodology to ensure the measurements chosen match each other theoretically. Furthermore, there is broad evidence that if psychological attributes, such as core self-evaluations, moderate the perceived stressor-strain-satisfaction relationships, then controlling these cognitive processes would be likely to result in different levels of strain.

2.8 Core Self-Evaluations as a key personality construct

The fundamental subjective cognitive appraisals, referred to as core evaluations, were originally defined by Packer (1985), followed by Judge, Locke and Durham (1997), who extended the core evaluations concept by proposing the global evaluation-focussed applicability of the personality traits.

The core self-evaluations concept refers to the “individual’s subconscious basic conclusions and bottom-line evaluations” that represent the fundamental values of one’s life (Packer, 1985, p. 3). These fundamental beliefs represent a “global evaluation of themselves, other people, and the world” (Judge *et al.*, 1997, p. 18). Core self-evaluations is dispositional in nature and composed of four closely-related but separate core traits: (1) self-esteem, (2) locus of control, (3) emotional stability, and (4) generalised self-efficacy (Judge *et al.*, 1998b). These four individual core self-evaluations traits involve similar concepts that are interrelated, as well as related to the work-based criteria and have been justified empirically as a common personality dimension construct. Similarly, it appears that the “four core traits can be treated as measures of the core self-evaluations concept” (Judge *et al.*, 2004, p. 328). For example, in Judge, Erez, Bono and Thoresen’s (2003) meta analysis, the average correlation among the four traits is .64, which is at least as high as the correlations among alternative measures of traits in the five-factor model of personality (neuroticism, extraversion, openness, agreeableness and conscientiousness). Thus, these correlations are not excessive. The four traits load on a higher-order latent factor which is evaluative, fundamental, and broad. The nature of the three criteria of core self-evaluations is described below (Judge & Bono, 2001):

- i. An “evaluations-focus” where each trait has a direct influence on the attitudes of oneself and the environment (Judge, Erez, & Bono, 1998; Judge *et al.*, 1997).
- ii. The fundamental traits are more central to one’s self-concept (Judge *et al.*, 1998; Judge *et al.*, 1997).
- iii. The scope of the traits are directed to one’s self-worth as a worker. “The wider in scope, which means the more objects and entities encompassed by the trait, the higher the chances that the evaluation will encompass the job realm and/or generalize to it” (Judge *et al.*, 1997, p. 156).

The dimension structure of core self-evaluations is focussed on four closely-related factors as described in detail below.

2.8.1 Self-esteem

Self-esteem is one of four essential dispositional variables in the construct of core self-evaluations. The self-esteem of the individuals can be either low or high, depending on the individuals’ self concept of worthiness and ability to cope with life (Locke, McClear, & Knight, 1996). Self-esteem is the evaluative component of a broader representation of cognitive, affective, and behavioural processes (Blascovich & Tomaka, 1991). During adulthood, the trait is relatively stable, enduring, and not vulnerable to change. On the other hand, there is evidence of short-term variability in self-esteem because individuals are influenced by their environment (Judge, 2009).

Research by Judge and Bono (2001) noted that the high self-esteem individuals are more likely to be satisfied because they choose jobs consistent with their interest. Those individuals who have high self-esteem are likely to be successful. On the other hand,

individuals with low self-esteem are worried, self-doubting, and may be depressed (Barrick & Mount, 1991). From a theoretical perspective, it is reasonable to assume that low self-esteem individuals are more influenced by an uncertain environment than those with high self-esteem. Empirical research has provided some support for self-esteem as a moderator in the stressor-strain relationship (Jex & Elacqua, 1999).

2.8.2 Generalised Self-efficacy

Generalised self-efficacy can be conceptualised as a component of and antecedent to self-esteem (Lightsey, Burke, Ervin, Henderson, & Yee, 2006). The close relationship between self-esteem and generalised self-efficacy can be seen in the high correlations between the two, as found by Judge, Bono, Erez, Locke, and Thoresen, (2002) and Judge *et al.* (1998), which are .85 and .86, respectively.

According to Bandura (1997), generalised self-efficacy represents an individual's beliefs regarding a particular course of action or behaviour. Enactive mastery is the primary determinant of self-efficacy and refers to individuals who succeed in accomplishing a performance repeatedly. This depends on both perceived and actual task performance.

Litt (1988) suggests that individuals who have high levels of generalised self-efficacy can control key events. Their effort and performance will lead to attaining desired results and satisfaction (Bandura & Locke, 2003). Individuals with high generalised self-efficacy possess effective coping skills. Thus, they are able to cope with job and life-related problems (Johnson *et al.*, 2008).

An individual fundamental belief in achieving a specific goal in a work situation is a predictor of job satisfaction (Bandura & Locke, 2003). According to Judge *et al.* (1997),

“generalised self-efficacy is the individuals’ judgments of their capabilities to mobilize the motivation, cognitive resources, and courses of action needed to exercise general control over key events in their lives...” (p. 162). Further, Judge and colleagues extended the concept of generalised self-efficacy from individuals’ specific goals to a broader level whereby control over a variety of situations is exercised. This suggests that the individual’s level of generalised self-efficacy is dependent on their ability to exercise control in the workplace. Farm managers who successfully exercise personal control over farm practices are displaying effective generalised self-efficacy. For instance, a farmer who ensures workplace safety or who monitors weather forecasts is able to use their generalised self-efficacy to avoid accidents or prepare for unpredictable weather.

2.8.3 Locus of Control

Locus of control is a general trait that is the result of individuals’ personal control over the outcome of events that the individuals believe they possess (Judge *et al.*, 1998). Locus is internal when an individual has self-control on a range of factors in his or her life (Horner, 1996). Individuals who possess an internal locus of control are more satisfied with their job because of the perceived ability to control situations. The successful individuals will be more likely to evaluate the situations and tend to predict favourable job events. At the other end of the continuum, individuals with an external locus of control believe they have little control over personal experiences. They report high levels of distressing emotions and are vulnerable to illness (Horner, 1996). Those with an external locus focus more on external factors whereby they feel helpless and ineffective (Blau, 1993; Spector, 1982). Moreover, they will likely experience psychological strain when encountering a threat (Spector &

O'Connell, 1994). Similar to most traits, the individual's locus of control is developed and accumulated from their previous experiences over a period of time. For instance, in a longitudinal study, unemployed individuals with an internal locus of control were not affected by retrenchment and were more likely to obtain new jobs quickly (Ginexi, Howe, & Caplan, 2000).

2.8.4 Neuroticism

Neuroticism is a broad core personality trait that has been studied in relation to job and life outcomes to predict individuals' behaviour in personality research (Johnson *et al.*, 2008; Judge *et al.*, 2002). Neuroticism is generally considered the opposite of self-esteem.

Burke, Brief and George (1993) suggest that neuroticism may lead to the creation of stressful conditions from the impact of stressors. Individuals who show nervousness and sleeplessness are more likely to show symptoms of neuroticism from a heightened stressful work environment (Barrick & Mount, 1991). For example, individuals with high neuroticism may respond to an unfavourable work environment (such as high workload) by avoiding it and subsequently experience dissatisfaction with themselves and their lives. As a risk factor, individuals with high neuroticism can exhibit abnormal sensitivity to environments associated with threats, following the experience of an aversive stimulus. The personality and cognitive measures of neuroticism are more closely associated with disorders that are dysfunctional attitudes and sociotropy-autonomy personality. In fact, experiencing a personality disorder is a vulnerability factor in developing anxiety and depression (Mineka, 2007). Further, individuals with avoidance-motivation or high neuroticism will experience unstable emotions. They perceive negative information in everyday occurrences, which leads

to higher job dissatisfaction because they tend to focus on the negative aspects of work (Johnson *et al.*, 2008). Conversely, Watson and Clark (1984) suggest that low neuroticism (or high emotional stability)⁴ individuals are secure and self-satisfied because they view the world and themselves through a positive lens in their work environment.

Furnham and Zacherl (1986) show that neuroticism is negatively correlated with job satisfaction. Similarly, Dormann *et al.* (2006) suggest that negative affectivity (neuroticism) can significantly influence job satisfaction. Previous studies have shown consistent evidence that neuroticism is related to job dissatisfaction (Smith, Organ, & Near, 1983; Tokar & Subich, 1997). Thus, high or low neuroticism will have different impacts on individuals' well-being and health outcomes under different working conditions. As such, individuals with low emotional stability experience a negative affect that could lead to a decline in subjective well-being (Diener, Larsen, & Emmons, 1984).

It appears that Watson and Clark (1984) noted the conceptualisation of negative affectivity as neuroticism. Judge *et al.* (2004) argue that:

From a conceptual standpoint, core self-evaluations does appear to be more broad than emotional stability and, on this basis alone, one might argue that core self-evaluations should be subsumed under the emotional stability concept because the later has a much more extensive tradition of research. However, this does not mean that typical measures of emotional stability adequately represent this broad construct.

Typically, measures of neuroticism, perhaps owing to its psychopathological origins, assess dysphoria, hostility, stress, and anxiety (pp. 329-330).

⁴ Emotional stability and neuroticism are similar constructs used interchangeably (Judge & Bono, 2001).

As Judge and Bono (2001) have argued that typical measures of neuroticism, both conceptually and operationally, do not explicitly assess core aspects of the self.

Several studies have been conducted on core self-evaluations to address its construct validity as a single factor (Erez & Judge, 2001; Judge, Bono, & Locke, 2000; Judge *et al.*, 1998; Judge, Locke, Durham, & Kluger, 1998a; Judge *et al.*, 1997). Judge *et al.* (1998) suggest this construct is a higher-order latent construct which is concluded from data across 12 separate studies. The good convergent validity as revealed by strong correlations of self-esteem, self-efficacy, locus of control and neuroticism make up the higher order core self-evaluation construct. Since the core self-evaluations scale is a reliable and valid assessment of the construct, the factor structure should match theoretical predictions (Schwab, 1980). In this case, it should have a unitary factor structure where the measure adhered to theoretical expectations. In light of the suggestion that personality traits should not be used in isolation, the nomological network of core self-evaluations is hypothesized to understand work behaviour (Erez & Judge, 2001).

However, research by Judge *et al.* (2002, 2003) has noted that locus of control exhibits the lowest correlations with core self-evaluations, which suggests locus of control is one of the components of core self-evaluations. The issue is, specifically, whether, of the measures of four traits, locus of control or other related traits will go beyond core self-evaluations in predicting those criteria (Judge, 2009).

Furthermore, Johnson *et al.* (2008) proposed the core self-evaluations construct in a different perspective. Johnson and colleagues argue that the core self-evaluations concept does not adequately assess the four personality traits and has internal validity issues. In the first illustration, core self-evaluations is a “fundamental and broad evaluation of self-

regulation capacities” (p. 406). Individuals who possess positive core self-evaluations are likely to respond favourably to the environment and will normally be resilient when confronted by the obstacles. They are motivated to pursue their ideal goals.

Secondly, core self-evaluations is specified as an aggregate construct with causal indicators. Johnson and colleagues argue that all the four personality traits of core self-evaluations are not empirically interchangeable and do not have a similar effect on criteria. For example, locus of control and neuroticism show a weaker convergent validity when compared with self-esteem and generalised self-efficacy, which are both significantly correlated (Dormann *et al.*, 2006).

Thirdly, Johnson *et al.* (2008) suggest extraversion and positive affectivity as an approach-oriented trait that should be included in the core self-evaluations criteria. On the other hand, self-esteem did not fit the core self-evaluations criteria because this trait is found to be the “by-product of achievement-oriented outcomes” (Johnson *et al.*, 2008, p. 405). Since this is only one study that explores the validity of core self-evaluations, further evidence is needed.

Nevertheless, previous personality researchers have justify the inclusion of broad personality trait in explaining individual behaviour at work (Brockner, 1988; Ghiselli, 1973). In fact, the current trend in stress research is to regard a broad personality trait as containing most of the information necessary to predict behaviour.

To summarise, there are many characteristics cited in the literature on self-esteem, locus of control, generalised self-efficacy, and neuroticism. These cognitive products are the most widely-studied personality concepts in psychology. Based on evidence, the four core traits are loaded on a higher-order latent concept, as well as playing a central role as

indicators of a broad core self-evaluations construct (Piccolo, Judge, Takahashi, Watanabe, & Locke, 2005). Since core self-evaluations is a broad, latent trait that is the common source of the four specific traits, it is the psychological mechanism that causes these individual traits to be highly correlated. Due to its breadth, compared to individual core traits, core self-evaluations may better predict diverse array of work activities and behaviours. This suggests that each trait demonstrates the characteristics necessary to belong to core self-evaluations. Since each trait is highly related to the others, core self-evaluations plays a pivotal role in determining these traits. Since Judge and colleagues seek to advance research by developing a new personality concept, there is a need for ongoing validation of the core self-evaluations construct and for it to be tested in a variety of settings.

2.8.5 The Role of Core Self-Evaluations

The preceding discussions suggest that there are strong theoretical and empirical relationships with the effect of core self-evaluations as a higher order concept on work-based attitudes. Further, each of the personality traits comprising core self-evaluations appears to play a significant role when individuals evaluate events.

Judge *et al.* (1997) argue that the core self-evaluations model can be easily integrated and complemented by other theoretical perspectives, as well as the established interactional approaches of job satisfaction. The dispositional concept of core self-evaluations does affect one's level of satisfaction. According to Judge, Bono and Locke (2000), "Job satisfaction is itself a cognitive process, thus, it involves emotional generalization – individuals' positive feelings about themselves spill over onto their jobs" (p. 240).

According to Judge *et al.* (1998), the personality trait of core self-evaluations has been found to be consistent in its relationship with job satisfaction and life satisfaction. Judge *et al.* (1997) propose three specific mechanisms linking core self-evaluations to both job and life satisfaction. The first mechanism is the emotional generalisation of evaluations which is central to the self, other, and world views. Thus, job and life satisfaction which are broader aspects of emotional life are anticipated to be directly influenced by core self-evaluations. Second, core self-evaluations may affect the processes in which job and life satisfaction is appraised. For example, in the farming context, a farm manager may consider herself fundamentally worthless if she is awarded “Farmer of the Year” title just because Federated Farmers Inc. or Horticulture NZ favours her more than the other registered members. If she is rewarded because of her sincere dedication towards farming, she will consider herself to be fundamentally a good farmer. Third, core self-evaluations may impact on the individual’s perceptions of objective conditions by influencing the causal process. For example, the farm manager who considers the reward is unjustified may attribute it to being the result of unfair farming organizational policies, while the farm manager who views the reward as essential, may just simply assume that the reward is for the best farm managers.

Additional support for the role of core self-evaluations is also provided in the study by Judge *et al.* (2000). Judge *et al.* (2000) found that the relationship between the core self-evaluations and job satisfaction persisted over time. Specifically, the findings revealed a correlation coefficient of $r = .46$ over a period of 30 years. According to Judge and Bono (2001), all four traits of core self-evaluations display positive correlations of similar magnitude with job satisfaction. According to Judge *et al.* (1998), individuals are more satisfied with their lives and jobs when these core self-evaluations are positive. Individuals

who possess positive core self-evaluations are capable of capitalising on the environment to their advantage in any given circumstances (Judge & Hurst, 2007). The generalisability of core self-evaluations' (such as positive self-concept) relationship with job satisfaction and life satisfaction indicate the significance of the job and life attitudes model (Piccolo *et al.*, 2005).

Best *et al.* (2005) provide further evidence for the influence of core self-evaluations on job satisfaction via appraisals of the work environment. Further, Heller *et al.* (2002) argued that the link between job and life satisfaction might be spurious due to dispositional influences of core self-evaluations on the satisfaction domain. Core self-evaluations may affect life satisfaction partially through job satisfaction. Consequently, the individuals with positive core self-evaluations are more satisfied with their life with an indirect effect through to job satisfaction (Bono & Judge, 2003; Heller *et al.*, 2004; Judge *et al.*, 1998).

There is concrete research evidence on dispositional factors that has shown personal traits such as self-esteem do affect job satisfaction, from childhood onwards for men (Staw, Bell, & Clausen, 1986). As noted, although core self-evaluations predict outcomes better than individual core traits, self-esteem has been found to be as reliable as core self-evaluations (Judge, 2009). Researchers have shown considerable interest in self-esteem. For example, self-esteem is correlated with job characteristics (Tharenou, 1979), performance in the work place (Bandura, 1986; Tharenou, 1979), job satisfaction (Judge, Boudreau, & Bretz, 1994; Staw *et al.*, 1986), and stress (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964; Margolis *et al.*, 1974).

While previous studies support the role of core self-evaluations, the causal assumptions have been limited to empirical findings, and are limited by two factors.

First, the results have limited generalisability because of the small homogeneous convenience sample size ($n = 150$) in the longitudinal studies conducted by Judge, Bono, and Locke (2000). Second, the study did not control for any possible environment interferences (such as life satisfaction variables) in the model. Thus, the result is not high enough for a consistent and stable relationship.

Different individuals can respond differently to the same stress stimulus which supports their subjective evaluations of the work environment (Sulsky & Smith, 2005). The core self-evaluations construct can influence individual assessments because of the influence by external events that suit occupational stress research (Best *et al.*, 2005). According to Judge in his communication with Best, “The dispositional nature of the core self-evaluations construct is advantageous to support individual characteristics in its appraisal orientation that helps shape subjective interpretations of contextual events” (Best *et al.*, 2005, p. 442).

Past research has found that stress can cause strain on individuals’ emotions, thoughts, and their physical condition (Locke, 1976; Margolis *et al.*, 1974). Most empirical evidence supports job stress having a negative impact on job satisfaction (Assouline & Meir, 1987; Jamal, 1990; Judge *et al.*, 1994), core self-evaluations in terms of how individuals view themselves (Boyd, 2006), and psychological well-being or happiness (Tetrick & LaRocco, 1987). The geographical isolation of farmers is a significant predictor of job stress (Lobley *et al.*, 2004) but not of life satisfaction (Eberhardt & Pooyan, 1990).

Boyd (2006) suggests that each of the individual personality traits of core self-evaluations moderate the relationship between job stress and burnout. Likewise, Smith and Tziner (1998) have shown that positive affectivity moderated the stressor and strain relationship. This implies that an individual with a positive outlook who perceives stressors in the workplace may experience low intensity of stress, and subsequently less psychological strain. Further, theoretical support by Hurrell, Nelson and Simmons (1998) shows that negative affective (neuroticism) states may affect the relationship of stressors and health-related outcomes. Judge and Larsen (2001) develop a stimulus-organism-response model to describe how personality may moderate individual responses by the influence of the environment (stimuli). Individuals with positive core self-evaluations are likely to pursue realistic goals in the work environment, whereas negative individuals are more likely to avoid work goals. Furthermore, Hiller and Hambrick (2005) argued that high levels of positive core self-evaluations individuals may likely take unwarranted risks by making suboptimal decisions.

Overall, high or low core self-evaluations usually change the relationship between job stress and job satisfaction. That is, when high core self-evaluations individuals are stressed in the workplace, they are likely to be highly satisfied or to experience extremely low job satisfaction. As core self-evaluations is directly related to job satisfaction, it would suggest that stress in the workplace for high core self-evaluations individuals may have a different impact on job satisfaction.

2.9 Theoretical Links in the Model

Past research has found that core self-evaluations is an important variable in predicting job satisfaction and life satisfaction. No studies have yet been published examining the influence of core self-evaluations on the relationship between the stressor-strain and also strain-job satisfaction, particularly in the farming context. However, given the cognitive and affective elements discussed, there is a natural extension and integrating factor in extending the stressor-strain and strain job satisfaction model.

As noted, occupational stress among farmers has a negative impact on psychological well-being and, consequently, leads to significant physical or health symptoms. Horner (1996) reveals a complex interaction effect of the traits (neuroticism, locus of control, and stressors) on physical health and illness.

Stressors are not intrinsically stressful to individuals, rather it becomes a threat when individuals perceive them as such. This stressful appraisal can result in self-injury or damage to self-esteem (Simmons & Nelson, 2007). Thus, the investigation of the stressor-strain-satisfaction linkage requires specific analysis of the antecedents of the individual to draw accurate inferences about the situation (Koslowksy, 1998). An individual's inherent characteristics, such as very high neuroticism and external locus, have been assessed in predicting strain. Burke *et al.* (1993) suggest that individuals who possess a high negative trait (neuroticism) may feel distress in stressful conditions from the impact of stressors. In addition, Walker and Walker (1987) emphasised that cognitive changes among farmers are the result of personal strain in order to meet the demands in the farming environment. Since personality factors moderate the measures of stressors and strains, it is important to understand how individuals manifest symptoms of stress under work environments.

While there are a number of stressors implicated in the high levels of stress amongst farmers, it is suggested that the main cause of stress is their lack of control over unpredictable stressors (Deary *et al.*, 1997; Raine, 1999). According to the essence of Karasek's (1979) Job Strain Model, self-employed individuals, such as farm managers who lack personal control over crucial aspects of job-related farm activities, could experience potential psychological and health symptoms. However, the way personal control is operationalised in the workplace depends on the potential effects of the moderator (Newton & Jimmieson, 2008).

As such, farm managers have to learn to be capable of handling unforeseen circumstances (such as drought and loss of income) in order to be resilient. Personality traits can effectively influence individuals in coping with crises in life situations (Frederickson, Tugade, Waugh, & Larkin, 2003; Tugade & Frederickson, 2004). Healthy individuals would develop an internal locus of control and a more positive self-concept than those who encounter psychosocial problems. This process enhances the development of individuals at risk for problems and psychopathology. The protective factors, such as high self-esteem and internal locus of control, could counterbalance the negative aspects of life when individuals are vulnerable to an increased number of risks factors, or when they experience more stressful life events (Werner & Smith, 2001).

Figure 2 depicts an integrated job and life attitude model and, more precisely, how the core self-evaluations construct influences the relationships of the stressor-strain-satisfaction. That is, those farmers who possess positive core self-evaluations and who are resilient may be more capable of handling stressful jobs than those farmers who do not. Thus, they are possibly more satisfied with their jobs and lives on the farm. Because the farmers' work is an

important part of their life, job satisfaction greatly influences their satisfaction with their life in general. The range of farm stressors (such as government bureaucracy, trade globalisation, economic factors, and workload) has been identified as being positively related to strains (Lobley *et al.*, 2004; Spector & Jex, 1998; Walker & Walker, 1988; Wallis, Dollard, & Ranzijn, 2003). Core self-evaluations can influence the individuals' appraisals of external events which cause psychological strains. The reason that core self-evaluations can have an impact on job stress is because job stress can produce changes within people (Matterson & Ivancevich, 1982), forcing them to deviate from their normal state, resulting in job dissatisfaction (Selye, 1976). Therefore, it is argued that job stress is negatively related to job satisfaction.

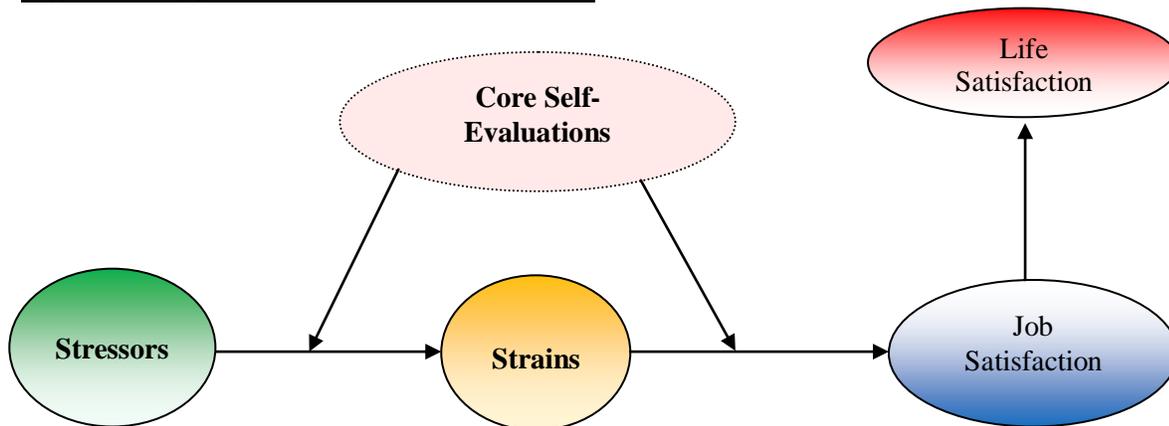
Further, the basis of the theoretical model presented in Figure 2 is rooted in the argument that the core self-evaluations construct could sufficiently capture the personality of New Zealand farmers who are prone to stress. The high or positive core self-evaluations trait can act as a buffer against the environmental stressors on strain, and subsequently against strain on job satisfaction. Individuals may interpret the stressful events as challenging and may tolerate the effect of stress to reduce strain levels. Similarly, the high core self-evaluations individuals are more effective at setting goals and remaining motivated to pursue goals (Erez & Judge, 2001). On the contrary, those with low core self-evaluations are likely to focus on the negative aspects associated with environmental demands and they will experience psychological strain.

The evidence from the existing literature, such as Judge and Hurst's (2007) study, suggests that core self-evaluations may likely play a moderating role. Furthermore, as Judge, Heller and Klinger (2008) have validated the framework of core self-evaluations and job

satisfaction, the proposed stressors and strain, and strain and job satisfaction, while controlling life satisfaction with core self-evaluations as a moderator, has been proposed as an hypothesised model. The model, therefore, shows an expanded set of variables and core self-evaluations - a moderator of the relationship between farm stressor and strain and also between strain and job satisfaction.

This is an important finding that lends support to the idea that the study of core self-evaluation should be expanded beyond the boundaries of what has been researched to date (such as Judge *et al.*, 2008). The moderated model of core self-evaluations' impact on the stressor-strain-satisfaction relationships is shown in Figure 2.

Figure 2: Hypothesised Theoretical Model



2.10 Research Questions

There is a theoretical reason to believe that stressors are perceived by individuals as a source of stress. For example, previous researchers have cited similar causes of farm stressors on farmers' psychological health (Alpass *et al.*, 2004; Deary *et al.*, 1997; Eberhardt & Pooyan, 1990; Firth *et al.*, 2006; Pollock *et al.*, 2002). In particular, the existing literature on stress research is based on occupation stress models and explains the work-related and psychosocial outcomes.

Therefore, what is the relationship between perceived stressors and strain, as well as job satisfaction among the rural managers in the farming context? This may be broken down into three hypotheses drawn from the general stress, and farming stress literature:

- i. Hypothesis 1: There is a positive relationship between farm stressors and strain;
- ii. Hypothesis 2: There is a negative relationship between strain and job satisfaction;
and
- iii. Hypothesis 3: Job satisfaction is positively related to life satisfaction.

The second emerging discourse in the literature recognises that the personality factors should be an integral part of various theoretical models that link stressors with strain (Dawis & Lofquist, 1976, 1984; Tziner & Dawis, 1988). Previous research shows that the measure of personality traits may exaggerate the correlation of stressor-strain and strain-job satisfaction relationships (Hurrell *et al.*, 1998; Smith & Tziner, 1998; Watson & Clark, 1984). Because of the potential effect of an individual's personality traits on stress outcomes, the relatively untapped operationalised aggregate of four trait dimensions, core self-evaluations, is

explored in this study. Although prior studies have explored the various issues encountered by farmers, including psychosocial and environmental stressors, they have not investigated the relationship of stressor, strain and satisfaction with core self-evaluations constructs. How farm managers' core self-evaluations influence assessments of stressors on their farm will provide a better understanding of occupational stress within a farming community. In particular, occupational stress models may benefit from the use of the core self-evaluations. This may be broken down into three hypotheses drawn from the stress and core self-evaluations literature:

- iv. Hypothesis 4: Core self-evaluations are positively related to job satisfaction;
- v. Hypothesis 5: The relationship between farm stressor and strain is moderated by core self-evaluations; and
- vi. Hypothesis 6: The relationship between strain and job satisfaction is moderated by core self-evaluations.

CHAPTER 3 – METHODOLOGY AND RESEARCH DESIGN

3.1 Introduction

This chapter describes the research design of the study, including the research participants, design, data collection procedures, instrumentation, data analysis, and limitations of the study.

Prior to deciding on a research method, it is essential to be aware of the phenomena of interest that are known or unknown to the researcher (Thomas & Pollio, 2002). The researcher then focuses either on qualitative or quantitative strategy to specify the hypothesis to be tested. Quantitative research is an interpretative measurement which concretely specifies the psychological phenomena (Westerman, 2006). As the quantitative method is the main approach used in this research, the main principle in designing this study is to ensure a high probability of accomplishing the purpose of the research (Leong & Austin, 2006). This approach would expect to enrich theoretical knowledge by specifying the relationships among the variables; all psychological research seeks, fundamentally, to explain variance.

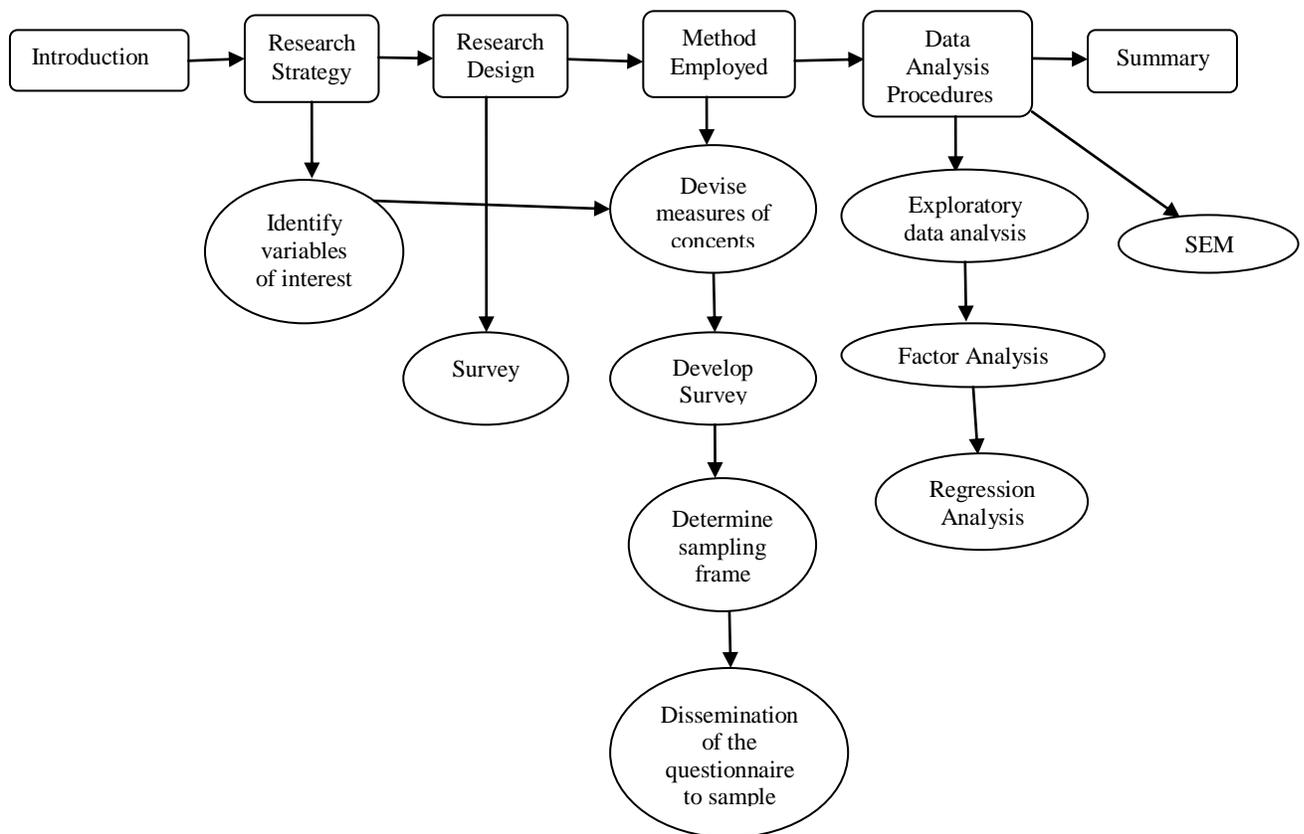
Figure 3 below illustrates the chapter outline.

3.2 Research Methodology

In this section, the philosophical approach is explained, and the research strategy and research design are set out. Two distinctive clusters of research strategy, that is, the nature of quantitative and qualitative research, are outlined. Next, the research design which entailed a

process of achieving objectives and answering research questions in this study, is discussed (Cooper & Schindler, 2008). An overview of the choice of methodology, the methods of collecting data, limitations and delimitations and, hence, the analysis procedures, are also discussed.

Figure 3: Structure of the Methodology



3.2.1 Research Strategy

According to Morgan and Smircich (1980), the appropriateness of using qualitative or quantitative techniques depends on the underlying assumptions of the researcher and the nature of the phenomena to be studied. “The distinction between quantitative and qualitative methods is often conflated with modes of inquiry that involve obvious interventions to produce responses of interest” (Sechrest & Sidani, 1995, p. 79). In contrast to quantitative research, qualitative research is interpreted as a research strategy that emphasizes words rather than quantification in the collection and analysis of data. Although both paradigms use different genre to report their research findings, they seek to improve understanding of the phenomena (Weber, 2004).

The qualitative method is a useful tool to investigate in-depth phenomena of interest (Lee, Mitchell, & Sablynski, 1999) and to understand the “socially-constructed nature of reality” (Denzin, & Lincoln, 2003, p. 13). The researcher considers the most appropriate method to identify the stressful aspects of farming is the semi-structured interview. The interviews were conducted mainly to determine the themes to be measured in the surveys. Previous research undertaken has been based on small samples (Lobley *et al.*, 2004) and a review of the literature found that most of the reported earlier studies used qualitative methods (such as Booth & Lloyd, 2000; Wallis *et al.*, 2003). Qualitative methods differ from quantitative methods by addressing the research problem in a way that can provide rich insight into human behavior (Becker, 1996). However, qualitative methods are hampered by their lack of generalizability, by bias, and issues of validity (Kidd, 2002). Further, qualitative methods fail to provide adequate accounts of non-mainstream lives (and “other”) that may lead to falsification of hypotheses (Guba & Lincoln, 1994; Marcus & Fischer, 1986).

An alternative method, the quantitative paradigm, views measurement to be a necessary part of understanding natural phenomena (Michel, 2003). The measurement has to be assessed for validity for it to be reliable, which is a major concern in quantitative research. The quantitative method provides a framework for hypotheses to be developed and then tested from the data that are usually collected by a questionnaire or survey (Bryman & Bell, 2007; De Vaus, 2000). Moreover, a questionnaire offers an advantage over a structured interview because it allows a degree of anonymity and is likely to yield a greater response to personal questions (Allan & Skinner, 1991). The analysis of quantitative data offers opportunities for a deductive theory development based on hypothesis testing (Bryman & Bell, 2007). This approach is useful to generalize the conceptual finding which is highly specific and objective (Hussey & Hussey, 1997). Although the quantitative studies exclude the meaning and purpose of actual human activity, one can obtain an understanding of how the phenomena really work (Guba & Lincoln, 1994). This method seeks to develop quantified measures of phenomena that explain the relationships among key variables, such as: Core Self-Evaluations, Edinburgh Farming Stress Inventory, General Health Questionnaires, Job Satisfaction, and Life Satisfaction. It seeks to cast light on the research questions by obtaining a detailed description and understanding of current situations (Guba & Lincoln, 1994).

Taken together, as Hammersley (1996) pointed out, the choice of the textual form of words interpretation or any forms of numerical measurement on a particular study should depend “not on ideological commitment to one methodological paradigm or another” (p. 162). Since the purpose of this study is mainly the hypothesis testing of individuals-related characteristics and work behaviors, the dominance of the quantitative approach is the primary

strategy. The assumption is that “the researcher is independent of and neither affects nor is affected by the subject of the research” (Remenyi, Williams, Money, & Swartz, 1998, p. 33).

The two fundamentally different approaches to research are summarised in Table 2.

Table 2: Differences between Quantitative and Qualitative Research

	Quantitative	Qualitative
Researcher	<ul style="list-style-type: none"> i. Indirect contact with participants to prevent bias which allows anonymity ii. Excludes the meaning and purpose of actual human activity 	<ul style="list-style-type: none"> i. High participation by observing research in real-time ii. Bias and issues of validity
Research purpose	<ul style="list-style-type: none"> i. Gain an understanding of natural phenomena based on hypothesis/theory testing/research questions 	<ul style="list-style-type: none"> i. Provides rich insight and in-depth phenomena based on emergent theory
Focus of research	<ul style="list-style-type: none"> i. Describe and predict by quantification and statistical analysis ii. Hard, reliable data 	<ul style="list-style-type: none"> i. Understand and interpret by emphasizing words ii. Rich, deep data
Sample size	<ul style="list-style-type: none"> i. Large sample (able to generalize the conceptual findings) 	<ul style="list-style-type: none"> i. Small sample (lack of generalizability)
Research design	<ul style="list-style-type: none"> i. Survey method 	<ul style="list-style-type: none"> i. Interview/case study

3.2.2 Research Design

The research methods are associated with different types of research design. The five prominent research designs are: experimental design, cross-sectional design, longitudinal design, case study design, and comparative design. Each research design has different criteria for evaluating the research findings. The research design is a vital tool to provide the researcher with a framework to conduct the research. The framework evaluates the evidence against a set of criteria and the research question. Moreover, the choice of research methodology is determined by how the data is collected and the timeframe to ensure the validity and reliability of the study (Bryman & Cramer, 2009). Thus, there is no simple

classification of research design that covers the understanding of phenomena as accurately and objectively as possible (Cooper & Schindler, 2008).

The longitudinal and cross-sectional designs are two distinct forms of research design that are mainly based on structured interviews or self-completion questionnaire survey research. A survey in longitudinal design research is repeated over an extended period to understand the work phenomena of the same farm managers, such as with seasonal farm work. Thus, it is possible to focus on changes occurring within subjects and to make farming population inferences in case study interviews with the farm managers (Bryman & Bell, 2007). Since this type of design is conducted over a period of time, it is not feasible to conduct organizational research and it is costly to recruit new farm managers when they declined to participate in the survey over time. While longitudinal research is important, there is also a risk of bias if the information is collected for the second time from the same individuals (Cooper & Schindler, 2008).

Contrary to longitudinal design, cross-sectional design research is administered in a nation-wide survey and represents a snapshot taken at a specific time, to overcome constraints of time or resources. Although the cross-sectional design does not provide definite information on the cause and effect of relationships, the design allows the understanding of the associations of different variables at the same time. For instance, self-administered cross-sectional surveys to evaluate occupational stress at a specific time have been widely been utilized recently to understand farm stress experienced by farm managers (Alpass *et al.*, 2004; Firth *et al.*, 2006). Table 3 below summarizes the advantages and disadvantages of cross-sectional design compared to longitudinal design:

Table 3: Advantages and Disadvantages of Cross-sectional Design versus Longitudinal Design

	Advantages	Disadvantages
Cross-sectional survey	<ul style="list-style-type: none"> i. Cost-effective to resample new subjects, and data collected simultaneously ii. Consistent benchmarks and easy to replicate iii. Increased understanding of the phenomena iv. Examines relationship of variables v. Compares different groups 	<ul style="list-style-type: none"> i. Does not provide information on cause-and-effect relationships ii. Method variances iii. Lacks internal validity iv. Risk of non-response bias v. Reliance on self-report measures
Longitudinal survey	<ul style="list-style-type: none"> i. High validity ii. Able to make accurate inferences over long-term changes 	<ul style="list-style-type: none"> i. Sample varies when subjects decline to participate ii. Costly to conduct iii. Risk of bias iv. Long period of time to gather results v. Not feasible in business and organisational research (Bryman & Bell, 2007)

Given these considerations, cross-sectional design is adopted for clarifying and explaining variables of interest and their relationships. In doing so, the research is expected to develop and test a psychological model in order to understand the personality of farm managers in the farming community. This strategy entails the collection of data simultaneously, at a single point in time, from the respondents by self-completion questionnaires. A sample of respondents was drawn from the New Zealand farming population in order to make an assumption about the theory and in an attempt to increase predictive understanding of the phenomena (Hussey & Hussey, 1997; Orlikowski & Baroudi, 1991). In this study, farm managers were selected because of increased international interest and evidence of the effect of stressors on their jobs and life on the farm (Judd *et al.*, 2006). The respondents were from diverse farming sectors that were exposed to different conditions during the same period of time. Since each respondent administered the same instrument and

answered each question in the same order, the use of the questionnaire method allowed the standardization of responses. Therefore, any variation in responses could be attributed to genuine variations and not to divergences in the manner of asking the questions (Bryman, 1989). By examining a number of variables, quantifiable measures of phenomena can be developed (Bryman, 1989; Guba & Lincoln, 1994; Rossi, Wright, & Anderson, 1983).

There are many advantages with self-administered surveys, especially when distributed by mail. They are generally cheaper than other methods of data collection. Further, the respondents may be more honest if anonymity is assured, and interviewer bias is eliminated. Greater numbers of subjects can be included from wide geographic regions and respondents can answer the survey at their own pace, taking time to consider the items, if necessary (Dillman, 2000). Further, the advantage of quantification is that it provides the researcher with a consistent benchmark and it is simple to replicate (Bryman & Bell, 2007).

On the other hand, a self-administered survey of a cross-sectional design does introduce possible sources of error. These include a social desirability bias, method variance, an acquiescence response set, and a non-response bias error (Dillman, 2000). In addition, the non-respondents may differ from respondents in certain aspects (Bryman & Cramer, 2009). These biases and errors require all surveys to be well-constructed and carefully worded. Unfortunately, some of the possible errors associated with self-administered surveys are unavoidable. The surveys rely on the respondents' memory and interpretation of events, which may or may not indicate a psychological response. The answers may depend on the mood of the respondent at the time they complete the survey. For example, after a bad day at work, the respondents may report that the occupation was more stressful. This survey was designed to provide empirical evidence to establish a theoretical model.

3.3 Participants

The sample in this survey was composed of farm owners, sharemilkers, orchardists, salaried farm managers and lower order sharemilkers who participated in the survey. They either owned the land and/or had the responsibility to oversee the farm and manage the work of the farm workers. They were all principally responsible for helping the farm to achieve optimum productivity.

In this study, New Zealand farm managers may have been members of either the voluntary organization, Federated Farmers NZ, or Horticulture NZ. Federated Farmers NZ, which represents the majority of dairy/beef/sheep/crop/arable farm managers, and Horticulture NZ, which represents the majority of horticultural farm growers, distributed the questionnaires. There were approximately 6,000 registered farm managers who were members of Federated Farmers NZ and Horticulture NZ.

The farming organizations distributed the questionnaires in a variety of mediums to increase the response rate (see Table 4). Table 4 shows the techniques used to administer the self-completion questionnaires.

Table 4: Sample Accessibility Approach for the Self-completion Questionnaire

Techniques	Administered
1. Traditional mail surveys <ul style="list-style-type: none"> • postal questionnaire • survey via personal interview • survey via telephone interview 2. Web-based surveys <ul style="list-style-type: none"> • web-based questionnaire • email-based 	<ul style="list-style-type: none"> • online survey • postal questionnaire • post-paid reply questionnaire inserted inside the ‘Orchardist’ magazine
3. Increase response rates <ul style="list-style-type: none"> • monetary incentives • booklet format questionnaire • stamped, addressed envelope • follow-up or reminder to non-respondents • clear instructions/good cover letter • appeal to participate 	<ul style="list-style-type: none"> • incentives – gift vouchers for the lucky participants • good cover letter/clear instructions • stamped, addressed envelope • reminder advertised in the ‘Orchardist’ magazine and two reminders by email • set deadline dates

The use of self-administered questionnaires allowed the data to be collected by the farming organization. Distributing the questionnaires ‘en masse’ was likely to save cost and time (Bryman & Bell, 2007). The members received a participant cover letter explaining the research along with the survey instrument. Further, self-completion was more convenient as they were able to complete it in their own time. Upon completing the survey, participants were sincerely thanked and were presented with the option of filling in their email address or telephone number if they chose to enter into the random drawing of gift vouchers. The winners of the draw were informed through the participating farming organization. A review of literature suggests that the inclusion of monetary incentives substantially increases response rates (King, Pealer, & Bernard, 2001).

Federated Farmers NZ recommended an email survey as well as a postal survey to reach out to their members. According to Schaeffer and Dillman (1998), using both mail and email surveys would tap into the mode preferences among respondents. Yun and Trumbo

(2000) implemented a mixed-mode procedure of paper and electronic versions which yielded a good response rate (72%), which highlights the need for further experimental comparisons of mode combinations.

On the other hand, the survey for the growers was sent as a post-paid reply questionnaire which was inserted inside the front cover of the 'Orchardist' magazine to each of their 3,000 members. A follow-up notice was placed in a column of the next issue of the Orchardist magazine to ask members to participate in the survey. Participation in the study was entirely voluntary. However, the precise number of questionnaires sent out as part of the survey was difficult to ascertain, as the membership databases used in this study were the property of the individual organisations and are protected under the New Zealand Privacy Law, 1993.

3.4 Data Collection Procedures

Quantitative researchers are generally concerned with the ability to generalize their findings beyond the confines of the given context in which the research was conducted. A large sample size enables the study to be generalized more easily (Bryman & Bell, 2007). Thus, to strengthen the generalization of the findings in this study, the respondents' addresses were identified from the farming organizations with stratification by type of farming. Since the population of subjects was large, selection by stratified random sampling was the most appropriate choice (Bryman & Cramer, 2009). The nature of the stratified random sampling procedure offered the advantage of comparing different groups because the sample selected was representative of the farming population, and, thus, provided more information (Bryman & Cramer, 2009; Cavana, Delahaye, & Sekaran, 2001). This strategy was an efficient

research sampling design compared with other probability sampling designs and reduced sampling error (Sekaran, 2003). It involved a process of segregation which was followed by random selection of subjects from each group. Stratified sampling was chosen from the other sampling techniques because the samples were drawn from each of the different types of farming. This technique was preferred on the basis of the following criteria (Cooper & Schindler, 2008):

- i. To increase statistical efficiency in the sample of the farming population.
- ii. To gather adequate data for analyzing the various subpopulations.
- iii. To administer the appropriate research methods and procedures in different subpopulations.
- iv. To identify easily the sources of information on the characteristics of farm managers from different types of farming populations.
- v. To generate cost savings and efficiency if the actual sample is known (Bryman & Cramer, 2009; Sudman, 1976).
- vi. To further enhance the likelihood of proper representation of the farming population in the sample (Bryman & Cramer, 2009).

For example, this study used the internet and magazines that were readily available to the members. They were assigned to every member in a target population with a known probability of being selected, which avoided coverage error. The sample size provided a basis for the estimation of sampling error (Hair, Black, Babin, Anderson, & Tatham, 2006). For example, a small sample size may lead to the acceptance of a hypothesis which is not

generally a good fit. Further, if the sample size is too large, the model may be rejected due to sensitivity in detecting differences (Hair *et al.*, 2006). Thus, sampling error and bias can lead to a lack of generalization of the findings.

Federated Farmers NZ began with an initial list of 1,000 random members who received the postal questionnaires. The survey questionnaire was posted in two batches by Federated Farmers NZ: 532 members in the first batch and 468 members in the second batch. There was no follow-up letter. The respondents were informed that the questionnaire would take fifteen minutes to complete. Copies of the cover letter and the survey instrument are included in the appendices (Appendix I: Participant Letter; Appendix II: Survey instrument). In addition, Federated Farmers NZ sent the questionnaire to the usable email addresses of their members, requesting participation in the survey. The member database of Federated Farmers NZ was used and 3,000 emails were sent. After two weeks, Federated Farmers NZ sent a follow-up email letter to remind the potential individuals of the online survey (see Appendix III). One week later, a final reminder was sent. Individuals who agreed to participate were diverted to the web site through the URL-embedded link. (Appendix IV)

In the mail survey, there were three respondents who declined to participate due to farming commitments because they had not had any days off. There were four respondents who returned the survey questionnaire stating that they were semi-retired and did not fit the criteria. A further two questionnaire surveys were returned by the participants because they had sold their farms. However, there were three respondents who completed the survey even though they had sold their farms (two dairy farmers and a beef/sheep farmer). Another respondent suggested adding a questionnaire about the recruitment, employment, and management of labour in the farming industry.

3.5 Instrumentation

Five established instruments were utilized in this study, and were comprised of sixty-eight scale items. Edinburgh Farming Stress Inventory (Deary *et al.*, 1997) and several other survey components: the General Health Questionnaire-12 (Kalliath, O’Driscoll, & Brough, 2004), the Index of Job Satisfaction (Brayfield & Rothe, 1951), Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985), and the Core Self-Evaluations scale (Judge *et al.*, 2003) were used to gather information (see Appendix II). The existing scales were used to measure all of the constructs in this study. Each component of the survey instrument contained a Likert-type scale to rate the respondents’ answers. The questionnaires were sent by mail and distributed through the electronic system to the identified subjects.

3.5.1 Stressors

Stressors were measured using the Edinburgh Farming Stress Inventory. The item “Changes in Common Agricultural Policy (called the CAP)”, which is not relevant to New Zealand farming, was deleted from the thirty-five item stress inventory. With respect to this point, the thirty-four items in the inventory were administered to all respondents. A total of six domains, consisting of thirty-four items, to assess farm-related stress were identified in the inventory: 1) government bureaucracy; 2) financial debts; 3) unpredictable factors in farming (such as weather and machinery breakdown at busy times; 4) time pressures; 5) personal farm hazards; and 6) geographical isolation (Deary *et al.*, 1997). The questionnaire was prefaced by the statement, “Each of the items and situations below represents a potential source of farming-related stress”. The respondents were instructed to rate the severity and

frequency of the occurrence of the stressors personally, using a scale from 1 to 5, 'none' to 'very severe', respectively.

3.5.2 Strain

Strain was measured using the General Health Questionnaire-12 (Banks *et al.*, 1980; Kalliath *et al.*, 2004). The General Health Questionnaire is a widely-used measure to detect psychiatric disorders in a community (Goldberg & Williams, 1991), and psychological strain (Banks & Jackson, 1982; Winefield, Goldney, Winefield, & Tiggermann, 1989). Banks *et al.* (1980) and Kalliath *et al.* (2004) used a six-point scale which has been shown to be effective in structural equation modeling. Low scores indicate low levels of psychological strain and high scores indicate high levels of psychological strain. The measurement of the General Health Questionnaire-12 employed a similar scale to the previous research (such as Kalliath *et al.*, 2004) with a six-point response scale ranging from 1 = 'never' to 6 = 'all the time'. The General Health Questionnaire-12 consisted of six positively-worded items (such as 'Felt capable of making decisions about things'; 'Been able to concentrate on what you are doing') and six negatively-worded items (such as 'Been thinking of yourself as worthless person'; 'Been feeling unhappy or depressed?'). This measure has acceptably high internal consistency, as measured by Cronbach's Alpha coefficient which is 0.91.

3.5.3 Job Satisfaction

Job satisfaction was measured with five items from the Brayfield-Rothe (1951) index of job satisfaction, using a seven-point Likert-type scale ranging from 1 = ‘strongly disagree’ to 7 = ‘strongly agree’, with the neutral response being ‘neither agree nor disagree’. Some of the statements that respondents responded to included, “I feel fairly satisfied with my present job”; “I find real enjoyment in my work”, and, “Each day of work seems like it will never end” (reverse scored), and “I consider my job to be rather unpleasant” (reverse scored).

3.5.4 Life Satisfaction

To help control for the potential confounding effects of life satisfaction on the relationship between strain and job satisfaction, a brief measure of life satisfaction was utilized. Life satisfaction can be measured directly by expressed self-report assessments of the participants. Life satisfaction measures rely on participant self-disclosure and are affected by the ability of participants to respond openly (Jourard, 1971). To enable participants to honestly self-disclose, the questions must be unambiguous and comprehensible while ensuring participants of their confidentiality. The most widely-known and commonly-utilized is the measure with the five-item Satisfaction with Life scale from Diener *et al.* (1985). The satisfaction with life scale consists of five statements, such as, “I am satisfied with my life”, and, “In most ways my life is close to my ideal”. Respondents rated each statement on a 7-point scale, 1 = “strongly disagree”, 2 = “disagree”, 3 = “slightly disagree”, 4 = “neither agree nor disagree”, 5 = “slightly agree”, 6 = “agree”, and 7 = “strongly agree”. The satisfaction with life scale has been shown to have favorable psychometric properties, including high internal consistency and high reliability ($\alpha = 0.82$) (Diener *et al.*, 1985).

3.5.5 Core Self-Evaluations

This measure was adapted from the twelve-item measurement scale of Judge *et al.*, (2003). The scale items were derived from an exploratory factor analysis of an original item pool consisting of sixty-five scale items, which related to each of the four individual core self-evaluations traits (self-esteem, generalized self-efficacy, neuroticism and locus of control) (Chen, Gully, & Eden, 2001; Gray-Little, Williams, & Hancock, 1997; Rosenberg, 1965; Rotter, 1966). This measures the commonality among the core traits directly (Judge *et al.*, 2003) and as indicators of a higher-order latent psychological concept (Erez & Judge, 2001; Judge *et al.*, 2000; Judge *et al.*, 1998a). According to Judge *et al.* (2003), there is evidence that the 12-item core self-evaluations scale displays acceptable levels of internal consistency. Of the 12 items, 6 are positively worded and 6 are negatively worded. Respondents were asked to express the extent of their agreement to questions such as “I complete my tasks successfully”, “When I try, I generally succeed”, and, “Sometimes when I fail I feel worthless”, “Sometimes I feel depressed” (reverse scored). The Cronbach’s Alpha coefficient values reported were .85 in sample 1, .83 in sample 2, and test-retest reliability was .81. The measurement of the core self-evaluations scale anchors was changed from a five-point response to a seven-point response so that this survey was consistent in scale format throughout.

3.5.6 Demographic Variables

A standard questionnaire containing questions about participants’ demographic characteristics was utilized in this study. The information requested included gender, age, job title, ethnicity, and marital status. Other contextual questions included the size of the farm,

type of industry, job tenure, number of employees, and average working hours per week. Demographics provided an overview and descriptive data of the farm managers and, further, have the potential to control variables for this research. Given Judd *et al.*'s (2006) suggestion, collecting demographic data would allow potential correlates of job strain to be tested. The demographic details were included in the last section of the survey questionnaire.

3.6 The Pilot Study

A pilot study was conducted in the first part of the research. The pilot study was intended to ensure that the proposed farm-related stress instrument and its procedures would work, in practice, before being applied to a large sample of subjects. As questionnaires were designed to be self explanatory, the use of a piloted questionnaire helped to minimize the risk of missing data (Alreck & Settle, 1995; Bryman & Bell, 2007). The pilot study took place at five farming organizations. The farming organizations that were willing to participate were AgResearch, Federated Farmers NZ, Horticulture NZ, Fonterra, and Dexcel. The reason these organizations were chosen for the pilot study was because the key personnel were easily approachable and willing to assist when contacted by email. The key personnel were informed prior to meeting them and were provided with the information regarding the proposed survey on New Zealand farm managers. They were also informed that this was a study on the effect of farm stressors as well as an attempt to understand aspects of the farm manager's personality, and that they could talk about anything that they felt was inappropriate, or that farmers might refuse to answer.

Pilot study is important in research as it determines whether the questionnaire could be easily understood by the respondents before conducting wider survey of the farming

population. This survey instrument was examined by five volunteer farm managers during the pilot study. One of the questionnaires in the Deary *et al.*'s (1997) Edinburgh Farming Stress Inventory instrument was deleted. In addition to the questionnaire, subjects also provided a feedback concerning clarity of instructions, difficulties with the questions, questionnaire length, layout and preferred method for returning the questionnaires. The overall feedback on the questionnaires was positive. The instructions were clear and questions were well laid out. Based on their recommendations, I omitted the following question, "Changes in Common Agricultural Policy", from the Edinburgh Farming Stress Inventory. This question was considered relevant only to the European farmers because the European Union supports (subsidizes) European farming which effectively sets the prices farmers receive. However, New Zealand farmers do not receive subsidies or anything equivalent to the CAP⁵.

The pilot survey highlighted that the most commonly-used modified version of the General Health Questionnaire (GHQ-12) is the most appropriate for psychometric properties measurement of farmer's mental strain. The General Health Questionnaire (GHQ-12) has been used in a number of ways: 1) in the UK to psychologically assess and compare farmers who have been, or not been, affected by the impact of foot-and-mouth disease (Peck, Grant, McArthur, & Godden, 2002); 2) to indicate the extent of occupational stress amongst farmers and their families (Booth & Lloyd, 2000); and 3) to link farmers' decision-making with the personality trait of neuroticism (McGregor *et al.*, 1996).

After seeking advice from Federated Farmers' NZ management team, a carefully designed cover letter with guidelines for filling in the questionnaire, and a post-paid return envelope addressed to the Federated Farmers' head office, was prepared. The format of the

⁵ James Allen, farm consultant of AgFirst Waikato, personal communication, June 4th, 2007.

cover letter was changed to a simplified and easy-to-read format. An introductory paragraph was included to provide the respondent with a background to the study so they could feel more involved and be encouraged to participate. The purpose of the study was explained to provide them with an insight into why they were completing the questionnaire and what value it might bring to the farming industry.

This survey instrument was examined by the farming organization to ensure that all areas had been reviewed and that the final questionnaire was deemed appropriate for this study. I was informed that a brief report of the survey was seldom sufficient reward for participating in the survey for the participants who offered their time. They suggested that the participants would require a monetary return, which was provided by means of a prize draw.

3.7 Methodological Limitations

The self-report instruments of this study have several shortcomings. The credibility of the data was an issue in each step of the research design and data collection procedure. The information collected from respondents by various means could be biased. With an online survey, there is a risk that some respondents may accidentally complete the questionnaire more than once. Further, the online users are a biased sample of the population because they are better educated, younger and not representative in ethnic terms (Couper, 2000). Thus, Cavana *et al.* (2001) recommend that the data should be collected from different sources and by different methods. To overcome the limitations in the data collection procedure, both online and postal surveys were conducted from different samples of the subpopulation.

The reliability and validity is a necessary condition to test measures in the context of the study. However, all scores for reliability and validity of the Core Self-Evaluations (Judge

et al., 2003), General Health Questionnaire-12 (Tait, French, & Hulse, 2003), Edinburgh Farming Stress Inventory (Deary *et al.*, 1997), and the Job Satisfaction and Life Satisfaction Index (Heller *et al.*, 2006) had fallen into acceptable ranges in previous studies.

3.7.1 Issues of Validity

Validity is an issue that needs to be addressed in order to ensure the accuracy and dependability of the data to interpret the situation accurately (Hussey & Hussey, 1997). According to Cavana *et al.* (2001), a valid construct is concerned with how well the variable of interest is measured by a specific instrument. Further, the self-report instruments may fail to address adequately the research problems because of inconsistencies among the respondents to report accurate responses (Laing, 1988).

In this study, the scale has convergent validity when it is correlated significantly with other instruments designed to measure the same construct (Bryman & Cramer, 2009; Constantine & Ponterotto, 2006). Hence, the validity of the equal weighting of the four specific core traits (self-esteem, generalized self-efficacy, neuroticism, and locus of control) in the 12-item Core Self-Evaluations scale can be an issue (Johnson *et al.*, 2008). Based on existing evidence by Bono and Judge (2003), and Judge *et al.* (2000), locus of control tends to show a weaker convergent validity when compared with the other three traits after correcting for measurement errors. Similarly, Dormann *et al.* (2006) reported significantly lower loading for neuroticism compared with self-esteem and generalized self-efficacy.

To assess the psychometric soundness of the core self-evaluations instrument, research needs to establish the link between theory and psychometric properties to establish construct validity (Kerlinger, 1986). To demonstrate construct validity, a confirmatory factor

analysis (CFA) by structural equation modelling (SEM), and principal-components analysis were employed to confirm the construct of core self-evaluations (Johnson *et al.*, 2008). This research adopted this procedure to develop the core self-evaluations scale because of two primary benefits:

- i. to avoid biased parameter estimates (MacKenzie, Podsakoff, & Jarvis, 2005).
- ii. by specifying separate constructs for core self-evaluations and its traits, the unique and joint effects of traits can be examined (Judge *et al.*, 2004).

3.7.2 Issues of Reliability

A survey is reliable if the results can be replicated by the researcher. The lack of reliability is attributed to factors such as differences in the context in which the research was conducted, inconsistencies in the research process used, researcher biases, and measurement errors (Weber, 2004).

In this study, there are several issues of reliability. The incomplete information regarding certain variables, particularly the farming stressors, may be a source of bias. Secondly, it is not known if it is an accurate representation of the population sample. Thirdly, the respondents who did not answer the questionnaire accurately could severely bias the results (Bryman & Cramer, 2009). The impact of any measurement error will lead to corresponding lower reliability of the predictor variable, and threaten the validity of the relationships between measures (Bagozzi & Yi, 1990; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). However, the reliability can be improved by careful wording of the questionnaires and the assured confidentiality of the respondents. Further, to overcome potential concern about reliability, several strategies have been performed to minimize bias

and ensure a consistent measurement. In particular, to ensure reliability with a large number of items such as the 34-item farming-specific environmental stressors measure, more stringent requirements have to be met (Hair *et al.*, 2006). First, to maintain internal consistency, the individual items of the scale should all be measuring the same construct (Hair *et al.*, 2006). By using a piloted questionnaire, the reliability of the study can be improved (De Vaus, 2000). Next, to ensure a measuring instrument is reliable, the item-to-total correlation exceeding .50 and the lower limit value of 0.70 for Cronbach's Alpha is desirable (Hair *et al.*, 2006; Robinson, Shaver, & Wrightsman, 1991). However, the established instruments and systematic coding scheme will improve the reliability of the study. As the relationships between variables in this study are based on the observed correlation and resulting regression coefficient, the statistical estimation can be improved and a more accurate estimate of the structural coefficients can be developed by tackling the issues of reliability. The limitations and delimitations of the reliability issues are summarized in Table 5.

Table 5: Limitations and Delimitations in the Issues of Reliability

Limitations		Delimitations
1	<ul style="list-style-type: none"> i. Measurement errors ii. Internal consistency 	<ul style="list-style-type: none"> i. Individual items of the scale should all measure the same construct and be highly inter-correlated ii. Assess with Cronbach's Alpha iii. Use established instruments and systematic coding scheme iv. Pilot questionnaires
2	<ul style="list-style-type: none"> i. Respondent biases 	<ul style="list-style-type: none"> i. Careful wording of the questions, clear format, and content ii. Anonymity assured
3	<ul style="list-style-type: none"> i. Incomplete information on certain variables 	<ul style="list-style-type: none"> i. Use multiple items indicators
4	<ul style="list-style-type: none"> i. Representation of the population sample 	<ul style="list-style-type: none"> i. Standardise administration of questionnaire across sectors ii. Meet the farming organisations

3.7.3 Controlling for Common Method Variance

Since this study is conducted in a cross-sectional design, the relationships of the variables of interest are vulnerable to the inflation of correlations by common method variance (Lindell & Whitney, 2001). Common method variance is comprised of both systematic and random measurement error that is attributable to the measurement method rather than the variables measured (Bagozzi & Yi, 1990; Spector, 1987). A study by Brief *et al.* (1988) found that correlation coefficients were inflated in the self-ratings of job stressors, job satisfaction and other self-reported attitudinal variables. Studies by Jex and Spector (1996) failed, however, to show similar results in self-reported measures of job stress and job strain. Therefore, the inconsistency in their finding is a cause for concern in measurement. The error in estimates due to common method bias can lead to improper rejection of a theory (Doty & Glick, 1998). Further, the common method variance arises when two or more variables are collected from the same respondents and are measured by the same method to interpret the relationships (Podsakoff *et al.*, 2003; Spector, 2006).

When implementing multiple instruments in a single study, Podsakoff *et al.* (2003) encourage the use of multiple scale formats, such as the Likert-type response scale of 5 or 7. This study has been controlled for error variance associated with common scale formats and scale length. However, the main issue in collecting data in the self-report measures is in identifying the extent of common method variance in the survey instruments, which could lead to an artificial increase in the strength of the relationships (Morgan & Berthon, 2008). The effect of such variance in the data has been minimized by randomised or intermixed items within the same section of the questionnaire which comprised items of the core self-evaluations, job satisfaction and life satisfaction. The different constructs have been built on

a similar scale format that makes it easier for respondents to complete the questionnaire. The instruments are consistent throughout which may encourage the participants to respond to initial scale items in a similar manner to subsequent scale items. Kline, Sulsky and Rever-Moriyama (2000), recommend this practice in order to reduce common method variance.

Second, the negative items of the core self-evaluations, strain and job satisfaction, are reverse coded. In addition, the survey provides clear instructions in each section of the questionnaire that entail no preferred response in the statements, while keeping the survey instruments as brief as possible. This practice can minimize the effect of such variance (Spector & Brannick, 1995).

Third, the data has been tested for the extent of common method variance by using exploratory factor analysis to determine a single factor within all the items from all the constructs in the study (Podsakoff *et al.*, 2003; Podsakoff & Organ, 1986). However, there is no single general factor extracted in the unrotated factor structure from the data that reflect underlying method variance effects in the questionnaires. Likewise, the common method variance is not an acceptable explanation for the construct relationships because the first factor does not account for most of the variance nor has a general factor been identified (Morgan & Berthon, 2008). Therefore, no remedial action to correct for such variance is necessary. Table 6 summarizes the limitations and delimitations of common method variance.

Table 6: Limitations and Delimitations of Common Method Variance
(Podsakoff *et al.*, 2003)

Limitations	Delimitations
Common scale format	Multiple scale formats in the questionnaires
Common variance	Multitrait-multimethod matrices by confirmatory factor analysis (Lindell & Whitney, 2001)
Scale length	Brief survey instruments
Artifactual relationships	i. reverse-coded items ii. exploratory factor analysis (Harman’s single factor test)
i. Inflated correlation coefficients ii. Common respondents effects <ul style="list-style-type: none"> • consistency motif • social desirability • mood state 	i. randomised or intermixed items within the same section of the questionnaire ii. Partial correlations procedures iii. clear instructions in each section and no preferred response in the statements.

3.7.4 Ethical Considerations

In the current study, the issues that arose while formulating the research problems were as follows:

- i. The participants have the right to refuse to answer any questionnaires or participate in the study if there is a possible risk associated with the research. For those participants who are stressed, they are advised to refer to health services or psychologists.
- ii. The items are phrased so as not to cause stress. This is to ensure that there is no prospect of participants causing harm to themselves by relating to the items that incorporate stressful events.

- iii. The researcher assured the respondents that all information collected would be treated confidentially, their privacy would be protected and no one would be identified in the report.

All respondents who participated in the current study had signed a written consent form which stated that their anonymity was assured in all circumstances and publications. A detailed proposal from the University of Auckland ethical protocols was used as a guide to construct the consent form. It stated that participants could withdraw their responses when and if they felt it necessary, as well as withdraw their data after the survey if they wished. All participants were assured that the research would be conducted strictly in compliance with the University of Auckland Human Subjects Ethics Committee guidelines (UAHSEC). UAHSEC draws up ethical guidelines and other considerations to be integrated into the research design to protect participants against harm or intimidation. The email messages described the purpose of the study and assured participants of the confidentiality of their responses (see Appendix I).

3.8 Managing the Data

In quantitative data, ratings made on each survey by respondents were transformed into raw data in a form that can be easily analyzed in a spreadsheet (Cooksey & McDonald, 2009). In this study, all items were numbered in chronological order for identification and coded.

The negatively-worded items were reverse scored to ensure that all items were coded in the same direction. In the case of General Health Questionnaire-12 and the Core Self-

Evaluations measurement, there were six negatively-worded items that were reverse scored in each of the instruments. Two of the Job Satisfaction items were reverse scored. Since this study was a combination of paper-based and web-based surveys, the necessary steps were taken to ensure the proper alignment of variables from the two data sources and to ensure coding consistency.

The responses to the job level and type of industry in the demographic variables were coded from 1 to 5, and the marital status and ethnicity variables were coded across a range from 1 to 7. The Northern region of residence was coded from 1 to 11, and the variable of the South Island region of residence was coded from 12 to 17. Gender was coded as 1 or 2 depending on whether the response was from a male or female. Table 7 shows the individual coding of the demographic variables.

In this survey, exact figures were required from the demographic variables such as the size of the farm, tenure, age, number of employees working during the peak season, average hours worked per week, number of days sick per year and whether or not these industries were from horticulture/dairy/beef/sheep/crops. In cases where open-ended and written responses were given, they were assigned to a number as a category code (Vaus, 2002). This coding system generates distinct categories, especially for a large sample. The data then needs to be edited for simplicity. The stem-and-leaf plot is a useful way to manage and present the data (Tukey, 1977).

Table 7: Codes for Demographic Variables

Demographic Variables	Code	Demographic Variables	Code
Gender Male Female	(1-2) 1 2	Type of industry Dairy Dairy and mixed farm Horticulture and mixed farm Sheep/beef Arable/agriculture	(1-5) 1 2 3 4 5
Marital status Never married Married Civil union Separated Divorced Widowed De Facto	(1-7) 1 2 3 4 5 6 7	Northern region of residence Northland Auckland Waikato Hauraki/Coromandel Gisborne Hawkes Bay Bay of Plenty Central North Taranaki Manawatu/Wanganui Wairarapa	(1-11) 1 2 3 4 5 6 7 8 9 10 11
Ethnicity NZ Maori NZ Pakeha/European Pacific Islander Asian African European New Zealander	(1-7) 1 2 3 4 5 6 7		
Job level Farm owner Farm manager Sharemilker Lower order sharemilker Others	(1-5) 1 2 3 4 5	Sothern region of residence Nelson Marlborough West Coast Canterbury Otago Southland	(12-17) 12 13 14 15 16 17

3.8.1 Missing Data Treatment

To address the missing data, the case-wise deletion is the most common method applied in statistical software (Acock, 2005). If there is no large amount of missing data for variables or any problematic missing data patterns, it is preferable to leave a blank rather than estimate the values (Cooksey & McDonald, 2009). To find inapplicable responses, the descriptive function can be used in SPSS to identify the cases as “missing values”.

However, in multivariate analyses that involve many items, a low rate of missing values on each item may cause large portions of the sample to be discarded. Thus, prior to testing the structural model using AMOS program, missing data were replaced with the mean of each variable in order to achieve a good fit of the model (Donner, 1982). The substitution of the mean will reflect the respondent's own observed items for each of his or her missing items (Schafer & Graham, 2002).

3.9 Statistical Analysis of the Model

This section outlines the statistical analyses of the model by using the raw data. The analysis of the model began by computing the stem-and-leaf plot for all the scales measured in the sample. Following this, the descriptive statistics, factor matrix, multivariate correlations, analysis of variance, multiple regression analyses and structural equation modelling were computed.

3.9.1 Stem-and-Leaf Plot

The stem-and-leaf plot is a very effective exploratory tool in managing data on a range of numeric values that correspond to the actual observed value in the distribution (Bollen, 1989; Coakes & Steed, 2007; Tukey, 1977). An accurate size range of the demographic variables as well as variables of interest can easily be determined. Further, the interval variables that displayed a wide range of values were easily identified when the values were clustered with the original data. Besides providing the actual data values, the potential outliers can be identified. The stem-and-leaf plot was generated to determine valid ranges for age, tenure, size of farm, and average working hours. Hence, the descriptive

statistics were drawn by plotting these data to make the inferences on a sample of the farm managers.

3.9.2 Descriptive Statistics

Descriptive statistics is the conversion of raw data into empirical data that provides information on the variables of interest in a particular situation (Cavana *et al.*, 2001). It describes the basic structure of the data by applying the measure of central tendency (mean and median), variance, and standard deviation. These measures provide general observations about the distribution of each variable. A preliminary analysis of the data was conducted to check if the precondition falls in a normal distribution, and whether the respondent is a random and independent sample from the population (Coakes & Steed, 2007).

The means and standard deviations were calculated for the continuous demographic variables of the respondents: their age, years involved in farming, size of farm in hectares, and number of livestock. The categorical demographic variables are gender, marital status, ethnicity, and region of residence, whereby the frequencies in the form of absolute numbers and percentage breakdown were calculated.

The multiple item measures of the stressors, strain, core self-evaluations, job and life satisfaction were each collapsed into single measures by taking the factor score of the items. The factor scores are useful when the variables have different means and/or standard deviations. The factor scores are standardised according to a *z*-score, with zero mean and unit standard deviation. The regression estimates method in factor scores are used to minimize the discrepancy between the predicted and the true factor scores. Factor scores using unit-weights based on scoring coefficients performed better than using other unit-weighting

methods (Grice, 2001). Ten Berge and Knol (1985) found that simple loading-based factor scores were more reliable, in terms of internal consistency. A number of empirical studies seemed to support unit-weighted factor scores based on loadings which were shown to be more stable, valid, and univocal (Thompson, 1994; Wackwitz & Horn, 1971). Further, to address the issues of common method variance, all the variables were loaded into the exploratory factor analysis and the unrotated factor solution examined to determine whether the majority of the variance was accounted for by a single factor.

3.9.3 Factor Matrix

The factor analyses were conducted to ensure the validity of the five constructs in the model. Factor analysis could be used to validate the multi-item scales in the questionnaire. When all the variables were loaded and computed in SPSS, the significant loadings were identified from the factor scores. The scores in the factor analysis were the more desirable option for creating a smaller set of variables for the regression analysis, compared to using summated scales. This is because factor scores are based on the factor loadings of all variables on the factor, whereas the summated scale is calculated by combining only selected variables (Hair *et al.*, 2006). Factor scores take into consideration the loadings of other variables, and not just their influence but the highest loadings.

For a large sample size, normality of the data is less crucial compared to the robustness in the assumption of independence (Wallenstein, Zucker, & Fleiss, 1980). The data were analyzed by performing Z score to assess the normality of the five constructs. The value of Z-score was compared to the critical value of the statistic test. The critical value of 1.96 denotes a .05 significance level for the test with large sample sizes (Hair *et al.*, 2006).

Likewise, if the absolute value of the statistic was greater than the critical value, this denotes statistical significance. For comparison of two groups, the value of F-ratio should be close to 1.0 when there are no real differences among the group. Alternatively, if the F-value is larger than the appropriate critical value (which depends on the degrees of freedom), “it is unlikely the observed differences are due to chance alone and the differences are statistically significant” (Wallenstein *et al.*, 1980, p. 3).

Variables with a factor loading of more than 0.40 were considered significant. Those factors loading less than 0.30 account for less than 9 percent of the variance (Bryman & Cramer, 2009). The criterion for the number of factors to be extracted was the scree slope (Child, 1990). The latent root criterion was used for deciding the number of factors to be extracted, where significant variables with eigen values more than 1 were selected (Hair *et al.*, 2006). These criteria were developed in order to make the factors clearly distinct from each other and to account for much of the common variance. The principal component analysed the total variance of the variables, whereas the principal axis factoring analysed the common variance and excluded the unique variance (Bryman & Cramer, 2009).

To determine whether or not factor analysis was suitable for the data, the correlation matrix between the variables was also examined. First, the goal of pretesting farm work stress events was to reduce the number of events on the list via factor analysis. The associations among the items in the questionnaire were examined using principal components analysis with Varimax rotation. Second, the General Health Questionnaire, and the Life and Job Satisfaction items were also examined in the exploratory factor analysis. This provided a better understanding of the structure of the variables. The Bartlett Test and the Measure of

Sampling Adequacy (MSA) were also performed to examine the overall significance of the correlation matrix (Hair *et al.*, 2006).

Last, the 12 core self-evaluations scale items were subjected to principal axis factor analysis to ensure the instrument exhibits its purported single-factor solution. Factor analyses were conducted to perform oblique rotation, using the most appropriate rotation method for the data. Hair *et al.* (2006) suggest that this method should be used if the researchers expect to have constructs that may be correlated. Judge *et al.* (2003) use Varimax rotation but, for this study, various rotation methods were performed to ensure that the most appropriate was selected. Further, a confirmatory factor analysis was performed to evaluate the validity of the proposed factor structure of core self-evaluations as a latent variable.

3.9.4 Multivariate Correlations

The strength and direction of the dichotomous and continuous variables in a linear relationship were measured by Pearson product-moment correlation. This statistical procedure identifies the degree and form of the association of any two variables (Sekaran, 2003). The factor scores were used to identify the correlation of the variables.

3.9.5 Analysis of Variance (ANOVA)

Analysis of Variance determines whether a respondent's demographic variables affect the stressor and strain variables. Mean comparisons were analyzed. Before the ANOVA test was conducted, a Levene's Test for equality of variances was performed for each scenario to check if the homoscedasticity (equal variance) assumption had been violated where

significant differences were found in the ANOVA test. A *post hoc* test was performed using the Tukey method to further investigate the differences. The alpha value was set up at $<.05$.

For example, a one-way ANOVA test was conducted to determine whether there was a difference in the level of stress for gender, hours worked, job titles, size of farms, tenure, age group, marital status, regions, and type of industry. Mean comparisons between the item scores of the farm managers from the different industries were conducted.

3.9.6 Moderated Multiple Regression Analyses

Multiple regression analyses examine simultaneously the effects of several independent variables on a dependent variable. The equation of regression is an equation that represents the best prediction of a dependent variable from several independent variables (predictors) (Tabachnick & Fidell, 2007). The variance in the dependent variable is explained by the predictors (Cavana *et al.*, 2001).

Consequently, hierarchical multiple linear regression analyses were conducted to test the moderating effect of core self-evaluations on the stressor-strain and strain-job satisfaction relationships. According to Cohen and Cohen (1975), the appropriate statistical analysis of moderator variables is hierarchical multiple regression because it allows to test for the theories on the relationships of these variables. According to Coakes and Steed (2007), there are a number of assumptions highlighting the use of multiple regression analysis and these are discussed in the following section.

3.9.6.1 Outliers

Outliers can violate assumptions of sphericity and multivariate normality if a variable is non-randomly distributed (Rasmussen, 1988). In this study, the dependent and independent variables were tested for outliers. Outliers are unusual values in the data that may have strong influence over the fitted coefficients and can also affect a confirmatory factor analysis of the data (Bollen, 1989). They generally increase error variance and reduce the power of a statistical test (Zimmerman, 1995). The individual outlier cases can also adversely affect covariances, correlations, and estimates of parameters in the structural equation (Bollen, 1989). When outlier cases are present, the covariances provide a misleading summary of the association in most of the cases. Thus, the outliers can have a considerable impact on any multiple regression equations that show a poor fit to the quality and precision of the results (Osborne & Overbay, 2008). To overcome this issue, multivariate outliers can be detected using standardized or studentized residuals in regression, and often the $z = 3$ or more of standard deviation from the mean is relatively effective (Osborne, 2008; Wainer, 1976).

3.9.6.2 Multicollinearity

The multicollinearity and singularity affect the relationships of independent and dependent variables. The moderator, Core Self-Evaluations, was tested for multicollinearity with independent variables, General Health Questionnaire-12 and Edinburgh Farming Stress Inventory. Multicollinearity creates a shared variance between independent variables (Hair *et al.*, 2006). This prevents the best estimation of any coefficients. Aiken and West (1991) suggest that to avoid the issues of multicollinearity, the independent variables can be centred, that is, converted to the deviation score so that each variable has a mean zero. The centering

of variables does not require scores to be standardized. However, there is no advantage to centering dependent variables because independent variables do not affect its simple correlation with other variables. It also does not affect regression coefficients, instead it affects the power of independent variables in the regression equation.

3.9.6.3 Non-normality of the dependent and independent variables

The test of normality of the distribution is by plotting the normal probability of residuals, whereby the expected normal values (i.e., z-scores estimates) are plotted against their actual normal values (Tabachnick & Fidell, 2007). Residual scores are defined as differences between obtained and predicted dependent variable scores. To evaluate whether the variables are meeting the assumption required for regression analysis, Hair *et al.* (2006) suggest plotting the residuals to examine the error for the variance. The most encountered assumption of violation is non-normality of dependent and/or independent variables (Hair *et al.*, 2006). Further, normality is assumed when the overall shape of the scatterplot is nearly rectangular with a concentration of scores along the centre (Bryman & Cramer, 2009). A variable's distribution is significantly different from normal distribution when the skewness (lack of symmetry) is more than 0.00 (Bryman & Cramer, 2009; Osborne, 2008). If the assumption of normality is violated, the multiple linear regression goodness of fit test may not be the statistical significance of the model. A moderate to extreme deviation score may lead to underestimating the independent and dependent variables relationship.

Next, two hierarchical multiple regression equations were tested to determine the moderation of Core Self-Evaluations in the stressor-strain and strain-job satisfaction relationship. Based on theoretical considerations, before running the moderated multiple

regression equations during hypothesis testing, the control variable, life satisfaction and significant demographic variables were entered first. Then all independent variables of interest were first centred and then multiplied together to create the moderating variable interaction term. In addition, the centering of independent variables led to similar unstandardized regression coefficients compared with uncentred variables (Tabachnik & Fidell, 2007). The intercept for the standardized solution for centred data is not zero, as compared with non-centered data.

To test for moderating effects, both independent variables and moderator are jointly entered in the equation. If the results show that the interaction variable (the product of two independent variables) is significant, moderation has occurred. When interaction terms are statistically significant, plots of interaction between two continuous independent variables with dependent variable values are useful for interpretation (Aiken & West, 1991).

As Byrne (2001) pointed out, one critically important assumption of SEM is that the data in the analysis have a multivariate normal distribution. The testing of a structural model involves checking for linear relations among variables and any high skew and kurtosis indicators. This critical assumption requires that each variable is normally distributed and the joint distribution of all the variables is also normal. If this critical assumption is not met by the data, then the tests of model fit and the estimation of path coefficients will not be accurate. Furthermore, according to Kaplan (2009), the reasons for the model rejection are not only the violations of underlying assumptions, such as normality, but also the completely random missing data, incorrect restrictions placed on the model, and sample size sensitivity.

Thus, by using the z-score value, skew and kurtosis of each indicator's distribution were calculated. To correct the non-normality of observed indicators, such as the flat and

skewed distributions, Bollen (1989) suggests the logarithmic transformation of the data. This was applied to the four items of Job Satisfaction, two items of Life Satisfaction, five items of Core Self-Evaluations, one item of Edinburgh Farming Stress Inventory (stressor), and four items of the General Health Questionnaire (strain). The list of items that has been assessed for non-normality and transformed by logarithmic is given in Table 8.

Table 8: Logarithmic transformation of the items

Variables (items)
Job satisfaction (JS)
JS 1 JS 2 JS 4 JS5
Life satisfaction (LS)
LS 2 LS 4
Core Self-Evaluations (CSE)
CSE 3 CSE 5 CSE 7 CSE 9 CSE 11
Stressor (EFSI)
EFSI 27
Strain (GHQ)
GHQ 9 GHQ 10 GHQ 11 GHQ 12

3.9.7 Structural Equation Modelling (SEM)

An additional analysis to verify the hypothesised model was conducted by using Structural Equation Modelling (SEM). Structural Equation Modelling is a combination of factor analysis and path analysis when constructs have several items (such as indicators). The path model tests the theoretical model of the relationships among the constructs that correspond with the reality (Bollen, 1989; Kaplan, 2009). The model is an improvement of fit when the value of measurement model chi-square value is less than the baseline model of chi-square value. So far, there is no single statistic that identifies the best fitting model. A variety of statistics are suggested as each has its strength and weaknesses.

However, SEM offers more advantages compared to multiple regression. In contrast to multiple regression, which seeks to explain relationships in a single equation and may amplify type II error, SEM is used to test the simultaneous estimation of multiple equations (Hair *et al.*, 2006). Second, SEM allows interpretation of results, despite multicollinearity, and tests models with multiple dependent variables (Kline, 2005). The researcher has the flexibility to statistically test theory and measurement assumptions against empirical data (such as confirmatory analysis) (Bohrnstedt, 1983; Chin, 1998). Third, Bollen (1989) suggests that when maximum likelihood estimation is used, SEM is robust against missing data and departures from normality⁶. Thus, the SEM strategy of comparing alternative models to obtain a relative model fit makes it more robust than regression.

⁶ To validate the maximum likelihood estimation, the missing values were replaced with the mean of the respective indicators.

3.9.7.1 Measurement Model Analysis

The primary analysis of this study was to fit the data to the hypothesised model presented in Figure 1. To assess the path model, as with SEM, one central question was how to link the measurement of observed variables to latent variables via a confirmatory factor model (Joreskog, 1993).

SEM allows the examination of the effects of the specific independent variables on the dependent variable after taking into account the effects of the remaining independent variables in the model. The adequacy of the internal structure of the model was evaluated by testing the significance of the parameters, and by estimating the reliabilities of the factors and the average variances extracted from the factors. This provides the reliability coefficient, a direct index of item performance for each factor (Joreskog, 1993). Further, SEM is able to remove measurement error effects from latent variables measured by multiple indicators, which allows for a more precise examination of the relationships in question (Hair *et al.*, 2006). Mulaik and Millsap (2000) suggested a four-step approach to modeling:

- i. Common factor analysis to determine the number of latents.
- ii. Confirmatory factor analysis to confirm the measurement model.
- iii. Test the structural model. A large structural equation model will result in the rejection or modification of the original measure in order to produce a measure or model with compromised validity (McQuitty, 2004).
- iv. Test the nested models to get the most parsimonious model. The power associated with the tests of nested structural equation models is a function of the magnitude of the modified parameter and the location of the parameter in the model (Kaplan, 1995).

The estimation of the model parameter uses maximum likelihood estimation. The maximum likelihood tests a specified number of factors present that account for the intercorrelations between the continuous latent variables (Kaplan, 2009).

The model of the moderating effects of core self-evaluations between stressor-strain and strain-job satisfaction were tested by applying a technique described by Ping (1995), which allows the inclusion of interaction terms within SEM. Kline (2005) suggests centering the main effect to reduce collinearity between the main effect variable and its interaction. High multicollinearity decreases the reliability of SEM estimates.

In this research, three statistical tests were selected to reflect diverse criteria (Kline, 2005). First, the overall fit of the model to the data was assessed by examining the chi-square indices of fit (X^2). The X^2 index measures the extent to which the model differs in fit relative to an identified version of the model, with significant X^2 suggesting a good model fit (Bollen & Stine, 1993; Kline, 2005). Next, the other fit indexes examined included were the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). The RMSEA and SRMR were suggested for three reasons:

- i. RMSEA is sensitive to complex (measurement) model misspecification (factor loadings), while SRMR is sensitive to simple (structural) model misspecification (factor covariance) (Fan & Sivo, 2005; Hu & Bentler, 1998).
- ii. RMSEA and SRMR are common guidelines to interpret a quality model (Hu & Bentler, 1998, 1999).

- iii. The availability of confidence interval in RMSEA provides precision of the exact fit, which corresponds with the chi-square test of model fit (MacCallum & Austin, 2000; McQuitty, 2004).

Hu and Bentler (1998) recommended the use of the SRMR in tandem with the RMSEA to detect potential misspecification in both structural and measurement model parameters. The confidence interval of RMSEA evaluates the model's failure to fit the data, while taking into account degrees of freedom. Finally, the SRMR measures the average difference between the predicted and observed variances and covariances in the model, based on the standardized residuals (Fan & Sivo, 2005). If the difference between the actual and estimated matrix is small, goodness of fit is assumed. Applying all these criteria to a model can provide the most acceptable model.

3.10 Summary

Designing a proper research model will ensure that the study addresses the purpose of the research. Several measures were taken to ensure the research design was characterized by a high degree of reliability and validity. All efforts were made to integrate ethical consideration into the research design. The data was collected through self-administered questionnaires from the members of farming organizations. The data was also checked for normality to confirm that the data collected was of normal distribution. The analyses were conducted with SPSS and AMOS programs.

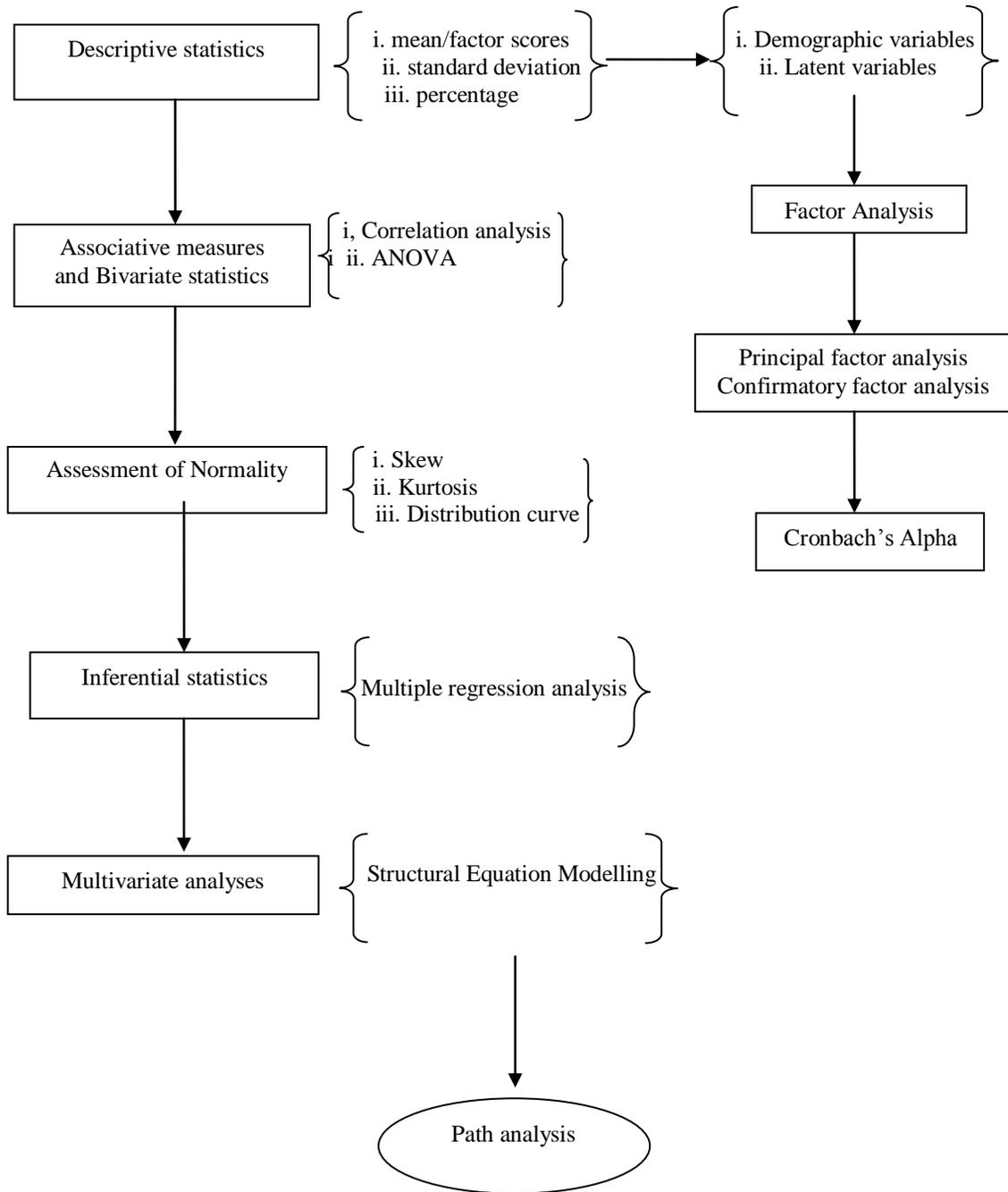
CHAPTER 4 – RESULTS

4.1 Introduction

In this chapter, the results of the various data analyses were discussed. The raw data obtained from the usable questionnaires was analyzed using the Statistical Package for the Social Sciences (SPSS) program and AMOS 17 program. First, the descriptive statistics, including the means and standard deviations were calculated for the continuous demographic variables, age, years involved in farming, herd numbers, number of employees/peak season, sick days/year, and size of farm in hectares. For the categorical demographic variables, gender, marital status, ethnicity, frequencies in the form of absolute numbers and percentage breakdowns, were calculated. Next, the results of the variables of interest were assessed for factor scores, mean, and standard deviation. The variables were subjected to factor analysis to help determine the optimal number of items to be retained for adequate factor description. The Cronbach's Alpha was calculated to determine the reliabilities of the variables for internal consistency. As for the associative measures of the variables, Pearson product-moment correlations were computed between the pairs of variables of factor scores. As a supplement to bi-variate analyses, ANOVA were conducted to determine if the sample of farm managers differed significantly. The moderating effects of the core self-evaluations construct on the relationship between stressor-strain-satisfaction were measured via multiple regression analyses and path analysis.

The multiple regression analysis is an extension of bi-variate regression, in which several predictor variables are used to predict one criterion measure, the dependent variable. As violations of the statistical assumption may cause biases or non-significance in the results, the issues of normality and linearity in the variables as well as missing data were addressed for each application of the multivariate technique (Kaplan, 2009; Hair *et al.*, 2006). Bohrnstedt (1983) suggests that by employing multiple-item measures of constructs, SEM can test the measurement model and the theoretical model, simultaneously. As Structural Equation Modelling (SEM) is an extension of the General Linear Model and a powerful alternative to multiple regressions, it was used to validate the hypothesised model. Figure 4 shows the overview of the analytical pathway showing how the variables of the study were analysed and the measurement tools used to evaluate the theoretical model.

Figure 4: Overview of Analytical Pathway



4.2 Sample Size

The respondents to this survey were farm owners and farm managers of dairy/horticultural/arable/crop/forestry/beef and sheep farms. These respondents had the responsibility and authority for operation of the farms and the management of the workers. Of the 6,000 surveys sent out, 1,041 questionnaires were returned, representing a 17.35% response rate. There were 580 participants from the dairy sector, 266 participants from the horticulture sector and 195 participants from the beef/sheep/arable/crop/forestry sectors. In previous New Zealand farming-related stress studies (such as Alpass *et al.*, 2004; Firth *et al.*, 2006), no formal assessments were made of the response rate or the representativeness of the farmers, though demographic data were presented. This survey had a higher response rate in comparison with similar studies in the US or UK, but was lower than the 28% reported by Pollock *et al.* (2002), and other studies such as Schellenberg *et al.* (1985) and Eberhardt and Pooyan (1990) studies. This may suggest that the farming population, in general, were unwilling to respond to occupational stress surveys (Booth & Lloyd, 2000). Of greater relevance, Baruch's (1999) research suggests there is a distinction between studies directed toward managers and the conventional working population; historically, the response rate for managers is normally half that of other populations.

As shown in Table 9, for the postal survey, a total of 201 survey questionnaires were received from the dairy industry, 107 survey questionnaires from the sheep/beef industry, and 9 survey questionnaires from the horticulture industry. There were 9 unanswered questionnaires returned because the prospective participants had quit farming. Of the 1,000 survey questionnaires posted, a total of 317 were returned, making a response rate of 32%.

Denison and Mishra (1995) argued that a response rate of 20-30% is fairly typical for a mail-out survey to a large sample of the population.

In the online survey, of the 3,000 emails sent to members of the farming organization, there were 479 (16%) email responses received. The data showed a good balance of sectors: dairy, horticulture, dairy/beef, and arable/crop/forestry. The total breakdown of participants is: 379 online questionnaires received from the dairy sector, 12 online questionnaires from the horticulture sector, 83 online questionnaires from the sheep/beef sector, and 5 participants from the arable/crop/forestry sector. In addition, Horticulture NZ sent the survey questionnaire to 2,000 members in the August issue of the 'Orchardist' magazine. A total of 245 growers returned the questionnaire, making a response rate of 12%.

A total of 1,041 individual questionnaires were received from online surveys, the postal questionnaire magazine insert, and postal surveys. This study has found that the response rate was different for postal, magazine, and email surveys. The results suggest that participants preferred the mail and email surveys compared to the magazine survey. Hence, the different modes of the survey have tapped into mode preferences among the participants (Schaeffer & Dillman, 1998). Previously, many studies have found higher response rates to mail surveys than to email surveys (Harewood, Yacavone, Locke, & Wiersema, 2001; Weible & Wallace, 1998; Yun & Trumbo, 2000). Table 9 shows the breakdown of participants according to sectors in the farming industry and the type of survey. However, there was no information gathered on the possible number of members in each sector of the agriculture industry, which has resulted in an inability to calculate a response rate for each sector.

Table 9: Responses by Sector

Sector	Direct Post (1,000)	Postal-Magazine Insert (2,000)	Online (3,000)	Total
Dairy	201	-	379	580
Horticulture	9	245	12	266
Sheep/Beef	107	-	83	190
Arable/Crop/Forestry	-	-	5	5
Unanswered	9	-	-	
Total	317(31.7%)	245 (12.3%)	479 (16%)	1,041 (20%)

4.3 Missing Data

It is necessary to consider unanswered questionnaires or inapplicable responses before conducting statistical analyses. In the survey, the respondents were instructed to skip any subsequent questions based on certain responses that were inapplicable if they were contingent questions. In this study, many items were left blank in the online survey questionnaire. However, the online surveys were associated with fewer errors (Kiesler & Sproull, 1986) and omitted items (Kiesler & Sproull, 1986; Schaeffer & Dillman, 1998; Truell, Bartlett, & Alexander, 2002). The actual value does exist if the missing data is a latent variable, but the value cannot be accurately determined (Heitjan & Rubin, 1991).

Missing data in the General Health Questionnaire-12 ranged from 1 to 11 (.1% to 1.1%) per variable, Core Self-Evaluations ranged from 2 to 26 (.2% to 2.5%) per variable, Job Satisfaction ranged from 1 to 12 (.1% to 1.2%) per variable, and Life Satisfaction ranged from 5 to 13 (0.5% to 1.3%). The missing data in the Edinburgh Farming Stress Inventory ranged from 12 to 28 per variable (1.2% to 2.7%). Many of these events were not central to the respondents' farm life. The missing values of this present data matrix can be considered

random, since the missing values were no more than 5% (Schafer, 1999)⁷. “Latent variables are missing with probability one and are, therefore, also known to be missing at random” (Schafer & Graham, 2002, p. 152). However, the inferences on estimate parameters and test statistics of structural equation models are influenced by the presence of incomplete data (Kaplan, 2009). Since all the variables have a high reliability ($\alpha > .70$), the averaging of the items was a reasonable choice for filling in missing items before conducting SEM (Schafer & Graham, 2002).

4.4 Descriptive Statistics

For this analysis, multiple item measures were collapsed into single measures by taking the mean of the items making up that specific measure. All the measures with differing response scales were in the original scale when calculating the mean of the items. Mean is the most useful tool of gauging central tendency when examining relationships of the variables (Bryman & Cramer, 2009; Rode, 2004). The results of the descriptive statistics did not indicate any reliability problems. The participants indicated a high degree of satisfaction with their jobs ($M = 5.91$, $SD = 0.82$). The farm managers ($n = 1041$) reported a mean score of 1.1 ($SD = 0.93$) which indicates a low level of strain. On the other hand, UK farmers appear to experience higher levels of strain than the general population (Booth & Lloyd, 2000).

⁷ A complete result is attached in Appendix V: Descriptive analysis of variables.

The farm managers reported a mean score of 5.4 (SD = 0.83) on a range of 1 to 7, which indicates a moderately high level of core self-evaluations. This result is much higher across the five samples on core self-evaluations (such as Brunborg, 2008; Boyar & Mosley, 2007; Judge *et al.*, 2003, 2004; Stump *et al.*, 2009). The means ranged from 3.64 to 3.87, with an average of 3.74 on a range of 1 to 5. The standard deviations ranged from .39 to .54, with an average of .48. None of the means was significantly different from the others. However, farm managers who reported moderately high levels of core self-evaluations experienced low strain. Thus, as the core self-evaluations average score is the same as the norm, the low strain is more likely to be as a result of environmental influences.

The descriptive statistics for all five established scales, including mean and standard deviation, were calculated. The internal consistency reliability estimates of all measures were calculated using coefficient alpha and are presented in Table 10.

Table 10: Mean, Standard Deviations, and Internal Consistency Reliability

Variables	M	SD	Alpha
Core Self-Evaluations	5.40	0.83	0.85
General Health Questionnaire	1.10	0.70	0.91
Edinburgh Farming Stress Inventory (Frequency)	2.35	0.58	0.94
Edinburgh Farming Stress Inventory (Severity)	2.14	0.58	0.93
Job Satisfaction	5.91	0.82	0.75
Life Satisfaction	5.37	1.02	0.82

N = 1021

4.5 Demographic Variables

The demographic profiles of respondents to the survey are presented and discussed extensively in this section, and presented in Table 11 and Table 12. The sample consisted of (819) 80% men and (207) 20% women farm managers from diverse farming sectors. The labour force participation in this sample for male farm managers is higher than that for female farm managers. According to recent New Zealand Statistics, 43% of men and 25% of women are in the New Zealand labour force (Bascand, 2008). In general, female participation in the New Zealand labour force is lower than for males, which is consistent with many developed countries (Bascand, 2008; Jaumotte, 2003). In contrast to New Zealand's labour force statistics, results indicate an under-representation of women in the agriculture industry with a ratio of 1 female to 4 males. Total work force statistics, by gender, and the data from diverse sectors of the farming industry, were used to compile the demographics, such as ethnicity, tenure, sickness, hours worked, type of industry, and age.

86% of the respondents were farm owners with a mean/median age of 48 years (SD = 11.6). Most of the farm managers were more than 35 years of age. In 2007, Statistics NZ recorded the median ages for men and women in the New Zealand work force as 35.3 and 36.9 years, respectively (Bascand, 2008). Thus, the farm owners were older in age compared to those in the New Zealand work force. Along with other OECD countries, New Zealand has an aging population because of the low fertility and low mortality rates (Bascand, 2008; Stroombergen, 2007). Over the last decade, the age structure has changed to reflect the composition of the New Zealand population, where older workers (aged 45-64 years) have recorded a larger increase (13.3%) than younger workers (4.7%) (Bascand, 2008). Further,

24% of older workers are in the New Zealand labour force, which was comparatively high compared to other OECD countries.

As far as years worked on the farm are concerned, the largest percentage had worked for less than 30 years: 260 subjects had worked for less than 10 years, 422 subjects had worked from 11 to 20 years, and 173 subjects had worked for 30 or more years. Overall, the farm managers had an average tenure of 20 years ($SD = 14$) in their present job. Seasonal workers employed in the horticulture industry were included in the New Zealand working population, and 41.1% had worked for less than 12 months (Skellern, 2006). The average number of peak season workers employed was 8 ($SD = 15$). When compared with other developed countries, New Zealand appears to have nearly twice as many jobs lasting less than one year.

The farm managers reported working an average of 54 hours ($SD = 19$) per week on their farm. This sample worked longer hours than the standard working hours per week for New Zealand's working population (about 40 hours per week over the past 20 years) (Bascand, 2009b; Stroombergen, 2007).

Of the 1041 participants, 88% were New Zealand Pakeha, 1.5% were Maori, and 4.4% were "New Zealanders". Compared with other New Zealand ethnic groups, the indigenous Maori ethnic group was under-represented in this sample compared with labour force participation in general of 24% in 2006. The Maori ethnic group was engaged in less-skilled manual jobs in secondary industries, and almost half of New Zealand's Maori ethnic group population was under 23 years of age (Bascand, 2009a). Similarly, according to the results of this study, the New Zealand Pakeha population has the highest participation rate of all ethnic groups, at 68%, of the New Zealand labour force (Bascand, 2009b).

Furthermore, less than 3% of farm managers in the survey were divorced, widowed, in a de facto relationship, or separated. 6% had never been married which was lower than the official statistics of about 12% for New Zealanders (Bascand, 2008). This reflects the underlying differences in the demographic-social circumstances and the different nature of economic activity in the rural area, as well as the more simple lifestyle in farming communities (Bascand, 2009b).

The average farm size was 370 hectares ($SD = 1317$) taken over all sectors of the primary industry. The average farm size was in line with the average farm size of all farms in New Zealand. Farm size has decreased in the past decade to 380 hectares, as smaller farm holdings have become increasingly popular (Cook, 1998).

Table 11: Characteristics of Sample Distribution by Frequency and Percentage

Characteristic	N	Percentage
1. Ethnicity	1028	
NZ Pakeha	916	88.0%
NZ Maori	16	1.5%
New Zealander	46	4.4%
European	14	1.3%
African	2	0.2%
Asian	1	0.1%
Other	32	3.1%
2. Marital Status	1021	
Never married	62	6.0%
Married	868	83.4%
Civil Union	11	1.1%
Separated	13	1.2%
Divorced	30	2.9%
Widowed	24	2.3%
Defacto	13	1.2%
3. Job Status	1041	
Farm Owner	895	86.0%
Farm Manager	65	6.2%
Sharemilker	57	5.5%
Lower Order Sharemilker	40	0.4%
Other	19	1.8%

Table 12: Sample Distribution by Demographic Characteristics

Characteristic	N	Mean	Range
Age (years)	1018	48	48 (24-79)
Average hours worked/week	1001	60	58 (0-140)
Tenure (years)	875	13	17 (0.1-63)
Farm size (hectares)	1017	171	288 (36-3000)
Herd numbers	604	400	560 (1-10350)
No.of employees peak season	664	2	3 (0-60)
Sick-days/year	642	2	2.5 (0-69)

4.6 Factor Analysis

The Statistics Package for Social Science (SPSS) version 17 was applied to explore the factor structure of the Core Self-Evaluations, Job Satisfaction, Life Satisfaction, General Health Questionnaires, and the Edinburgh Farming Stress Inventory (EFSI). Factor analysis is, essentially, a guide for the selection of items best defined in each variable scale, and to remove any items which did not contribute to a particular variable scale (Campbell, Walker, & Farrell, 2003). All the constructs included in this study were adopted from previous studies, thus, the number of factors measuring each construct is known.

Standard exploratory factor analysis (EFA) procedures are useful to investigate the structure of data which is derived from statistical results. Next, the data is analysed from a theoretical position and the extracted factors are identified (Campbell *et al.*, 2003). The confirmatory factor analysis (CFA) is used to determine construct validity. The CFA procedures do permit significance testing of the number of factors in the data as well as the structure of those factors on the basis of pre-established theory (Hair *et al.*, 2006). Further, a model of the relationships between the variables is constructed, and the statistical procedure consists of an analysis of 'fit' between the data and the model (Steven, 1996). Thus, the measurement model using confirmatory factor analysis prior to estimation of the hypothesised model could overcome problems in interpreting the simultaneous estimation of measurement and the hypothesised model (Anderson & Gerbing, 1988). In short, running CFA allows the researcher to accept or reject prior theory.

4.6.1 Core Self-Evaluations

Researchers have suggested various distinct methods for measuring Core Self-Evaluations: a principal component analysis (Erez & Judge, 2001; Johnson, Kristof-Brown, Van Vianen, De Pater, & Klein, 2003; Judge *et al.*, 1998; Piccolo, Judge, Takahashi, Watanabe, & Locke, 2005), and a single-factor confirmatory factor analysis (Judge *et al.*, 2000; Judge, Locke, *et al.*, 1998a; Judge *et al.*, 2002).

Core self-evaluations was factor-analyzed using confirmatory factor analysis to determine if the model was constructed on the basis of expected relationships according to Judge *et al.*'s (2003) study. One factor was predetermined in the confirmatory factor analysis. The analysis assessed all the variance of the variable, which was perfectly reliable and without error (Bryman & Cramer, 2009). The number of factors actually extracted was determined by the number of items with eigen values greater than 1 (Bryman & Cramer, 2009). The eigen values indicated a single-factor solution, explaining 39.0% of the total variance. The factor loadings ranged from 0.50 to 0.74. Since the single-factor loadings were greater than .4, the single-factor structure of core self-evaluations was established, providing evidence of construct validity (Hair *et al.*, 2006). The factors in core self-evaluations were perceived as completely single constructs from the indicator variables where they can be evaluated precisely (Judge *et al.*, 2003). The results of the factor analysis are presented in Table 13.

Core self-evaluations is a unidimensional variable that measures four common core traits (Rode, 2004). This relatively brief measure of personality traits is generalized as the aggregate of four core specific traits, namely, self-esteem, generalized self-efficacy, locus of control, and low neuroticism (Judge *et al.*, 2003). As Hair *et al.* (2006) suggest, if the scale is

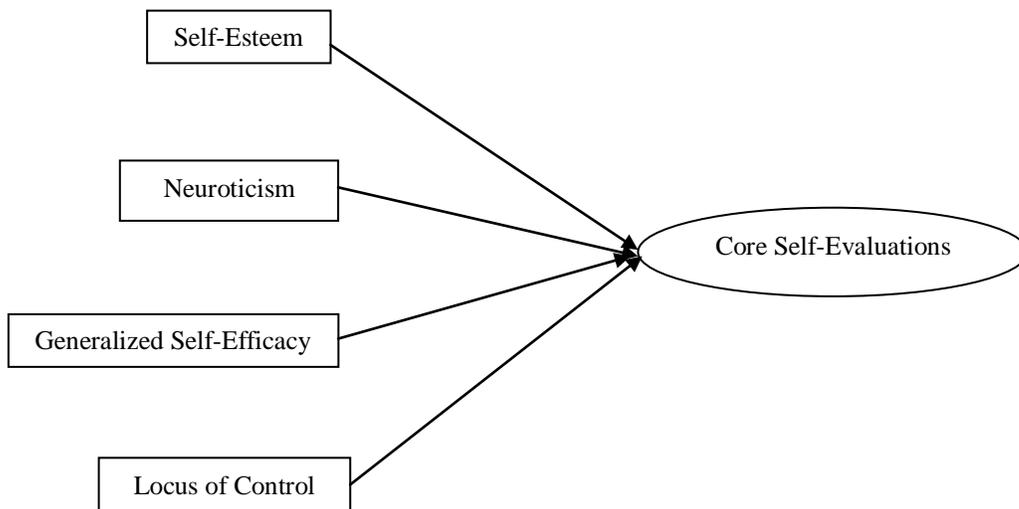
unidimensional, the Cronbach's Alpha should exceed a threshold of .70 in confirmatory research. When including all twelve original Core Self-Evaluations scale items, the instrument exhibited a sufficient internal consistency reliability coefficient of .85. Additionally, the score for reliability and validity falls into an acceptable range as indicated in Judge *et al.*'s (2003) study. As the results show that core self-evaluations does not measure each of the four core traits, it is assumed to be a higher order construct (Judge *et al.*, 1998). Thus, core self-evaluations is the unidimensional construct that comprises the common variance of the indicators (i.e., neuroticism, locus of control, self-esteem, and generalized self-efficacy) (Figure 5) It is for this reason that Judge *et al.* (2003) encourage the use of core self-evaluations as a single instrument when conducting research.

Accordingly, core self-evaluations was treated as a composite of the four trait-like variables in subsequent analyses. This construct was modelled as a first-order latent variable, because modelling higher order factors requires a minimum of three first order factors (i.e., scales) (Rode, 2004). Hence, the scales were employed as indicators of an overall core self-evaluations factor in subsequent moderated regression analyses and structural equation modelling.

Table 13: Factor Loadings Principal-Component Factor Analysis (confirmatory factor analysis): Core Self-Evaluations Scale

	Factor loading
Scale item	1
1. There are times when things look pretty bleak and hopeless to me (r)	0.74
2. Sometimes when I fail I feel worthless (r)	0.60
3. Sometimes I feel depressed (r)	0.55
4. Sometimes I do not feel in control of my work (r)	0.67
5. I am filled with doubts about my competence (r)	0.50
6. I do not feel in control of my success in my career (r)	0.58
7. I am confident I get the success I deserve in life	0.67
8. Overall, I am satisfied with myself	0.64
9. I determine what will happen in my life	0.63
10. When I try, I generally succeed	0.66
11. I am capable of coping with most of my problems	0.56
12. I complete tasks successfully	0.67
Eigen value	4.68
Cumulative percent variance explained	39.0%

Figure 5: Core Self-Evaluations as a Unidimensional Construct (Judge *et al.*, 1997)



4.6.2 Job and Life Satisfaction

In this study, all the five scale items of job and life satisfaction were subjected to principal axis factor analysis to ensure that the instrument exhibited its purported single-factor structure. The test of the Kaiser-Meyer-Ikin Measure of Sampling Adequacy of more than 0.6, and the figure for the Bartlett's Test result, show that the factorability of the matrix as a whole is significant (Coakes & Steed, 2007). A single-factor solution explained 53.2% of the total variance for job satisfaction, and 61.12% of the variance for life satisfaction (see Table 14 and Table 15).

Empirical validity of the job satisfaction was supported through inter-rater reliability of 0.68 by Judge *et al.*'s (1998) studies. The satisfaction with life scale has been shown to have favourable psychometric properties, with internal consistency of 0.87 (Oishi & Diener, 2001). The Cronbach's Alpha of not less than 0.70 will ensure the reliability and consistency of the entire scale (Hair *et al.*, 2006). In this study, the job satisfaction and life satisfaction exhibited a high internal consistency, with a reliability coefficient of 0.75 and 0.82, respectively.

Since the eigen values of both variables were greater than one and the single-factor loadings were greater than 0.4, the single-factor structure of job satisfaction and life satisfaction were established, providing evidence of construct validity (Hair *et al.*, 2006).

Table 14: Factor Loadings from Principal Axis Factoring: Job Satisfaction Scale

	Factor loading
	1
Scale item	
1. I feel fairly satisfied with my present job	0.72
2. Most days I am enthusiastic about my work	0.70
3. Each day at work seems like it will never end (r)	0.45
4. I find real enjoyment in my work	0.79
5. I consider my job to be rather unpleasant (r)	0.55
Eigen value	2.66
Cumulative percent variance explained	53.2
KMO and Bartlett's Test - Job Satisfaction	
Kaiser-Meyer-Ikin Measure of Sampling Adequacy 0.80	
Bartlett's Test 1336.05 10.0 0.000	Chi-square df Significance

Table 15: Factor Loadings from Principal Axis Factoring: Life Satisfaction Scale

	Factor loading
Scale item	1
1. In most ways my life is close to my ideal	0.80
2. The conditions of my life are excellent	0.72
3. I am satisfied with my life	0.82
4. So far I have got the important things I want in life	0.67
5. If I could live my life over, I would change almost nothing	0.58
Eigen value	3.06
Cumulative percent variance explained	61.12
KMO and Bartlett's Test - Life Satisfaction	
Kaiser-Meyer-Ikin Measure of Sampling Adequacy 0.85	
Bartlett's Test 1867.90 10.0 0.000	Chi-square df Significance

4.6.3 Edinburgh Farming Stress Inventory (EFSI)

The relationships of the 34 items in the questionnaire were examined using principal components analysis with Varimax rotation. For the rotated factors to be distinct from one another and account for the most common variance, Deary *et al.* (1997) suggested the following criteria for item retention in the EFSI:

- i. On any one rotated factor, items should have a loading of at least 0.5.
- ii. When (i) is met on any rotated factor, the next highest loading should be less than 0.3.
- iii. If the implementation of (ii) leads to less than five items, a subsidiary loading of less than 0.4 is permitted.

In this study, the principal component analysis of the Edinburgh Farming Stress Inventory suggested a six-factor structure, with 31 items and 27 items retained on severity and frequency of stress, respectively. The principal component analysis with Varimax rotation was used, using the Kaiser (1970) criterion (retaining factors with eigen values greater than 1) as the rule to retain six factors in this study (Osborne, Costello, & Kellow, 2008).

All items of the EFSI had significant positive loadings on the factor, with loadings being above 0.4 (Deary *et al.*, 1997). The results indicated that the factor structure on the questionnaire used in this study is similar to that found by Deary *et al.* (1997) for UK farmers and Firth *et al.* (2007) for New Zealand dairy farmers.

While supporting the notion that the Edinburgh Farming Stress Inventory is valid in the New Zealand farming community, the six factors are components of a single measure of stress (Firth *et al.*, 2007). This implies that a farmer's total score on all items may be used as an indicator of general farming stress. The rotated factor, 1 to 6, in the severity of stress accounted for 31.6%, 6.7%, 6.0%, 5.2%, 4.0%, and 3.5% of the common variance, respectively. The rotated factor, 1 to 6, in the occurrence of stress accounted for 32.4%, 6.6%, 5.9%, 5.2%, 4.4%, and 3.6% of the common variance, respectively. The rotated factors are shown in Table 16 and Table 17. These include numbers of items, means, and standard deviations.

Four items had high (> 0.6) loadings on factor 1. Four of these items were related to financial matters and were similar to Deary *et al.*'s (1997) findings. As shown in Table 16, the low amount of stress with a mean of 2.16 may reflect greater financial security among the farm managers. Factor 2 had three items with high loadings and three items with moderate loadings (> 0.5). There were four items retained from Deary *et al.*'s (1997) findings. All of these items related to "time pressure" or long hours of work in farming. Similar to Deary *et al.*'s (1991) finding, Factor 3 had a loading of more than 0.5, which related to the possibility of an accident or injury while working on the farm, or the possibility that illness would interfere with farm work. Factor 4 contained four loadings of between 0.51 and 0.82, which related to complying with policies and regulations. In addition, item number 12, "Adjusting to new government regulations and policies", has a high mean rating of 2.9 (SD = 1.2) in severity, and 2.96 (SD = 1.1) in frequency, meaning that the farm managers experienced the highest impact from concern about such events. Additionally, item number 33, "Filling in government forms", and item number 34, "Complying with environmental regulations", both

share a similar mean of 2.7 (SD = 1.2). Interestingly, the farm managers report comparatively high severity of stress, similar to UK farmers, with a mean of 3.3 (SD = 1.2) for “Adjusting to new government regulations and policies”; “Filling in government forms”, with a mean of 3.3 (SD = 1.4), and “Complying with environmental regulations”, with a mean of 3.2 (SD = 1.2) (Deary *et al.*, 1997). Along a similar line, the other UK studies reported most of the stressful items were related to government bureaucracy (Booth & Lloyd, 2000; Pollock *et al.*, 2002; Simkin, Hawton, Fagg, & Malmberg, 1998; Walker & Walker, 1988). Four items had loadings between 0.55 and 0.80 on Factor 5, mostly related to “isolation”. The geographical isolation compared favourably with Firth *et al.*’s (2006) and Deary *et al.*’s (1997) studies. Factor 6 contained four loadings between 0.40 and 0.80, all of which related to unpredictable interference with farm work due to weather, pests, and machinery breakdown. This factor is a useful generalization of unpredictable or unfavourable factors reported elsewhere (Alpass *et al.*, 2004; Deary *et al.*, 1997; Firth *et al.*, 2007; Walker, Walker, & MacLennan, 1986). In contrast, many indicators may not necessarily effectively represent a construct. More indicators may likely produce artifact factors, and make it difficult to produce a truly unidimensional factor (Hair *et al.*, 2006). Achieving unidimensional measurement is a crucial undertaking in theory testing and in the development of a model (Anderson & Gerbing, 1988).

Table 16: Factor structure: Severity of stress⁸

EFSI item	Mean	SD	Factor Loading					
Factor 1			1	2	3	4	5	6
1	2.23	1.1	0.81					
Financial Matters	25	2.24	1.1					
3	2.31	1.1	0.78					
9	2.12	1.1	0.65					
4	2.13	1.0	0.55					
26	1.75	1.1	0.48					
29	1.81	1.0	0.44					
<hr/>								
Factor 2								
13	2.6	1.0		0.71				
16	2.0	1.0		0.71				
Time Pressures	21	2.4	1.0	0.69				
17	2.1	1.0		0.59				
14	2.3	0.9		0.59				
28	2.2	1.1		0.55				
<hr/>								
Factor 3								
10	2.2	1.1			0.79			
7	2.5	1.2			0.71			
Farm/Personal Hazards	32	1.9	0.9		0.58			
6	2.6	1.1			0.56			
11	2.5	1.2			0.55			
15	1.6	0.8			0.49			
<hr/>								
Factor 4								
33	2.7	1.3				0.82		
Government Policies & Regulations	34	2.7	1.2			0.78		
12	2.9	1.2				0.76		
22	1.9	0.9				0.55		
<hr/>								
Factor 5								
27	1.5	0.8					0.80	
Geographical Isolation	30	1.2	0.5				0.78	
19	1.5	0.8					0.75	
20	1.4	0.8					0.61	
<hr/>								
Factor 6								
5	2.6	1.1						0.80
Unpredictable Factors	18	2.3	1.0					0.78
8	1.7	0.9						0.46
23	2.2	1.0						0.45
<hr/>								
Eigen value			10.56	2.27	2.04	1.78	1.39	1.20
% variance explained			31.06	6.67	6.0	5.22	4.10	3.52
Cumulative % variance explained			31.06	37.73	43.73	48.95	53.05	56.57

⁸ The Edinburgh Farming Stress Inventory is on a Likert scale of 1 to 5, with the severity of stress experienced measured as 1 = none, and 5 = very severe.

Table 17: Stress Factors: Frequency⁹

EFSI item	Mean	SD	Factor Loading					
Factor 1			1	2	3	4	5	6
1	2.62	1.1	0.73					
Financial Matters	25	2.52	1.1	0.78				
3	2.66	1.1	0.68					
9	2.30	1.1	0.64					
Factor 2								
16	2.57	1.1		0.68				
13	2.77	0.9		0.67				
Time Pressures	21	2.81	1.0	0.63				
28	2.57	1.1		0.56				
14	2.54	0.9		0.51				
17	2.48	1.1		0.50				
Factor 3								
10	2.06	0.8			0.74			
Farm/Personal Hazards	7	2.11	0.8		0.58			
32	2.16	1.1			0.51			
6	2.47	0.8			0.50			
11	2.39	0.9			0.43			
Factor 4								
33	2.87	1.1				0.81		
Government Policies & Regulations	34	2.98	1.1			0.72		
12	2.96	1.1				0.72		
22	2.41	1.0				0.51		
Factor 5								
19	1.65	0.9					0.77	
Geographical Isolation	27	1.77	1.0				0.75	
30	1.40	0.8					0.72	
20	1.73	1.0					0.55	
Factor 6								
18	2.73	1.0						0.69
Unpredictable Factors	5	2.77	1.0					0.61
8	1.96	0.9						0.40
23	2.56	1.0						0.40
Eigen value			11.01	2.24	2.02	1.77	1.51	1.23
% variance explained			32.39	6.57	5.95	5.19	4.44	3.62
Cumulative % variance explained			32.39	38.96	44.91	50.1	54.54	58.16

⁹ The Edinburgh Farming Stress Inventory is on a Likert scale of 1 to 5, with the frequency of stress experienced measured as 1 = never, and 5 = very frequently.

As SEM application is difficult to manage with many measured indicators, Hair *et al.* (2006) recommend “item parcelling” if a construct has more than 15 items. Since there were 31 observed indicators in the Edinburgh Farming Stress Inventory construct, “item parcelling” was considered. Deary *et al.* (1997), Alpass *et al.* (2004), and Firth *et al.* (2006) studies reported severity of stress as farm stressors. Therefore, this study adopted the 31 items loaded for severity in “item parcels” to address violations of normality. Parcelling reduces the complexity of the model and improves the model fit (Landis, Beal, & Tesluk, 2000). In “item parcelling”, the highest factor loading in each dimension of the Edinburgh Farming Stress Inventory was selected and confirmatory factor analysis was performed to check for unidimensionality. This was to determine whether the Edinburgh Farming Stress Inventory construct, reflected by all the 31 items, related to the 6 items in the same way. The result shows the CFA model of the unidimensional construct of the Edinburgh Farming Stress Inventory displays construct validity because all the factor loadings are equal, or more than, .40 and the eigen values greater than 1 (Hair *et al.*, 2006). Alpass *et al.* (2004) used a 12-item stress questionnaire, particularly in relation to adoption of new technology on New Zealand farms. Five of the factors were similar to those used in this study. The results of the 5 factors used by Alpass *et al.*'s (2004) study, which were similar to this study, are financial matters (debt), time pressures (balancing work and family duties), personal/farm hazards (risk of injury on the farm), government policies and regulations (keeping up with new technology and procedures), and unpredictable factors (machinery breakdown and bad weather). Another factor, geographical isolation, was excluded from the survey. This suggests that the use of item parceling, rather than 31 individual items, could assure external consistency of items (Hall, Snell, & Foust, 1999).

Structural equation modelling is sensitive to the external consistency of a measure, and provides a more stringent assessment of its unidimensionality (Gerbing & Anderson, 1988). Although the variance explained, (35%) in one factor loading, is much less than the full inventory shown in Tables 16 and 17, the unidimensionality of a construct is the most critical and basic assumption of measurement theory (Hattie, 1985). Accordingly, the Edinburgh Farming Stress Inventory was treated as a unidimensional construct in the structural equation modelling. The unidimensionality of the construct is shown in Table 18.

Table 18: Factor Loadings Principal-Component Factor Analysis (confirmatory factor analysis): Edinburgh Farming Stress Inventory Scale

	Factor loading
	1
Scale item	
1. Debt load	0.52
5. Bad weather	0.65
10. Farming-related accidents	0.57
16. Long hours of work	0.69
27. Not seeing enough people	0.61
33. Filling in government forms	0.49
Eigen value	2.09
Cumulative percent variance explained	34.9%

4.6.4 General Health Questionnaire-12 (GHQ-12)

The General Health Questionnaire (GHQ) as a measurement of psychological strain has been proven widely using measurements of personality illness in psychology research (Kalliath *et al.*, 2004).

Given the inconclusiveness of previous studies that identify the factor structure of the GHQ-12, the present study used confirmatory factor analysis to test for one-factor formulations (Kalliath *et al.*, 2004). The relationships of the 12 items were analysed to determine if the model was constructed on a one-factor structure predetermined in the principal-components analysis (Bank *et al.*, 1980). The results of the study show that GHQ was a strong unitary structure, with factor loadings ranging from 0.57 to 0.79. Since the single-factor loadings were greater than .4, the single-factor structure of GHQ-12 was established, providing evidence of construct validity (Hair *et al.*, 2006).

These twelve factors accounted for 46.7% of the total variance to form the General Health Questionnaire-12 subscale ($\alpha = 0.91$). Previous studies found very high internal consistency of items in the GHQ-12, which is evidence of the unidimensionality of the measure (Banks *et al.*, 1980; Banks & Jackson, 1982; Campbell *et al.*, 2003). Overall, previous studies have found that the factor loading yielded the best description of the GHQ-12 item responses, where the identified factors accounted for 46%-64% of the variance (Banks *et al.*, 1980; Goldberg, 1972; Gureje, 1991; Politi, Piccinelli, & Wilkinson, 2007; Werneke, Goldberg, Yalcin, & Ustun, 2000). The one factor comprised social dysfunction and anxiety, which together reflected the General Health Questionnaire (Kalliath *et al.*, 2004). Table 19 shows the results of the confirmatory factor analyses of the General Health Questionnaire-12.

Table 19: Factor Loadings from Principal Components Factoring (confirmatory factor analysis): General Health Questionnaire-12

	Factor loading
	1
Scale item	
1. Feeling reasonably happy	0.79
2. Feeling unhappy or depressed (r)	0.75
3. Face up to your problems	0.74
4. Capable of making decisions about things	0.73
5. Losing confidence in yourself (r)	0.73
6. Enjoy your normal day-to-day activities	0.70
7. Playing a useful part in things	0.67
8. Felt constantly under strain (r)	0.63
9. Able to concentrate on what you are doing	0.63
10. Could not overcome your difficulties (r)	0.61
11. Thinking of yourself as a worthless person (r)	0.61
12. Lost much sleep over worry (r)	0.57
Eigen value	5.6
Cumulative percent variance explained	46.7

In summary, a confirmatory approach was taken for Core Self-Evaluations and General Health Questionnaire, while principal component analysis was used for the Edinburgh Farming Stress Inventory and principal axis factoring for Job and Life Satisfaction. These scales have been reviewed to achieve different objectives (Bookstein, 1990; Gorsuch, 1990; Lochlin, 1990; Velicer & Jackson, 1990). Therefore, it is improper to reject the factor analytic model by previous expert review of these scales due to two reasons:

i. Due to the conceptual differences, the level of measurement of the scales may not meet the measurement requirements if different factor analysis were employed. As Kim and Mueller

(1978) argue that: “the informativeness of factor analysis varies from application to application: results of some factor analysis can be much more informative than those of others” (p. 49). For example, the goal of Principal Component Analysis is to account for variance in the measured variables.

ii. By using in conjunction with principal factor analysis and confirmatory factor analysis, the entire scales of measurement were benchmarked to ensure the reliability and consistency with previous findings (Fabrigar, Wegener, MacCallum, & Strahan, 1999; Hair *et al.*, 2006). This allows the researcher to check all of the variables developed are not indicators that measure other dimensions.

4.7 Assessment of Normality

Since the statistical inference is a primary part of the data analysis, it is important to examine the data for violations of the assumptions that underline normal distribution (Bryman & Cramer, 2009; Osborne, 2008). In the normal distribution, the acceptable values for skew and kurtosis are 0. However, the values of the Z-score for skew and kurtosis are more reliable measures of normal distribution when the variables have different means and standard deviations (Field, 2006). As Bradley (1982) suggests, statistical inferences become robust when using transformations of variables to improve normality.

The transformed scale is suitable for similar sample means (Bland & Altman, 1996). However, confidence intervals and difference between two means on the transformed scale may be difficult to interpret (Bland & Altman, 1996a). Hence, in this study, transformation of items is preferable because “it increases the likelihood of multivariate normality to bring the

data into conformity with one of the fundamental assumptions of most inferential tests” (Tabachnick & Fidell, 2007, p. 92).

By using the z-score value, skew and kurtosis of each univariate distribution were calculated. All the kurtosis and skew Z-scores were below the upper threshold of 3.29 and 1.96, respectively ($p < .05$). The results revealed that the skew and kurtosis of each univariate distribution were normally distributed. Table 20 shows the skew and kurtosis (Z-score) values of the variables.

Table 20: Assessment of Normality

Variable	Skew (Z-score)	Critical Value	Kurtosis (Z-score)	Critical Value	Results
Job satisfaction	-1.34	±1.96	3.08	±3.29	ns
Life satisfaction	-.91	±1.96	.86	±3.29	ns
Core Self-evaluations	-.49	±1.96	.06	±3.29	ns
Severity (stressor)	.20	±1.96	.43	±3.29	ns
Frequency (stressor)	.62	±1.96	.13	±3.29	ns
GHQ-12 (strain)	1.08	±1.96	1.21	±3.29	ns

Note: * $p < .05$; ns (non-significance)

However, in a large sample, it is also important to examine the shape of the distribution rather than significant values of the skew and kurtosis (Field, 2006). To test the normality of residuals, the histogram and normal probability plot were selected. The validity of the regression model is affected if the regression standardized residuals of the dependent variable is non-random and unevenly dispersed around zero throughout the normal

probability plot (Field, 2006). The inspection of the residual scatterplots and normal probability plots for all the multivariate relationships, except GHQ, did not indicate significant deviations from normality. Thus, GHQ was further examined.

By using the Z-score value, the skew and kurtosis of each item distribution were calculated. All the kurtosis and skew Z-scores were below the upper threshold of 3.29 and 1.96, respectively ($p < .05$), except for 5 items in the Core Self-Evaluations, 4 items each in the General Health Questionnaire and Job Satisfaction, 2 items in Life Satisfaction and an item in the Edinburgh Farming Stress Inventory. Table 21 shows the skew and kurtosis (Z-score) values of the items that require further remedy to achieve the statistical assumptions of SEM. The logarithmic transformation was used for these variables because of the skewness and extreme values in the items (Bollen, 1989). The other items did not require log transformation. According to Hair *et al.*, (2006) and Tabachnick & Fidell (2007), testing the complex structural equation models require multivariate normality. By transforming the scale score will not resolved multivariate normality in structure equation modelling, and thus all the transformed items were included in the model. On the other hand, these transformed items were not included in factor analysis and “item parcels” because it was not known which measured items tap on the same common factors (Fabrigar *et al.*, 1999).

Table 21: Results Assessment of Non-normality of Items¹⁰

Variable (items)	Skew (Z-score)	Critical Value	Kurtosis (Z-score)	Critical Value	Results
JS 1	-2.63	±1.96	3.51	±3.29	*
JS 2	-2.09	±1.96	3.70	±3.29	*
JS 4	-1.98	±1.96	3.62	±3.29	*
JS 5	-2.36	±1.96	3.70	±3.29	*
LS 2	-1.99	±1.96	6.86	±3.29	*
LS 4	-1.98	±1.96	3.95	±3.29	*
CSE 3	-1.97	±1.96	3.33	±3.29	*
CSE 5	-1.98	±1.96	3.29	±3.29	*
CSE 7	-2.19	±1.96	3.29	±3.29	*
CSE 9	-2.87	±1.96	3.49	±3.29	*
CSE 11	-2.77	±1.96	5.01	±3.29	*
EFSI 27	2.33	±1.96	5.07	±3.29	*
GHQ 9	1.98	±1.96	7.95	±3.29	*
GHQ 10	2.20	±1.96	8.74	±3.29	*
GHQ 11	4.41	±1.96	8.43	±3.29	*
GHQ 12	2.46	±1.96	8.67	±3.29	*

Note: *p < .05 significance level; Job satisfaction (JS); Life satisfaction (LS); Core Self-Evaluations (CSE); Stressor (EFSI); Strain (GHQ).

4.7.1 Examination of General Health Questionnaire-12

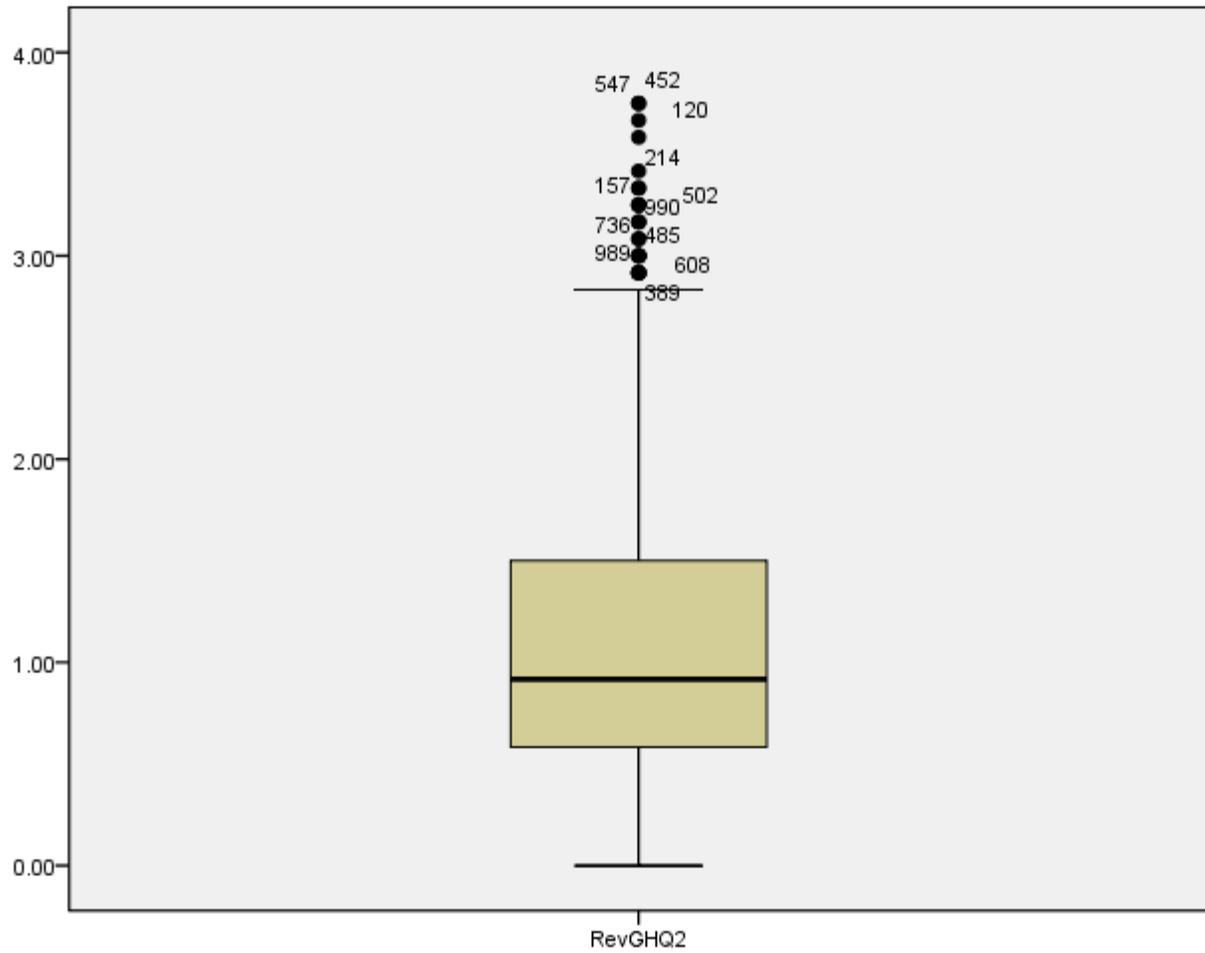
GHQ-12 data was screened to statistically identify out-of-range responses by exploratory data analysis (Bryman & Cramer, 2009; Tukey, 1977). It was found that GHQ-12 data has unusually discrepant means and standard deviations, and potential univariate outliers. Further analysis of the General Health Questionnaire-12 (strain) indicates increased

¹⁰ These items were transformed to logarithmic in the SEM.

variances across the residuals which violate the assumption of the linearity and homogeneity of the variances (Field, 2006). A large residual of dependent variables is evidence that these values are outliers (Chambers, Hentges, & Zhao, 2004; Field, 2006). The graphical analyses (i.e., box plot in Figure 6) were employed to assist in the identification of outlying cases that posed undue influence on the distributional properties of the data.

Since a normal distribution is appropriate for parametric multivariate analyses, the outliers of the Z-score were considered (Banks *et al.*, 2004). Because of the impact of multivariate outliers on regression analysis, outliers were identified and excluded using Z-scores of +3.0 as a threshold (Osborne, 2008). There were 15 outliers identified which were subsequently deleted. Further, when the stem-leaf was employed to examine the General Health Questionnaire-12, there were a further 26 cases of outliers identified (Figure 7). However, “some variables will not follow the shape of the normal distribution curve” (Bryman & Cramer, 2009, p. 116). Therefore, the remaining 26 cases of outliers were retained; there was a total of 1,026 respondents taken into account in the regression analysis and SEM. According to Saal and Knight (1996), the criterion for determining sufficient sample size, utilizes a case to predictor ratio of 10:1, that is, 10 cases for each of the predictors. Thus, the recommended sample size of a factor analysis on a 68-item scale is 680. Given the large number of surveys returned (1,041), statistical power was not a concern, even after consideration of the deleted cases. To summarise, the associations among the items of the General Health Questionnaire-12, Core Self-Evaluations, Edinburgh Farming Stress Inventory, Life and Job Satisfaction were examined using confirmatory factor analysis.

Figure 6: Box Plot of the General Health Questionnaire-12



4.8 Correlation Analysis

As a preliminary analysis, all the variables were tested and the results of the correlation were reported in Table 22 and Table 23. This study used the factor scores of each case to determine the correlations of the variables.

The correlations between the independent and dependent variables were used to evaluate the existence of the relationships. As shown in Table 22, all the independent and dependent variables were significantly correlated. The Edinburgh Farming Stress Inventory (stressor) variable was positively associated ($r = 0.46$, $p < .01$) with the General Health Questionnaire-12 (strain). However, this result contradicts the proposed acceptable correlation of about .26 and .40 in a stress-strain study, as suggested by Zapf, Dormann, and Frese (1996), and Koslowsky (1998), respectively. Taking this into account, it is reasonable to suggest that the correlation of stressor-strain in farming populations could achieve higher value. The relationship between the General Health Questionnaires-12 with job satisfaction is negative ($r = -0.59$) and significant at ($p < .01$). That is, the lower the strain, the higher the satisfaction. The analyses revealed a positive relationship between job satisfaction and life satisfaction. The relationship is positive ($r = 0.66$) and significant at ($p < .01$). The core self-evaluations was directly linked to job satisfaction with $r = 0.65$ at $p < .01$, and life satisfaction with $r = 0.69$ at $p < .01$. Several studies provide empirical support for the relationship between core self-evaluations and job satisfaction (Judge & Bono, 2001; Judge *et al.*, 2000; Judge *et al.*, 1998). In a meta-analysis of 169 correlations, Judge and Bono (2001) found that the correlation of the core self-evaluations to job satisfaction ranged from 0.24 to 0.45. The relationship between core self-evaluations and job satisfaction was positive because a positive attitude increases one's satisfaction. In addition, the analyses revealed a negative relationship between core self-evaluations and strain, with $r = -0.72$ at $p < .01$, and stressor,

with $r = -0.45$ at $p < .01$. Both the severity and the frequency of the stressor were significantly correlated at 0.76 ($p < .01$). Thus, farm managers who frequently encountered the high impact of farm stressors are likely to experience high severity from the impact of the farm stressors.

The age of the New Zealand farm managers was significantly correlated with the tenure of their current job on the farm ($r = 0.55$, $p < .01$). The number of employees working at peak season did not generally relate to various variables under examination, except the average hours worked ($r = -0.08$ ($p < .01$)). During the peak season, the farm managers worked fewer hours when they employed more workers. In addition, if they were sick, they were likely to employ more workers, $r = 0.62$ ($p < .01$). The size of the farm was negatively correlated with age $r = -0.10$ ($p < .05$), and positively correlated with average hours worked, $r = 0.14$ ($p < .01$). Older farm managers worked on smaller farms than the younger farm managers, though the correlations were small with respect to effect size. Herd numbers were negatively correlated with age, $r = -0.13$ ($p < .05$), and positively correlated with farm size, $r = 0.30$ ($p < .01$). Thus, the older farm managers are managing lower herd numbers compared with the younger farm managers who are managing higher herd numbers on larger farms. Table 23 shows the interrelation between the demographic variables.

To summarize, the results of the Pearson correlation show that the variables of interest were in the expected direction. Job satisfaction was associated with three correlated variables: life satisfaction, strain, and core self-evaluations, whereas strain was associated with stressors.

Table 22: Internal Consistency Reliability and Intercorrelations

Variable	1	2	3	4	5	6
1. Job Satisfaction	1 (0.75)					
2. Life satisfaction	.66**	1 (0.82)				
3. Core Self-Evaluations	.65**	.69**	1 (0.83)			
4. Strain (GHQ-12)	-.59**	-.59**	-.72**	1 (0.91)		
5. Stressor (severity)	-.34**	-.39**	-.45**	.46**	1 (0.93)	
6. Stressor (frequency)	-.33**	-.38**	-.43**	.44**	.76**	1 (0.94)

Note: *p < .05 (2-tailed); **p < .01 (2-tailed); Internal consistency reliability estimates (coefficient alpha) appear in parentheses on the diagonal; N = 1021.

Table 23: Intercorrelations between Demographic Variables

Variable	1	2	3	4	5	6	7
1. Age	1						
2. Tenure (years)	.55**	1					
3. Average hours worked	-.26**	.01	1				
4. Employee peak season	.05	.04	-.08**	1			
5. Farm size	-.10*	.07	.14**	.03	1		
6. No. of cows	-.13*	-.06	.80	0	.30**	1	
7. Sick days/year	.08	.03	-.13	.62**	.05	0	1

Note: *p < .05 (2-tailed); **p < .01 (2-tailed).

4.9 Analysis of Variance (ANOVA)

The farming stress and strain scores were calculated to examine the demographic variables of the farm managers. Two one-way Analysis of Variance (ANOVA) tests determined that no significant differences were found on strain ($F = 1.59$, $df = 7$, 1028, $p = 0.14$), and stressor ($F = 1.29$, $df = 7$, 1028, $p = 0.26$), in whatever type of farming.

Contrary to the finding by Walker and Walker (1987), the strain level was found to differ as a function of the type of farming operation.

Next, by testing one-way ANOVA on the General Health Questionnaire-12 (strain) as the dependent variable, and gender as the independent variable, the General Health Questionnaire-12 scale shows a gender difference, with females showing higher scores ($F = 13.59$, $df = 1$, 1019, $p < 0.001$). The strain mean score for female farm managers was 1.25 ($SD = 0.88$), compared to 1.04 ($SD = 0.71$) for male farm managers. Similarly, Booth & Lloyd (2000) found significant differences between male and female UK farmers in their GHQ scores. The female UK farmers showed higher GHQ scores than their male counterparts.

To determine whether gender scores differed from the Edinburgh Farming Stress Inventory (stressor), additional one-way ANOVA analyses were performed. A significant difference was found for stressor ($F = 23.43$, $df = 1$, 1019, $p < 0.001$). The stressor mean score for female farm managers was 2.45 ($SD = 0.55$) compared to 2.2 ($SD = 0.57$) reported by male farm managers. The critical value of F similarly suggests that the differences between the male and female scores are significant.

This study revealed that individuals differ in their response to stressors and react affectively in a different manner. Schwarzer and Schulz (2003) argued that females often report more distress than men, because females may generally lack appropriate coping skills in response to stressful life events. Schaubroeck *et al.* (1992) suggest that coping may play a role in the intra-individual differences in responses to a stressful environment.

There were significant age group differences on the experience of strain ($F = 2.4$, $df = 3$, 1009, $p < 0.07$), and stressor ($F = 3.5$, $df = 3$, 1009, $p < 0.02$), with younger age groups experiencing a higher impact. The critical value of F which is lower than the observed value F , suggests the differences in age group are significant. Thus, in this

study, the prevalence of strain symptoms and the impact of stressors differ among the different age groups. Similarly, Walker and Walker (1987) found higher levels of stress symptoms among younger Canadian farmers than the older farmers. The high level of stress symptoms among the young Canadian farmers was associated with higher financial pressures. Along similar lines, occupational stressors, such as financial issues, were associated with high stress levels among the affected farmers. Further, the older age group had more experience in coping with stressors (Ben-Zur & Zeidner, 1991; Schwarzer & Schulz, 2003). Table 24 shows the results of the one-way analysis of variance tests for farm types, gender, and age group among farm managers.

Table 24: Results of the one-way analysis of variance tests for differences in age groups, gender, and farm type on strain

Dependent Variable	Independent Variable	F-Ratio	Critical Value	Results
Strain	Age group	2.4	2.09	p<0.07**
Strain	Farm type	1.6	2.66	ns
Strain	Gender	13.6	6.67	p<0.001**
Stressor	Age group	3.5	2.61	p<0.02**
Stressor	Farm type	1.3	2.66	ns
Stressor	Gender	23.4	6.67	p<0.001**

**Significant difference; ns (non-significance)

4.10 Hierarchical Multiple Regression Analysis

Hierarchical multiple regression analysis was employed to test for any moderating effects that the core self-evaluations construct may have had on the stressor-strain and strain-job satisfaction relationships. Following the suggestions by Frazier, Tix and Barron (2004), all variables were centred (producing revised sample means of zero) to reduce problems associated with multicollinearity among the variables in the regression

equation. Core Self-Evaluations, Edinburgh Farming Stress Inventory (stressor) and General Health Questionnaire (strain) are transformed from a raw-score scale to a deviation score scale by subtracting the variable mean from all observations (i.e., mean centering). Therefore, the resulting product term of core-self evaluations with strain will be minimally correlated or uncorrelated; this will not limit the moderated regression results.

For interaction effects to take place, the strength was measured by unstandardized coefficient β , associated with a centred moderator multiplied with the centred predictor variable. For a significant interaction, the unstandardized coefficient has a value of more than zero (Osborne, 2008). Moreover, any equation with a changed R^2 was deemed significant and the independent variable in the regression model could significantly predict the dependent variable (Bryman & Cramer, 2009; Hair *et al.*, 2006). In this study, the moderator, core self-evaluations is hypothesised to affect the direction and/or strength of the relationship between stressor with strain, and strain with job satisfaction.

As noted in Model 1 of Table 25, life satisfaction was a control variable in the regression analyses. The demographic variables included as control variables in the subsequent regression analyses were gender, average hours worked per week, and tenure. This was done in order to control for the impact of the demographic variables and life satisfaction on the study variables (Brunborg, 2008). Thus, a hierarchical multiple regression analysis was conducted (using centred variables) to evaluate how well the independent variables, presented in Table 25, predicted the strain.

Table 25 shows the parameter estimates of regression models of core self-evaluations as a moderator in the stressor-strain relationship. Of the control variables, life satisfaction and gender showed significant effects. Life satisfaction was negatively related to strain ($p < .001$), consistent with the idea that the higher the strain, the more

dissatisfaction there is with life on the farm. In Model 2, stressor as an independent variable was added. The improvement of fit is significant ($p < .001$). The result reflected the expected direction, with a higher stressor related to higher strain, consistent with prior findings (Booth & Lloyd, 2000; Chen & Spector, 1991; Hurrell *et al.*, 1998; Kivimaki & Kalimo, 1996). Thus, Hypothesis 1 is supported. The average hours worked showed a significant effect ($p < .05$). The effect of gender on strain turned non-significant with the inclusion of core self-evaluations into the Model 3, suggesting that core self-evaluations had no effect on either male or female responses to strain or stressor. However, the core self-evaluations had a significant negative main effect on strain. This result supports the view that personality traits are a predictor variable of strain (Bond & Bunce, 2003; Brunborg, 2008; Kahn & Byosiere, 1992). In Model 4, the core self-evaluations did not account for any variance in strain beyond the variance attributed to stressor ($\Delta R^2 = .001$, $p = .21$). Results indicate that Core Self-Evaluations did not significantly moderate the stressor-strain relationship, $t(7, 821) = -1.25$, $p = .21$ (see Table 25). Although this study has enough power to detect an extant effect, the failure to find a moderation effect of core self-evaluations could mean that there is no interaction, or interaction exists in a quadratic form (Osborne, 2008). As the stressor increased, strain did not increase significantly, either for the low core self-evaluations farm managers or the high core self-evaluations farm managers.

Table 25: Moderated Regression Results for Core Self-Evaluations as a Moderator of Stressor-Strain relationship

Variable	Strain			
	Model 1	Model 2	Model 3	Model 4
Product Terms				
Stressor x CSE				-.04 (.033)
Moderator				
Core self-evaluations (CSE)			-.47*** (.028)	-.48*** (.03)
Independent Variable				
Stressor		.31*** (0.37)	.14*** (0.33)	.16*** (.04)
Control Variable				
Constant	2.77 *** (.154)	1.94*** (.177)	3.69*** (0.184)	3.75*** (.192)
Life satisfaction	-.39*** (.021)	-.32*** (.021)	-.11 *** (.022)	-.10*** (.02)
Average hours worked	.002 (.001)	.001* (.001)	.001 (.001)	.002 (.001)
Gender	.193*** (.054)	.112* (.053)	.066 (.045)	.064 (.045)
Tenure	.000 (.001)	.000 (.001)	.000 (.001)	.000 (.001)
R ²	.317***	.370***	.533***	.534
Adjusted R ²	.313***	.367***	.530**	.530
Change in R ²	.317***	.054***	.163***	.001
N	829	829	829	829
F	95.39***	96.86***	156.49***	134.45***

Note: Standard errors are in parentheses.
° values presented include centred data only.

†p < .10
*p < .05
**p < .01
***p < .001

In the second regression test, Table 26 shows the parameter estimates of regression models of core self-evaluations as a moderator in the strain-job satisfaction relationship. The hierarchical multiple regression analysis was conducted (using centred variables) to evaluate how well the independent variables predicted job satisfaction.

Model 1 shows the parameter estimates of the control variables. Of the four control variables, only life satisfaction shows consistent significant effects over subsequent models ($p < .001$). The life satisfaction measure shows a strong and positive effect on job satisfaction that is consistent with prior findings (Heller *et al.*, 2002; Tait *et al.*, 1989). Thus, Hypothesis 3 is supported. In Model 2, strain as an independent variable shows a significant negative effect with job satisfaction ($p < .001$), as predicted by Hypothesis 2, that is, the lower the strain, the higher the satisfaction. In Model 3, core self-evaluations is significantly related to job satisfaction ($p < .001$) which supports Hypothesis 4. The result is consistent with previous findings that core self-evaluations affects job satisfaction (Judge *et al.*, 2002; Judge, Locke, & Durham, 1997; Rode, 2004).

Finally, to address whether core self-evaluations would moderate the strain and job satisfaction relationship, hierarchical multiple regression analyses were conducted. The results indicate that core self-evaluations did significantly moderate the strain-satisfaction relationship, $t(7, 825) = 2.6$, $p < .01$ (see Table 26). The linear combination of the independent variables was significantly related to job satisfaction, $R^2 = .468$, adjusted $R^2 = .463$, $F(7, 825) = 103.5$, $p < .001$. Although the hierarchical regression result suggested that the interaction term was significant, the amount of incremental variance explained by the interactions in Table 26 was modest at 0.4% ($\Delta R^2 = .004$, $p < .01$). However, as Ozer (1985) noted, in interaction terms, R^2 is often a misleading measure of effect size. To further illustrate, Figure 8 shows the graphic representation of the interaction term. The plotted interaction demonstrated that as strain increased, job

dissatisfaction did not increase significantly for high core self-evaluations farm managers compared to low core self-evaluations farm managers. Hence, Hypothesis 6 is supported.

Next, a pairwise test was conducted to assess whether the mean differences of strain and job satisfaction between the two groups of farm managers were statistically meaningful. On average, the individual who experiences greater strain (median > .92) will likely experience lower job satisfaction (mean = 5.5, SE = .04). Thus, the low core self-evaluations farm managers may experience significantly greater strain than high core self-evaluations farm managers. The difference was significant at $t(814) = -15.5, p < .001$.

To summarize, the regression analysis reveals a two-way interaction on the strain and job satisfaction relationship, with core self-evaluations as a significant moderator ($p < .001$). On the other hand, core self-evaluations is not a significant moderator in the stressor and strain relationship. Therefore, the results of the regression analysis imply that those high or low core self-evaluations farm managers who experience high stress are likely to perceive high strain. Further, the high core self-evaluations farm managers who perceive high strain are more likely to be satisfied with their lives and jobs on the farm. The correlation between job satisfaction and life satisfaction in the last model of the moderated regression analysis ($r = .25$), was comparable to the average unadjusted correlation ($r = .31$) reported in the meta analysis by Tait *et al.* (1989).

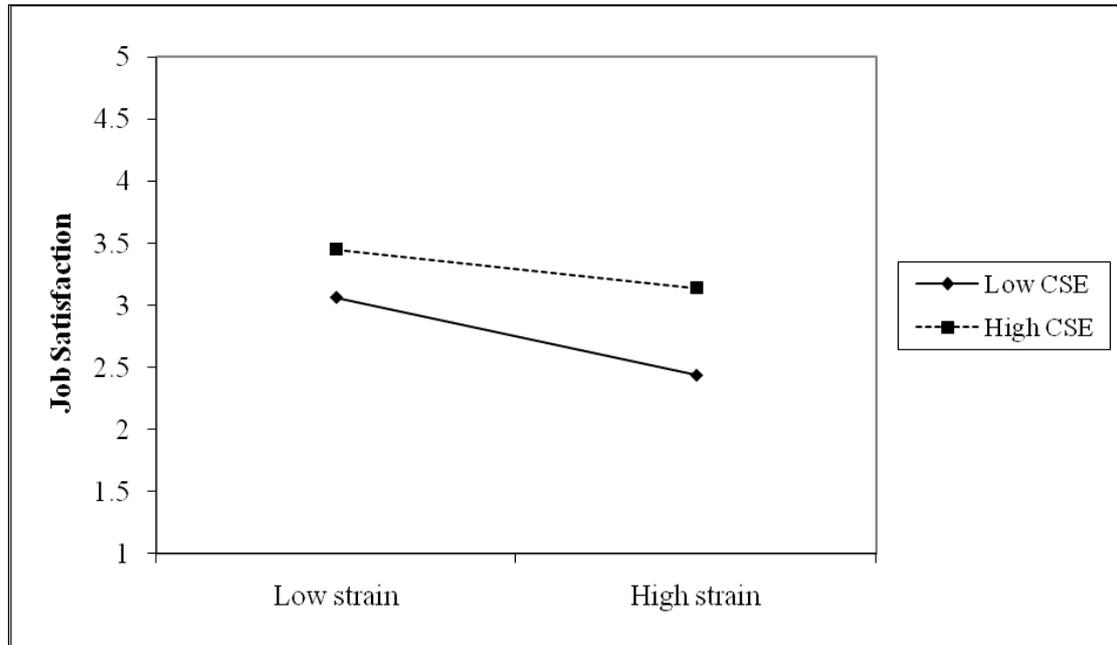
Table 26: Moderated Regression Results for Core Self-Evaluations as a moderator of Strain-Job Satisfaction relationship.

Variable	Job Satisfaction			
	Model 1	Model 2	Model 3	Model 4
Product Terms				
Strain x CSE ^o				.07** (.028)
Moderator				
Core self-evaluations (CSE)			.25*** (.038)	.27*** (.04)
Independent Variable				
Strain		-.36*** (0.04)	-.21*** (0.04)	-.25*** (.04)
Control Variable				
Constant	3.27 *** (.165)	4.27*** (.184)	3.14*** (.245)	3.07*** (.246)
Life satisfaction	.48*** (.022)	.34*** (.025)	.26*** (.027)	.25*** (.027)
Average hours worked	.001 (.001)	.002† (.001)	.002† (.001)	.002† (.001)
Gender	.042 (.058)	.111* (.055)	.130* (.054)	.138** (.054)
Tenure	-.002 (.002)	-.002 (.001)	-.001 (.001)	-.001 (.001)
R ²	.364***	.434***	.463***	.468***
Adjusted R ²	.361***	.430***	.459**	.463***
Change in R ²	.364***	.070***	.029***	.004**
N	833	833	833	833
F	118.26***	126.73***	118.80***	103.52***

Note: Standard errors are in parentheses.
^o values presented include centred data only.

†p < .10
 *p < .05
 **p < .01
 ***p < .001

Figure 8: The Relationship between Strain and Job Satisfaction as Moderated by Core Self-Evaluations.



Interaction between strain and core self-evaluations

4.11 Structural Equation Modelling (SEM)

SEM is an extension of the general linear model of analysis of which multiple regression is a part. SEM is able to remove measurement error effects from latent variables measured by multiple indicators, which allows for a more precise examination of the relationships of the hypothesised model. The measurement model examines the factor structure of the construct indicators. There can be multiple dependent/endogenous variables in a single structural equation model compare with a regression model which can only model one dependent/endogenous variable and cannot manage complex models involving indirect paths (Fletcher, Selgrade & Germano, 2006: Hair *et al.*, 2006).

In this study, a series of structural models was subjected to covariance structural equation modelling analysis utilizing AMOS 17.0 (SPSS). The AMOS program allows the specification of baseline models where covariances among the observed variables are required to be equal (Arbuckle, 2003). All SEM analysis was performed using the

maximum likelihood procedure. The major variables were tested by using Structural Equation Modelling to determine the pattern of path analysis in the hypothesised model. Whenever SEM was employed, the overall fit of the model to the data was assessed by examining the Chi-square indices of fit (X^2), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR).

In this study, the baseline Model 1 included all the variables: Core Self-Evaluations, Edinburgh Farming Stress Inventory, General Health Questionnaire, Job and Life Satisfaction. The paths from one latent variable to the indicators of another were constrained to equal zero to test empirically for goodness of fit (Bollen, 1989). Based on the results of the hierarchical regression analysis on Tables 25 and 26, Model 1 was first tested with the following paths: 1) from core self-evaluations measures to stressor; 2) from stressor to strain; 3) from strain to job satisfaction; and 4) from job satisfaction to life satisfaction. The control variable, life satisfaction was statistically partial from the data in the baseline model. It was included in the subsequent structural models to remove its influence from the entire system of variables (Newcomb & Bentler, 1988). Thus, by including a factor in a SEM is conceptually similar to having a control variable in a regression because the model does take account of relationships with life satisfaction. Table 27 shows the results of the path baseline model as obtained in AMOS 17.0. Examination of the fit indices (RMSEA and SRMR) indicated within the acceptable range.

Model 1 and Model 2 have the actual variables included. The only difference in Model 2, is that the product term of Core Self-Evaluations has been included with the General Health Questionnaire (strain) in the model to determine the interaction and quadratic moderation in the structural equation modelling (Kenny & Judd, 1984; Kline, 2005). The model of the moderating effects of core self-evaluations between strain and

job satisfaction, was tested by applying a technique described by Ping (1995), which allows the inclusion of interaction terms within SEM. The results reveal that the path from core self-evaluations as a moderator for strain and job satisfaction relationship was not significant. Thus, Model 2 was rejected because ΔX^2 (Δdf) did not provide a significant test of fit differences.

Next, Model 3 was built on the first model, plus the product term of Core Self-Evaluations with the Edinburgh Farming Stress Inventory (stressor) was added into the model to assess the interaction and quadratic moderation (Kenny & Judd, 1984; Kline, 2005). Again, the model of the moderating effects of core self-evaluations between strain and job satisfaction was tested by applying a technique described by Ping (1995), which allows the inclusion of interaction terms within SEM. The path in Model 3 was nested, or modified, with the same number of estimated parameters ($\Delta df = 0$). The results reveal that the path from core self-evaluations as a moderator for the strain and job satisfaction relationship was significant. The results, derived through a series of discrete regression models, are largely consistent with those from the path analysis in SEM. Likewise, Mu, Gnyawali, and Hatfield (2007) found similar results in their application of the regression models, and subsequently with structural equation modelling.

Finally, the fourth model was the same as the third model, plus the product term of Core Self-Evaluations with General Health Questionnaire (strain) was added into the model to assess the interaction and quadratic moderation. The model of the moderating effects of core self-evaluations between stressor, strain and job satisfaction, were tested by applying a technique described by Ping (1995), which allows the inclusion of interaction terms within SEM. The path from core self-evaluations as a moderator for stressor-strain, and strain-job satisfaction relationship were significant. The specific fit indexes were as follows: $\Delta X^2 (76) = 11.2$, $p < .001$, $RMSEA = .073$, $SRMR = 0.069$.

RMSEA values between .05 and .08 suggest a reasonably close fit in the model (Browne & Cudeck, 1993; Hair *et al.*, 2006; Kline, 2005; MacCallum, Browne, & Sugawara, 1996). Values of SRMR less than .08 are generally considered favourable (Hair *et al.*, 2006; Kline, 2005). Further, the power associated with RMSEA indicates the close fit of an entire structural equation model with a sample size of 1026, and degrees of freedom of 817 (McQuitty, 2004).

Given that Model 4 had better specific fit indices using more parameters (df = 817), it might be argued that Model 4 should be preferred over Model 3 (Kaplan, 1995; McQuitty, 2004). Alternatively, a change in X^2 close to the difference in degrees of freedom, suggests that the freed parameters constitute a real improvement. Further, moderator 1 (core self-evaluations x strain) and moderator 2 (core self-evaluations x stressor) were fitted to a covariance matrix to assess whether the model would provide a good fit to the data and would have a causal relationship (Bollen, 1989; MacCallum & Austin, 2000). The estimate value of the covariance is -0.02 and the critical ratio is -4.47. Thus, a model that produces an estimated value of covariance matrix is generally a good fit model (Hair *et al.*, 2006). Overall, a significant chi-square difference in Model 4 indicates that the fit of the more complex model is significantly better than that of the simpler model (Bollen, 1989; Joreskog, 1993).

In standard regression, the degrees of freedom are based on the sample size and reduced by the number of estimates in the model. The more complex models would have had fewer degrees of freedom. However, in Structural Equation Modelling, the degrees of freedom have nothing to do with the sample size; they are derived entirely from the models. As a result, the more complex models actually have more degrees of freedom. (Byrne, 2001; Newcomb & Bentler, 1988).

Specifically, as McQuitty (2004) noted:

When large samples are used to test complex models (i.e., those that have many df), it is possible for power to be much greater than expected by a researcher, leading to overrejection of “correct” models (p.177).

Similarly, Wheaton (1987) suggests X^2 depends directly on the sample size in assessing fit of a model. Thus, the findings of well-fitted hypothesized models, where the X^2 value approximate the degrees of freedom in large sample, have proven to be realistic. A summary of the goodness of fit indices is shown in Table 27.

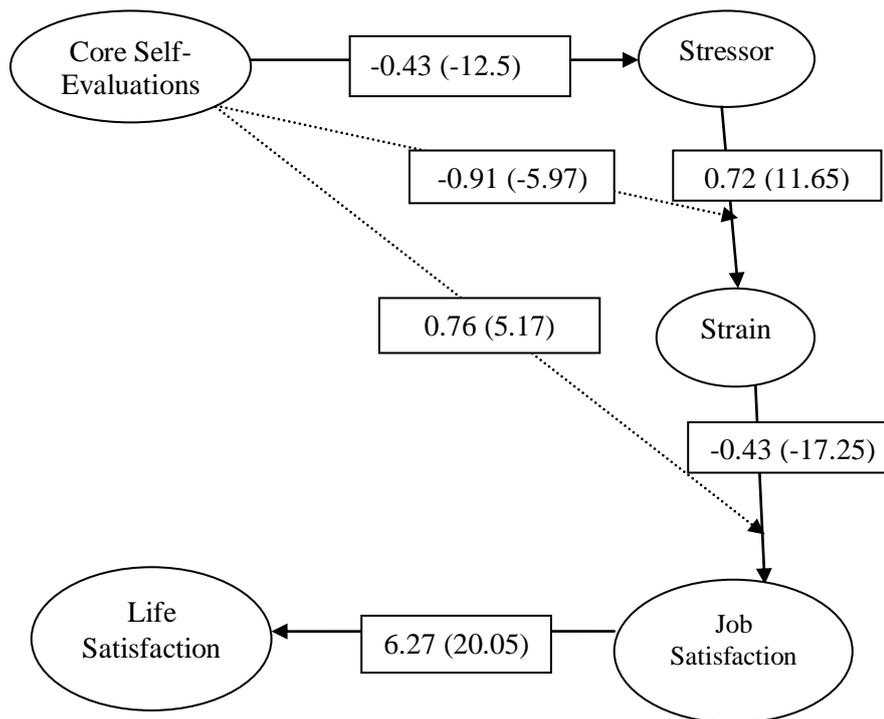
Table 27: Summary of Goodness-of-Fit Indices

Model	Measures	$X^2(df)$	ΔX^2	Δdf	$\Delta X^2/\Delta df$	RMSEA	SRMR
1 (baseline)	CSE, EFSI, GHQ, JS, LS	4419 (741)	-	-	-	0.070	0.064
2	CSE, EFSI, GHQ, JS, LS, CSE x GHQ (moderator 1)	4441 (779)	22	38	0.58	0.068	0.066
3	CSE, EFSI, GHQ, JS, LS, CSE x EFSI (moderator 2)	5472 (779)	1053	38	27.7***	0.077	0.071
4	CSE, EFSI, GHQ, JS, LS, CSE x GHQ, CSE x EFSI	5272 (817)	853	76	11.2***	0.073	0.069

Note: N = 1026; ***p < .001; ΔX^2 = difference Chi-square index; Δdf = difference degrees of freedom; RMSEA (Root mean square error of approximation); SRMR (Standardized root mean square residual); CSE (Core Self-Evaluations); EFSI (Edinburgh Farming Stress Inventory); GHQ (General Health Questionnaire); JS (Job Satisfaction); LS (Life Satisfaction)

Figure 9 displays Model 4 with the standard coefficient of each path, and the critical ratios as obtained in AMOS 17.0. Six paths in this full model were found to be statistically significant. The model fit indices provide additional information on the plausibility of the tested model. The paths running from core self-evaluations as moderator for the stressor-strain and the strain-job satisfaction relationships were significant. Thus, taken together, Hypothesis 5 and Hypothesis 6 were confirmed. The value of the hypothesised model is shown in Table 28. The results do not merely support the previous literature, but broaden the understanding of how core self-evaluations relate with the prescribed variables.

Figure 9: Empirical Test of the Structural Equation Modelling of the Hypothesised Model



Note: Figures given are coefficients (critical ratios in parentheses)

Table 28: Values of Hypothesised Model

Path to	Path from	Path value
Stressor	Core self-evaluations	-.43***
Strain	Stressor	.72***
Job satisfaction	Strain	-.43***
Life satisfaction	Job satisfaction	6.27***
Stressor-strain	Moderator 1 (core self-evaluations)	-0.91***
Strain-job satisfaction	Moderator 2 (core self-evaluations)	0.76***

Note: N = 1026; *** p < .001; **p < .05

In summary, core self-evaluations appear to be a significant moderator in the stressor-strain and strain-job satisfaction relationships. This finding has further expanded the “nomological network of core self-evaluations” which shows a higher proportion of the relationship of this latent construct with the variables of interest (Judge & Hurst, 2007, p. 1223).

4.12 Summary of Key Quantitative Findings

This chapter has presented all the data relevant to the six hypotheses outlined in the literature review. The study finds that individuals’ core self-evaluations are affected by stressors, which means they are linked with recent life events. As hypothesised, farm stressors and strain were positively related. This was confirmed by the farm managers who experienced low strain indicating that they experienced a low impact from farm stressors. In addition, as hypothesised, strain was found to be inversely related to job satisfaction. The farm managers who reported high levels of strain in the study reported low job satisfaction. Also as hypothesised, a strong correlation was discovered between job satisfaction and life satisfaction, and the farm managers who were satisfied with their job reported life satisfaction on the farm.

Finally, the measurement models and structural model showed that the core self-evaluations moderated the stressor-strain-job satisfaction relationships, which were then validated by structural equation modelling. The results suggest that core self-evaluations are a significant moderator for the stressor-strain relationship and the strain-job satisfaction relationship. Core self-evaluations, as a higher order latent variable, remained robust throughout the process of data analyses. The results of the hypotheses testing are shown below in Table 29

Table 29: Summary of Hypotheses Testing

SUMMARY OF HYPOTHESES TESTING	
HYPOTHESES	OUTCOME
1. There is a positive relationship between farm stressors and strain	Supported
2. There is a negative relationship between strain and job satisfaction	Supported
3. Job satisfaction is positively related to life satisfaction	Supported
4. Core self-evaluations is positively related to job satisfaction	Supported
5. The relationship between farm stressors and strain is moderated by core self-evaluations	Supported
6. The relationship between strain and job satisfaction is moderated by core self-evaluations	Supported

CHAPTER 5 – DISCUSSION

5.1 Overview of the study

This study examined the moderating effects of a broad personality measure called core self-evaluations in a comprehensive model that included not only psychosocial stressors and psychological strain but also the satisfaction domain. This study is designed to accomplish six hypotheses drawn from the general stress, farming stress, and core self-evaluations literature:

- i. Hypothesis 1: There is a positive relationship between farm stressors and strain;
- ii. Hypothesis 2: There is a negative relationship between strain and job satisfaction;
- iii. Hypothesis 3: Job satisfaction is positively related to life satisfaction;
- iv. Hypothesis 4: Core self-evaluations are positively related to job satisfaction;
- v. Hypothesis 5: The relationship between farm stressors and strain is moderated by core self-evaluations; and
- vi. Hypothesis 6: The relationship between strain and job satisfaction is moderated by core self-evaluations.

The objective is to develop a theoretical model for understanding the dispositional construct, core self-evaluations, in the stressors and strain, and strain and satisfaction relationships. No research on core self-evaluations has yet been published utilising the

method of incorporating measures of stressors, strain, and satisfaction in a hypothesised model.

The results of the present study support the prediction that stressors are directly linked to strain. The results also support the prediction that strain and job satisfaction are negatively correlated. Job satisfaction is found to be strongly related to life satisfaction. This study clearly supports the hypothesis that job satisfaction is positively associated with core self-evaluations. The statistical evidence based on a structural equation modelling technique confirmed that the broad personality construct, core self-evaluations, moderated the impact of stressors on strain, and, subsequently, that there is a negative influence of strain on job satisfaction. The final model suggests that traditional occupational stress models are incomplete as they do not include individuals' appraisals of the situations as affected by their individual differences.

5.2 Stressors in farming

Research involving farm managers has focussed primarily on associations between the external environment and health outcomes such as depression, anxiety, and heart disease (Smith & Saunders, 1995). This study examines how the cognitive appraisals of farm managers affects their psychological states. In farm work, farm managers encounter six domains of farm-related stressors such as government policies and regulations, finance issues, unpredictable factors in farming, time pressures, personal farm hazards and geographical isolation (Deary *et al.*, 1997).

In relation to the Beehr and Newman (1978) dimensions of stress, the environmental situation was perceived as presenting a demand which threatened to exceed the individual's capabilities and resources in the work stress process. The farm managers in the present study rated complying with government policies and regulations,

unpredictable factors, personal farm hazards, time pressure, and finance issues, and geographical isolation among their sources of farm stress.

As noted, this study identified that the highest source of stress experienced by farm managers are government policies and regulations. The farm managers viewed government policies and regulations as the highest stressor due to two factors. First, the government has to constantly regulate the economic policies (such as currency and interest rates) to remain competitive in the international market. As a result, the farm managers who lacked financial skills often suffered severe losses through exposure to the price fluctuations in the market for their produce. The second factor are the government policies which limit availability of labour on the farm. The farm managers in this study reported working up to 140 hours per week on large farms. The stressors are increased when not enough workers are available to assist them. Thus, employing farm workers has remained a critical issue in all sectors of the agriculture industry in New Zealand. This result increases workload and time pressure, which have deleterious psychological effects on the farm managers.

Taken together, the results of this study support previous research, verifying similar farm stressors, as reported by Alpass *et al.* (2004) and Deary *et al.* (1997). However, via confirmatory factor analysis, six specific farm stressors were selected from the 34-item Edinburgh Farming Stress Inventory. The most notable items are the debt load, bad weather, farming-related accidents, long hours of work, social isolation, and completion of government forms. In light of the relatively specific facets of farming-related stress revealed by this study, a general job-related stress inventories scale will provide support related to all aspects of stressors in farming.

5.3 Strain in Farming

The farm managers reported a high impact of stressors related to complying with government policies and regulations, but a comparatively low impact of stressors in relation to geographical isolation. Although farm managers rated geographical isolation as the least stressful factor, it is a significant predictor of psychological strain and illness (Eberhardt & Pooyan, 1990). To capture the total impact of strain, the farm managers who frequently encountered high impact stressors will experience more severe reactions to stressors (Alpass *et al.*, 2004).

To summarise, the sources of stress in the New Zealand farming population are found to be consistent with those reported elsewhere, particularly, in the Australian and British farming populations. The farm managers who experience stressful events while doing farm work tend to report psychological strain.

5.4 Stressor and Strain relationship

The relationships between workers' environments and their attitude outcomes have received enormous attention in the empirical literature (Grant & Langan-Fox, 2007; Kinman, 2001; Locke, 1976; Margolis *et al.*, 1974). For instance, previous researchers have found links between stressors and psychological strains (Lobley *et al.*, 2004; Spector & Jex, 1998; Walker & Walker, 1988; Wallis *et al.*, 2003). According to Fletcher (1989), "Occupational stressors are risk factors in the work environment which increase the probability of strain reactions" (p. 10).

As anticipated, this study supports previous findings that there are links between farm stressors and psychological strain. The farm managers in this study experienced strain when the characteristics and demands of the farm work were misaligned with their

abilities. When the profit-oriented farm managers' do not achieve their targets, they are likely to experience psychological strain. Farm managers in this study believed they had control over determining their affective responses. However, many of the factors contributing to farm crises are well beyond farmers' control. Thus, as a farm crisis endures over a longer time period, they often suffer from psychological strain. In effect, strain is the result of an incompatible fit between the demands of a job and the personal abilities of the individual (Lazarus & Folkman, 1984).

Although this study confirms the stressor and strain relationship as found in stress literature, it raises questions about certain core premises of the occupational stress model. As noted, the farm managers' responses to environmental farm stressors depend on the type of stressors encountered and their cognitive appraisals, which may or may not lead to psychological strain. If the stressor has a low impact, the farm managers will only suffer low psychological strain. For example, geographical isolations is rated lowest in severity for the impact of stressors. The result of this study supported findings that individuals are constantly exposed to changes in the external environment, thus there are variations in the level of strain experienced.

Interestingly, the farm managers in the present study report low strain when faced with the impact of farm stressors. These results contradict past research findings in the Australian and British farming populations in which numerous studies report that farm managers experience a high impact from farm stressors. Previous studies used similar instruments and the General Health Questionnaire 12-item version to measure strain. Thus, the disparity in the strain level reflects the differences in government regulatory pressure (such as, agricultural policy reforms) and unpredictable factors (such as, outbreak of diseases or natural disasters) experienced by the farming populations.

However, the relatively low impact of stressors reported by New Zealand farm managers results in low strain and, consequently, high job satisfaction is experienced.

To summarise, the results support the notion that the low impacts of stressors generate low levels of strain among New Zealand farming managers. This can have spillover effects into other aspects of farming life, and into their satisfaction with the job and farming life.

5.4.1 Gender and farming stress

An expected result in this study is the higher level of farming-related stressors and the higher impact of strain reported by female farm managers compared with their male counterparts. There is some evidence to suggest that female farm managers respond differently to stressors in comparison to their male counterparts (Alpass *et al.*, 2004; Ang, Lamm, & Tipples, 2008; McGregor *et al.*, 1995). For instance, Heppner, Cook, Strozier and Hepper (1991) report that U.S. male farm managers react differently to stressors from the female farm managers, “reflecting a more global, pervasive, and ambiguous sense of personal failure linked to their traditional need for achievement” (p. 172). The particular experience of strain among female farm managers has been addressed by other researchers (Alpass *et al.*, 2004; Booth & Lloyd, 2000; Deary *et al.*, 1997; Walker & Walker, 1987). However, there is no conclusive evidence that has been addressed by other researchers on the experience of higher stressors and strains among female farm managers.

In fact, a female farm manager in Christchurch who felt isolated working on her farm when confronted with the impact of a stressor said, “I have no friends from the nearest neighborhood on a farm and we never communicate with each other when I need

help” (farm manager 1, 2007)¹¹. However, based on the evidence of this study, the issue remains of whether females are simply more prepared to report experiencing stressors or really suffering farm-related strain. If the strain levels are truly significant among the female farm managers, sources of stress may be balancing work and family roles (Deary *et al.*, 1997) or personal factors (such as different coping styles) (Berkowitz & Perkins, 1984; Walker & Walker, 1987). In this context, females are more likely not to cope or to seek social support, which means they will experience increased levels of strain when confronted with stressful situations (Taylor *et al.*, 2000).

In relation to Karasek’s Job Strain Model, a high farm stressor and low control are significant predictors of strain among female farm managers. However, by seeking social support, personal control is no longer a significant predictor of strain (Karasek & Theorell, 1990). Therefore, social support from the neighbourhood may have an effect on the female farm managers’ well-being in the farm. Thus, it is reasonable for female farm managers to experience low job satisfaction when confronted with high levels of strain in their job.

5.5 The Role of Core Self-Evaluations

Judge *et al.* (2008) argue that core self-evaluations taxonomy may explicate the psychological processes underlying the disposition source of job satisfaction beyond the other personality taxonomies (such as the five-factor model, positive and negative affectivity).

Judge *et al.* (1997) demonstrate that the four personality traits reflect core self-evaluations, that produces self-esteem, generalised self-efficacy, low neuroticism (or high emotional stability), and locus of control. Consistent with past research, the results of this

¹¹ The quotes in the discussion chapter were obtained from the farm managers who participated during the pilot study.

study support the theoretical development of an aggregated conceptualisation of core self-evaluations, which represents the weighted sum of the four individual traits. From the results of confirmatory factor analysis, there is evidence to support that each of the four traits explains the psychological mechanism of the core self-evaluations as a broad, latent trait. As such, this study confirms core self-evaluations as a latent construct, as claimed by Johnson *et al.* (2008). As Dormann *et al.* (2006) highlight, “The model conceptualises core self-evaluations as an aggregate construct. Then, the four variables are the causes (*sic*) of a latent factor” (p. 31). That is, self-esteem, locus of control, generalised self-efficacy, and neuroticism, aggregate to form a nomological network with a core self-evaluations factor.

The protective factors, such as high self-esteem and internal locus of control, could counterbalance the negative aspects of life when individuals are vulnerable to an increased number of risk factors, or when they experience more stressful life events (Werner & Smith, 2001). However, research has demonstrated that these individual traits when used in isolation inconsistently predict job outcomes (Dewey, 1974; Ghiselli, 1973; Judge *et al.*, 2003).

As a fundamental trait, core self-evaluations possessed by individuals will remain relatively unaffected when they engage with unfamiliar environments. In the stress process, when individuals are exposed to unfamiliar environments or events that are interpreted as threatening, they will respond with appropriate behaviour and emotion to produce strain levels (Kammeyer-Mueller *et al.*, 2009).

The empirical findings support core self-evaluations as a moderator in the stress process. This suggests that core self-evaluations is useful in the context of understanding farm managers at work. This conclusion is further supported by the finding that core self-evaluations are negatively related to stressors that link to strain. Moreover, by utilizing

core self-evaluations as a single construct moderator, the model is more robust than the four widely-studied traits: self-esteem, locus of control, neuroticism, and generalised self-efficacy in isolation.

5.5.1 Core Self-Evaluations as a Moderator between Stressors and Strain

Relationship

The result in this study reflected the expected direction, with higher stressors related to higher strain, consistent with prior findings (Booth & Lloyd, 2000; Chen & Spector, 1991; Hurrell *et al.*, 1998; Kivimaki & Kalimo, 1996). However, this form of strain may not necessarily be influenced by work-related stressors. Other factors, such as dispositional tendencies, that is, core self-evaluations, are found to operate in an individual's life.

As the individual's core self-evaluations is negatively associated with strain, the cognitive appraisal of the situation affects an individual's levels of strain. This is in accordance with other studies using personality traits as predictors for strain (Bond & Bunce, 2003; Brunborg, 2008; Kahn & Byosiore, 1992). The degree of strain generated by a stressor is dependent on individual assessments of the situation. When this stimulus exceeds the threshold value, the individual is likely to produce a negative strain response. Therefore, the degree to which an individual feels control over such situations could mitigate the stressor-strain link.

In this study, the farm managers reported low levels of strain. Thus, the farm managers, as reported with other workers, were satisfied when working in a low strain job and, because farm work is an important part of farm managers' lives, it influences their life satisfaction. The results of this study support the findings that the farm managers evaluate the stressors or demands of their job with respect to their significance for their

well-being based on their affective responses. This relationship demonstrates that stressors and strain have a direct negative impact on job satisfaction. The results of this study support other findings, such as research by Kalliath *et al.* (2004) on New Zealand workers, and Markey (2010) on New Zealand teachers. The level of strain is comparable to the level reported by the New Zealand farm managers. Therefore, the New Zealand workforce is experiencing low psychological strain and, thus, are more satisfied with their jobs.

However, previous studies do not explain why certain individuals experience less psychological strain than others in the workplace environment (such as Grant & Langan-Fox, 2007; Judd *et al.*, 2006; Margolis *et al.*, 1974). The result of this study shows that core self-evaluations is a significant moderator for the stressor-strain relationship. As stressors increased (mean > 2.1) strain increased significantly (median > .92), for both low core self-evaluations farm managers and high core self-evaluations farm managers. The results of this study confirmed that the farm managers reported a moderately high level of core self-evaluations (mean = 5.4, SD = 0.83), and that the high core self-evaluations significantly reduce the stressor-strain relationship, whereas low core self-evaluations significantly increase the stressor-strain relationship. The relationship between stressors and strain is, in fact, dependent upon one's core self-evaluations. Both high and low core self-evaluations individuals pursue different avenues, especially following stressful events or threats. Individuals tend to have a general world view, which may spill over to the workplace and they are sensitive to demanding work situations (Judge *et al.*, 1998). Accordingly, core self-evaluations alter the effect of stressors on strain, specifically by buffering their effect. Individuals report varying levels of stressors and strain.

The results of the study support that the differences in response to stressors in the farming environment will vary as a function of an individual's disposition. Similarly, the level of psychological strain is a result of how the individuals perceive stress (stressors) and their ability to cope with the stressors (Decker & Borgen, 1993; Kammeyer-Mueller *et al.*, 2009).

Individuals who believe that they do not have sufficient personal resources to cope with specific events may experience a more intense stress reaction (Karasek & Theorell, 1990). Similarly, farm managers who experience high levels of strain are the result of a high impact of stressors and a low locus of control. Since locus of control is one of the central components of core self-evaluations, the low core self-evaluations farm managers are overwhelmed by farm stressors. Conversely, farm managers with high locus of control will exert greater confidence over the potential stressors. They can respond successfully to various situations, resulting in fewer strain reactions to stressors because of the psychological mechanism of core self-evaluations. These farm managers have increased self-worth and well-being which are buffers against threats (Judge *et al.*, 2004).

Second, farm managers who scored higher on the strain score also score higher on neuroticism, which is one of the components in core self-evaluations (Judge *et al.*, 1998; Parkes, 1990). Neuroticism is a broad trait that manifests an individual's view of his/her emotional status (Mount & Barrick, 1995). Those with high neuroticism scores demonstrate high strain levels in individuals, which, in turn, lead to high levels of negative affective states and depression (Costa & McCrae, 1992; Watson, 2000). The negative affectivity states can lead individuals to perceive the job demands or stressors as high, which spills over to the workplace (Spector, Zapf, Chen, & Frese, 2000; Watson & Clark, 1984). In contrast with negative affectivity, the low neuroticism individual will experience positive affectivity which reflects the individual's enthusiasm, pleasure, and

general well-being (George & Brief, 1992). Consequently, there is evidence to suggest individuals with higher core self-evaluations are associated with lower levels of strain.

The findings of this study suggest that high core self-evaluations individuals are advantaged in circumstances of change and insecure environments. For example, one typical highly-promising farm manager said, “When events change, you must change” (Avery, 2009). Farm managers with a high level of core self-evaluations actually experience less impact from farm stressors, because of their positive attitude and behaviour.

To summarise, core self-evaluations plays a moderating role which appears to influence the magnitude of self-reported stressors and strain. Moreover, the result supports individual differences being related to self-perception and affecting reinterpretation of self-expression, thereby reducing potential stress for high core self-evaluations individuals. This process is termed as “differential reactivity” (Kammeyer-Mueller *et al.*, 2009, p. 179).

5.5.2 Core Self-Evaluations as a moderator between Strain and Satisfaction

Relationship

Previous researchers have demonstrated that the impact of job-related stress decreases farm managers’ job satisfaction and, thus, increases psychological distress (Chen & Spector, 1991; Fogarty *et al.*, 1999; Pugliesi, 1999). Hence, farm managers who experience job satisfaction mainly derive it from the nature of their farm working environments. Their life on the farm is influenced by a broad range of farm events that can increase or decrease their level of satisfaction. Therefore, the happy individuals are less sensitive to unfavourable events compared with the unhappy individuals. Thus, the farm managers who report satisfaction working on the farm may have a belief that their

lives are good, and this belief might play a crucial role in enhancing their evaluation of central life domains.

However, this study confirms a slightly stronger association between job and life satisfaction compared with the true score in the quantitative review of all types of work by Tait *et al.*, (1989). The variation is hardly surprising because farm work is the central aspect of a farm manager's life. The finding of this study reveals that their experience and feelings have been associated with work and non-work. In the meta-analytic study, Heller *et al.* (2004) support that the domain satisfactions, including job satisfaction, were substantially associated with life satisfaction. This is consistent with the bottom-up approach to life satisfaction, positing that job satisfaction exerts a unique influence over life satisfaction. The intuitive bottom-up or situational factor of life satisfaction plays an important role in individual differences in domain satisfaction. Thus, job and life satisfactions are viewed as components which derive pleasant and unpleasant experiences from the overall life of the individuals.

The result in this study confirmed a significant interaction between core self-evaluations and strain for job satisfaction, and, therefore, fully supports a moderated effects model. Individuals who experience greater strain (median > .92) will experience lower job satisfaction (mean < 5.5). The results of this study confirmed that the farm managers reported a moderately high level of core self-evaluations (mean = 5.4, SD = 0.83). Thus, the low core self-evaluations farm managers are experiencing significantly greater strain than high core self-evaluations farm managers. As a result of the significant effect of core self-evaluations and strains, the individual level of job satisfaction varies.

Core self-evaluations can influence the individuals' appraisals of external events which cause psychological strains. The reason is that core self-evaluations can have an impact on cognitive processes that force the individuals to deviate from their normal

functioning state. However, there is no evidence to suggest in this study that the relationship between core self-evaluations and job satisfaction is direct. Although Judge and colleagues did find support for the relationship between core self-evaluations and job satisfaction, they have not controlled for the effects of possible confounding variables on the relationship. The effect of core self-evaluations on non-work domains and environment factors, relative to individual differences, are not emphasised in previous studies (Judge *et al.*, 2000; Judge *et al.*, 1994). This study demonstrates that core self-evaluations is a measure of affective disposition which has a strong association with cognitive assessments of stressor, strain, job and life satisfaction.

The high core self-evaluations farm managers thrive on challenging situations and are not threatened by seemingly hazardous situations, or when faced with more work than usual; they experience satisfaction in meeting the challenge. A successful farm owner claims, “I don’t know what causes climate change, but I do know that if people don’t think, adjust, and adapt, it will get them” (Avery, 2009). This helps explain why job satisfaction increases with increasingly challenging situations, and why strain is lower for farm managers high in core self-evaluations, even when their workloads increase. Individuals who thrive in challenging situations overall feel high job satisfaction (Stumpp, Hulsheger, Muck, & Maier, 2009). Another successful grower explained:

Growing cherries is like going to a casino ... it’s a real gamble. The crop can really be affected by weather - rain, hail, frost - and when that happens there’s nothing to export. But, when things go right and we have a good crop – it’s a real high! Save the money this year just in case next year is a failure, and set realistic goals. Crop farming is a big risk (Ang *et al.*, 2008, p. 90).

Likewise, the challenging environment allows the farm managers to perceive the environmental stressors as opportunities, which allow them to have tolerance for increased job demands on the farm. This might help explain why job satisfaction increases with increasingly stressful situations, and why strain decreases with increased work pressure for farm managers with high core self-evaluations. In such a situation, the model of “general adaptation syndrome” (GAS) proposed by Selye became complicated with many intervening variables. “Selye has ignored the role of psychological factors in individuals” (Sulksy & Smith, 2005, p. 24).

Conversely, the farm managers with low core self-evaluations experienced reduced job satisfaction on similar stress ratings. If the farm managers possess negative core self-evaluations and are stressed, they are more dissatisfied with their job than their counterparts with high core self-evaluations. As noted, the conceptualisation of neuroticism within the component of core self-evaluations may increase this effect; neurotic individuals tend to have a generally negative world view. This view may spill over to the workplace and their judgement of the situation. Thus, those high in neuroticism report less job satisfaction and higher levels of strain. However, there are contradictory findings regarding the relation of neuroticism to job satisfaction. Specifically, as Judge *et al.* (2004) noted:

It is possible that typical measures of emotional stability¹² do not adequately measure the broad concept, and do so to varying degrees, such that one observes validities that are both lower and more variable than one would observe with broader measures that better indicate the concept (p. 326).

¹² The authors use both terms, emotional stability and neuroticism, in the texts.

As such, Judge *et al.* (1997) suggest core self-evaluations is a broader measure of neuroticism. Accordingly, the result of this study has suggested that the measure of core self-evaluations has construct validity and is a higher-order concept representing the fundamental evaluations by which the farm managers perceive themselves, and how they will function in their farming environment. Since core self-evaluations predicts a unique variance in job satisfaction, it influences the strain and job satisfaction relationship.

In summary, the core self-evaluations construct is a buffer for the links between the strain and satisfaction relationship. When the farm managers who possess positive core self-evaluations encounter the impact of farm stressors, they are more satisfied with their job compared with those who have less positive core self-evaluations.

5.5.3 The Moderating Effect of Core Self-Evaluations on Stressor, Strain, and Satisfaction Relationships

The results of this study support the findings that the farm managers evaluate the stressors or demands of their job with respect to their significance for their well-being based on their affective responses. This relationship demonstrates that stressors and strain have a direct negative impact on job satisfaction.

In this study, the farm managers reported low levels of strain. Thus, the farm managers, as reported with other workers, were satisfied when working in a low strain job and, because farm work is an important part of farm managers' lives, it influences their life satisfaction. The results of this study support the findings that the farm managers evaluate the stressors or demands of their job with respect to their significance for their well-being based on their affective responses. This relationship demonstrates that stressors and strain have a direct negative impact on job satisfaction. The results of this

study support other findings, such as research by Kalliath *et al.* (2004) on New Zealand workers, and Markey (2010) on New Zealand teachers. The level of strain is comparable to the level reported by the New Zealand farm managers. Therefore, the New Zealand workforce is experiencing low psychological strain and, thus, are more satisfied with their jobs.

However, there is evidence that individuals can experience several stressors concurrently, from individual effects to the impact of job-related environmental factors.

As a distraught dairy farm owner said:

We are busy building a new cowshed and calving is just around the corner.

Stress levels this year will be particularly high; haven't had a day off since a weekend in early February, and there will be no day off until after calving, mid to late October, if we are lucky (farm manager 5, 2007).

As noted, the farm owner experiences a heavy workload during the peak season due to insufficient helpers on the farm, thus, the farm owner will have to work harder. The finding reflects their evaluations of stressful experiences that can cause psychological strain response. However, there is an individual variation in the impact of these stressors.

As the subjective stressors involve the cognitive processes, this impact is derived from the individual self-appraisal of the situations. The environmental factors can cause strain on the individuals in the workplace when he/she is not capable of controlling the task. Furthermore, core self-evaluations do appear to have an important psychological influence on farm managers, which is subsequently traced to job and life satisfaction.

According to the essence of Karasek's (1979) Job Strain Model, individuals who lack personal control over crucial aspects of job-related activities experience distress. Specifically, Karasek (1979) shows that job control moderates the relationship between

job demands and strains. Research supports Karasek's theory that individuals with high job demands and low personal control experience the highest levels of strain (Ganster *et al.*, 2001).

However, the results of this study demonstrate that individuals' appraisals of the work situation lead to varying psychosocial outcomes. As a result, this finding supports conceptual expansion of the occupational stress models (such as Karasek's (1979) Job Strain Model, Job Demand Control Support (JDCS) model (Johnson & Hall, 1988), and Job Demands-Resources model (Demerouti *et al.* 2001) to include personality traits as a moderator. The extent to which individuals successfully engage in handling strain depends largely upon the dispositional characteristics of the individuals. Another notable finding of this research associated with relationships, are the concurrent relationships between stressors and strain, and strain and job satisfaction-life satisfaction processes. Namely, there is a strong association between stressors and strain which is associated with greater strain, and job and life dissatisfaction. In increasingly stressful situations, it is shown that the low core self-evaluations individuals are not able to tolerate increased work pressure, and will experience reduced job satisfaction and, consequently, reduced life satisfaction.

For example, Karasek's (1979) Job Strain Model is conceptually too narrow because it considers only two constructs, worker's personal control and job demands in accessing strain (Sulsky & Smith, 2005). Furthermore, Schaubroeck *et al.* (2001), and Westman (1992) argue that the role of personal control as a moderator of the relationship between stressor and strain is not always supported in the occupational stress research. Research by Schaubroeck and Merritt (1997) suggests that the predictors in Karasek's (1979) Job Strain Model apply to high self-efficacious individuals but not to low self-efficacious individuals. Therefore, strategies to manage stress caused by job-related strain

could include improving an individual’s job self-efficacy, which may be as important for reducing the consequences of job stress as efforts to enhance their job control. In such situations, the individual differences, such as personal control, would seem to be less significant in the stress process and in relation to coping (Schaubroeck *et al.*, 2001). According to Karasek’s Job Strain Model (1979), psychological strain occurs when individuals are faced with stressors that are high they cannot control them. Conversely, individuals with high personal control will experience low strain when faced with low job demands. Alternatively, jobs combining high demands as well as high control provide an active job context for individuals. As de Jonge, Dollard, Dormann, Le Blanc and Houtman (2000) noted, “It appears that the active jobs (i.e., high demands, high control) give rise to positive outcomes, such as high job satisfaction” (p. 282). This provides a context for the individual to deal with current and new challenges. However, a low level of job demands with low control will lead to passive job situations. Figure 10 summarises the type of jobs that might result from different combinations of job stressors and job control.

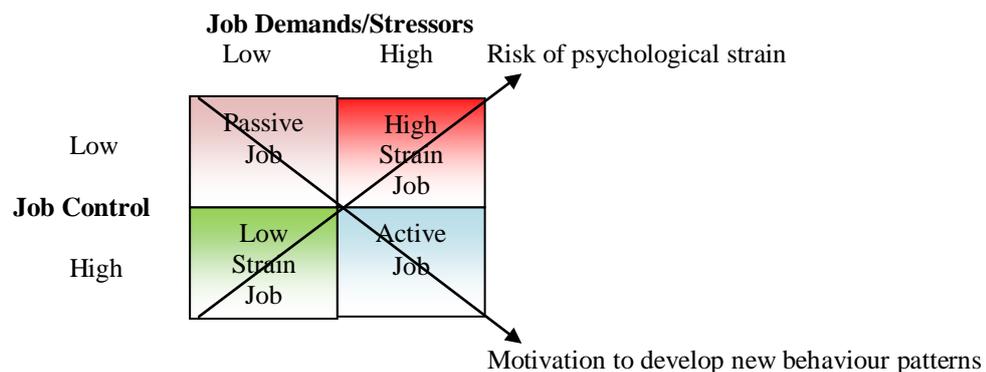


Figure 10: Adapted from Karasek’s Job Strain Model (1979, p. 288)

Findings from this research challenge Karasek’s (1979) Job Strain Model, where it highlights that high levels of core self-evaluations buffer the negative effects of highly demanding jobs (stressors). Research by Judge *et al.* (2003) and Judge *et al.* (2002) has emphasised that locus of control is one of the components of core self-evaluations. As

argued by Fletcher and Jones (1993), the model, which encompasses a larger range of variables, may explain more of the variance in strain outcomes which provides a clearer stressor-strain relationship. By building a model including broad personality traits, more of the variance in strain will be accounted for. Taken together, the extension of Karasek's (1979) demands-control model of strain or other occupational models can be incorporated with core self-evaluations as a moderator in the linkage of job demands with strain. Figure 11, below, shows the expanded structural characteristics of high or low job strain perspectives, where core self-evaluations is linked with job demands to promote well-being. Hence, the level of strain is predicted by a combination of the job demands-core self-evaluations interaction. The individuals' feelings about themselves will spill over into their jobs and life (as shown by the dotted line in Figure 11).

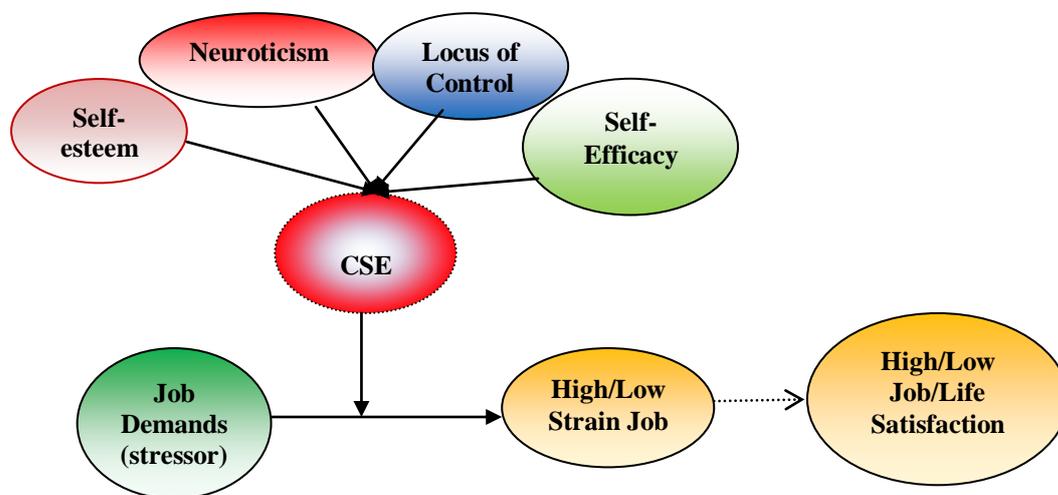


Figure 11: Job Demands-Core Self-Evaluations Model

The cognitive appraisal as a central feature of the stress process appears to permeate the popular Karasek's (1979) Job Strain Model and other occupational stress models. As such, the structural model of job demands-core self-evaluations provides the basic building blocks for investigating how core self-evaluations influences stress in

individuals. This finding will have practical implications for the farm managers and farming organizations.

5.6 Theoretical Implications

Empirical evidence presented in Chapter Four via confirmatory factor analysis and structural equation modelling, and the discussions of the key findings, critically challenge the occupational stress models. This study provides evidence for extending the existing occupational stress models.

From the review of the literature on occupational stress in Chapter Two, it is apparent that studies of individuals' personality traits in dealing with stressful work environments have used narrowly focussed models. There are five models of occupational stress put forth to describe the psychosocial effects of work environments in the farming context: the Simmons and Nelson's Holistic Stress Model (2007), Karasek's Job Strain Model (1979), Job Demand Control Support Model (Johnson & Hall, 1988), Job Demands-Resources Model (Demerouti *et al.* 2001) and Beehr and Newman's (1978) Structure Dimensions of Job Stress Model. Based on the gap identified, the hypotheses were drawn in an attempt to understand the personality factors, and core self-evaluations, in an integral part of various theoretical models which link stressor with strain and satisfaction.

This study supports the theoretical development of the self-evaluations as a fundamental broad personality trait (Judge *et al.*, 1997). Core self-evaluations presents an opportunity to further refine and explore the mechanisms through which dispositional traits influence individual attitudes and behaviours. The evidence from the results of this study has justified the aggregated conceptualisation of core self-evaluations (Johnson *et al.*, 2008; Judge *et al.*, 2004). As a result, this serves to answer lingering questions

regarding the conceptual precision of core self-evaluations in recent studies by Judge and Hurst (2007) and Johnson *et al.* (2008).

Although there is considerable theoretical support for such a disposition, previous research pertaining to core self-evaluations as a moderator or buffer to understand workers' various reactions to stress in the workplace is inconsistent. Previous studies by Bono and Colbert (2005), Harris *et al.* (2009), and Judge and Hurst (2007) have found that core self-evaluations is a significant moderator, whereas studies by Kammeyer-Mueller *et al.* (2009) and Best *et al.* (2005) found that core self-evaluations did not act as a moderator in the stress process.

Furthermore, the study of stress assessment incorporated with personality factors among farm managers has received relatively little attention in the empirical literature. At present, there are no published studies that have examined the influence of personality traits on the relationship between the stressors and strain, or the relationship between strain and job satisfaction concurrently, particularly in the farming context. This study shows that levels of core self-evaluations have a significant effect on strain. Accordingly, there is reason to believe that core self-evaluations will account for a significant proportion of the variance in strain (Brunborg, 2008). Previous studies report similar results using personality traits as predictor variables for strain (Bond & Bunce, 2003; Kahn & Byosiene, 1992), which provided empirical evidence that core self-evaluations was linked to strains.

This research provides evidence for the importance of individual differences in understanding the stress process in the work place. In particular, when assessing the relationships concurrently, the core self-evaluations is a significant moderator in the stressor and strain, and strain and job satisfaction relationships in the workplace. Further, the finding obviously explained the distinctions between various aspects, particularly the

implicit cognitive appraisal as a central feature in determining the individual's immediate affective reaction to the stress process.

The results support that high core self-evaluations reduced both stressors and strain, thus, less effort is required in planning to improve work conditions. This is justified by the fact that not only the perceptions of stressors, but also strain, influenced individuals' personality traits. This is consistent with the core self-evaluations effect on stressors-strain (Brunborg, 2008). As objective environmental events in the workplace vary, individuals will normally respond without being cognitively aware of the consequences (Beehr & Newman, 1978). However, core self-evaluations determines both perception of stressors and consequential expectancies of strain, job and life satisfaction. Therefore, more objective work conditions can be measured by controlling for the effects of the personality on strain (Judge *et al.*, 2000). As a result, improving the measures of work conditions (such as the availability of technology to avoid crop failure) will provide a more accurate basis for workplace improvement. Hence, the outcome of this research will guide contractors, or farming organisations who work with farm managers, to acknowledge how they interact with the farm stressors.

As in prior research by Packer (1985) and followed by Judge *et al.* (1997), this study finds cognitive appraisal is a central feature of the stress process. Previous stress research has failed to incorporate personality traits which may mean that current strategies for alleviating stress and strain are misguided and inadequate (Grant & Langan-Fox, 2007). In fact, Salanova, Peiro and Schaufeli (2002) argue that increasing the personal control of low self-efficacy workers may increase, rather than decrease, strain. To include core self-evaluations in occupational stress models appears promising in providing a convincing theoretical expansion.

In summary, when the variables of interest are assessed concurrently, it is sufficient to capture the core self-evaluations as a moderator. This research extends the role of core self-evaluations by establishing a new paradigm in work stress research.

5.7 Methodological Implications

This study supports a precise methodology technique in the self-report measures to assess the moderating effect of core self-evaluations. Two critical factors are emphasised to ensure the evidence of moderating effects. First, each of the latent variables is normally distributed, and the joint distribution of all the latent variables is also normally distributed. Second, the latent variables are free from the measurement error effects before testing the model. Hair *et al.* (2006) also recommend these techniques to ensure the robustness of the model.

However, previous research on core self-evaluations as a moderator is inconsistent, which may reflect differences in the techniques of data analysis. First, previous studies did not support an expanded model because the methodology employed was not robust enough to reveal the interaction effects within the multivariate context (Rode, 2004). Some authors have suggested that current methods for testing interaction terms present a number of statistical problems, including skewed data and normal distribution violations that result in unreliable beta coefficient and standard error estimates (Kenny & Judd, 1984; Kline, 2005). Another likely reason for these differing results is that previous studies employed moderated regression in their analyses, which includes unknown measurement errors.

This includes research by Best *et al.* (2005) which failed to reveal core self-evaluations as a moderator in the relationship between job burnout and perceived organisational constraints. On the other hand, Yagil, Luria and Gal (2008) explained that

the core self-evaluations may moderate the relationship by other variables, including through stressors which are not examined in the Best *et al.* (2005) studies.

The research validated the established CSE scale and developed a six-item farm stressors scale. Given statistical evidence from the survey data, the twelve-item core self-evaluations scale developed in this study captures the four core traits of CSE. The scales of core self-evaluations have been tested and validated using confirmatory factor analysis, as a robust measure grounded in this research, confirming Judge *et al.*'s (2003) findings.

The results of this study found that core self-evaluations can actually explain significant incremental variance in stressor, strain and satisfaction. This study raises questions about whether the individual four traits should continue to be included relative to core self-evaluations in future dispositional research. However, it is suggested that additional research is required to examine the unique, shared, and interactive effects of core self-evaluations if the purpose of the core self-evaluations as a moderator is to account for the complete range of dispositional effects in various settings.

The second methodological implication of this study is to validate and establish the six-item scale to measure general farming stress, resulting from structural equation modelling. The unidimensional six-item General Farm Stress Inventory is developed by using the "item parcelling" technique to capture the domain of interest in farming. In administering structural equation modelling, "item parcelling" is a critical technique that reduces the complexity of the model and improves the model fit (Landis *et al.*, 2000). Through confirmatory factor analysis, the unidimensional construction of the Edinburgh Farming Stress Inventory is demonstrated, but additional work is required to validate the reduced inventory across cultures. The short-form thus generalised could be particularly useful in gaining greater range and response variability, as a reduced inventory will increase response rates, particularly for very busy (potentially very stressed) respondents.

The finding also represents preliminary steps toward development of an instrument that will allow a profile of farming-specific stress to be drawn up for different types of individual farm managers and farms.

Another implication of this research is that it provides further evidence of the prudence of utilising covariance structure analysis for the purposes of path analysis and moderation for a large sample size. The results from structural equation modelling-based path analysis were virtually identical to the results that were obtained through moderated multiple regression-based path analysis. The use of covariance in structural equation modelling provides ample possibilities for model revision, which often results in parsimony, simplicity, and more elegant revised models.

Overall, the methodology implication of the study has validated the core self-evaluations measurement scale empirically, and established a shorter version of the Edinburgh Farming Stress Inventory that confirms the robustness of the model in this study. In relation to the methodological and theoretical development, this study highlights aspects of a broader claim for policy and practice for farm managers and the farming organizations.

CHAPTER 6 – CONCLUSION

6.1 Introduction

The results of this research extend the recent studies of core self-evaluations, and its impact on stressors and job satisfaction among full time employees (Harris *et al.*, 2009) as well as the meta-analytic review of the role of core self-evaluations in the stressor and strain relationship (Kammeyer-Mueller *et al.*, 2009). Unlike previous research, this study found that core self-evaluations moderate the stressor, strain and job satisfaction relationships concurrently among farm managers. In so doing, this study builds the integrative framework of the core self-evaluations in the stress process and acknowledges the importance of individual difference factors in stress research. Future research recommendations in reference to limitations associated with this research, ranging from methodological to research scope issues, are discussed.

6.2 Implications for Policy and Practice

The findings of the current study demonstrate support for the existing literature on the effect of stress on farm managers. The results of the present study have a number of implications for policy and practice. The next section discusses the implications for the farm managers, the farming organisations, and government agencies.

6.2.1 Implications for farm managers

There are at least two practical implications for farm managers. The statistical results in this study reinforce the notion that stressors can be potent drivers for strain and, consequently, lead to job dissatisfaction. For example, the evidence of farm stressors such as financial stress, can lead to psychological strain. Although it is important to minimise the effect of the farm stressors that farm managers encounter, these farm stressors are almost never completely avoidable. As such, it appears critical that farm managers work to minimise potential threats and recognise the role of cognition in stressors and strain. It is suggested that interventions highlight both personal skills development and an understanding of personal susceptibility to risk (Hope *et al.*, 1999).

This study demonstrates the importance of the effect that core self-evaluations has on one's satisfaction via the stress process. While the limitations of this study will need to be addressed by further research on the topic, the findings raise concern that farm managers who have low core self-evaluations may experience emotional strain and low job satisfaction. If this is so, the reasons for and causes of emotional strain need to be closely examined so that appropriate emotional strain reduction methods may be recommended. Recently, researchers have proposed maintaining a positive outlook in the face of stressors (Bonanno, 2004; Nelson & Cooper, 2007).

Second, researchers within the field of occupational health psychology and government agencies would need to address the high impact of the prevalence of stressors more closely, by taking into account the distressing effects of the impact of certain farm stressors, such as government policies and regulations, among farm managers. Existing government legislation and regulations are found to interfere in the daily farm work and add to farmers' workloads and strain levels (Swisher *et al.*, 1998).

More importantly, stress interventions and prevention strategies may be applied and introduced by farming organisations. The farming organisations could review and assess how well farm managers respond to potential farm stressors. Many farm managers require support to develop appropriate strategies to handle issues related to complying with government policies and regulations, unpredictable factors, personal farm hazards, time pressure, and financial debt, which were rated among the highest sources of farm stress. As the farm managers will continue to experience multiple sources of stressors simultaneously, the affected farm managers may benefit from interventions from farming organisations, their community, and government, as part of a strategic framework for rural health (Humphreys, Hegney, Lipscombe, Gregory, & Chater, 2002).

However, interventions may vary for farm managers with low or high core self-evaluations. Individuals with high core self-evaluations are likely to be “well-adjusted, positive, self-confident, and efficacious” (Judge *et al.*, 2003, p. 304). It could be argued that farm managers with positive core self-evaluations believe that they will succeed in the farming environment. They would not seek help from the farming organisations because they believe they can cope with challenging situations.

Conversely, the farm managers with low core self-evaluations focus on the negative aspects associated with environmental demands. There are two strategies that the farming organisations or other contractors could advise in order to lessen the impact of stressors by reducing the perceived stress and/or increasing coping strategies.

The first strategy is by focusing more on reducing perceptions of stressors in farm work and managing the emotional reaction to stressors. The farming organisation could utilize the high core self-evaluations farm managers’ responses to assist other farmers to reframe challenges. The findings of this study prove that high core self-evaluations individuals are advantaged in circumstances of change and insecure environments.

Extending this logic, the farm managers with positive core self-evaluations believe that they can succeed in the farming environment. By sharing their positive perceptions and how they think about the unpredictable weather (such as severe flooding), and government policies and regulations (such as Recognised Seasonal Employer policy) as a challenge, will help the low core self-evaluations individuals to cognitively reframe in a positive manner. Braden, McGlone and Pennington (1993) designed a self-help model of cognitive reframing skills that showed evidence of patterns of change among depressed individuals. Thus, positive reframing is possible for the low core self-evaluations individuals to enable them to view their problems as resolvable. For instance, when the low core self-evaluations farm managers perceive the severe flooding which destroys their farms as resolvable, they are not likely to experience high strain. However, individuals may have difficulty restructuring their belief system because of the cognitive complexity and affective challenges in the cognitive reframing process (Spillane, Reiser & Reimer, 2002). If the low core self-evaluations individuals are not able to cognitively reframe, it is suggested that they attend relaxation programmes and exercise activities. As a result of cognitive reframing, evidence has shown that individuals will experience a significantly better self-image (Braden *et al.*, 1993).

The second strategy is focussed on the individual-centred intervention which is more effective in reducing stress-related illness (Nelson & Sutton, 1990). The psychologist or counsellor could tailor a helpful intervention for the farm managers who are at risk of experiencing psychological strain. Training can help reduce strain levels and increase satisfaction (Saks, 1995). For example, the New Zealand Coaching & Mentoring Centre's Rural Mentor programme will provide the opportunity for networking and personal development among the farm managers in the rural sector (Allen, 2009). Further, as the result of a better understanding of the nature of stressor-strain-satisfaction relationships,

the farming organisations and the contractors will be able to develop relevant interventions at appropriate points in the relationships to help individuals understand how to improve their performance.

6.2.2 Implications for farming organizations

Previous studies report that farm managers' jobs and life on the farm are affected by various stressors that cause emotional strain. The typical outcomes of strain are decreased job satisfaction. However, the results of this study explain that the farm managers in New Zealand actually experience relatively low strain from the impact of stressors. This is partly due to low government regulatory pressures, and few outbreaks of diseases or incidents of prolonged bad weather in the New Zealand farming sector. Moreover, the New Zealand farming organisations provide a socially supportive structure for farm managers. In the farming context, Linn and Husaini (1987) found that social support groups were a protective factor in the farming community.

In contrast, the U.K. and Dutch farm managers have to face the consequences of disease outbreaks (such as Foot and Mouth Disease) and their aftermath of financial uncertainty (Lobley *et al.*, 2004; Olf *et al.*, 2005). The other factor creating a variation in the strain level among the New Zealand and European, and particularly the U.K., farm managers is reflected in the government policies and regulations. There is far greater government regulatory pressure under the reformed EU Common Agricultural Policy (CAP) experienced by European and U.K. farm managers. By international comparison, the New Zealand farm managers are not experiencing psychological strain because of the low impact of stressors. The results of this research have practical relevance to farming organisations and professional practice.

In this study, the significant findings with regard to the effect of core self-evaluations on stressor, strain, and satisfaction have implications for individuals and practitioners in organisations alike. The identification of the core self-evaluations construct as a unidimensional construct is important to industrial and organisational personnel, because it can be related to a variety of organisational criteria such as job performance, career decision-making, unemployment, and attributions.

Farm managers with low core self-evaluations will likely experience distress when they experience the impact of high farm stressors, and therefore, interventions could be designed to reduce psychological strain in stressful situations. Bond and Bunce (2001) have established that interventions can reduce stress which likely enhances satisfaction and performance. Therefore, the farming organisations may want to pay careful attention to individuals who have lower core self-evaluations, and provide additional services to confront the impact of stressors directly. For instance, Horticulture NZ and Federated Farmers New Zealand Ltd. may benefit from using personality constructs, such as core self-evaluations to determine farm managers and/or farm workers who are prone to stress. In other words, farm managers who exhibit low core self-evaluations may not be able to cope with adversity and dissatisfied with their job and life. Using the core self-evaluations scale as a tool may help to ensure that the farm managers who experience distress are provided with counselling supports and resources to handle farm stressors in the farming environment. In particular, the distressed farm managers could seek one-to-one counselling, could attend farm stress management workshops or stress management classes. By intervention, it may be beneficial for the low core self-evaluations farm manager's to increase his or her level of satisfaction.

While a high level of core self-evaluations is always an advantage for a farm manager, it seems to be especially crucial in farming contexts which involve multiple

stressors. It could, in turn, reduce the number of health-related problems caused by work. Previous findings suggest that various farm environmental stressors have been linked to a high incidence of injuries that cause emotional strain and illness, including occupational stress which has an immense impact on individuals (Fraser *et al.*, 2005; Pollock *et al.*, 2002; Smith & Saunders, 1995).

6.3 Limitations of the Study

While identifying the generic contributions and implications for policy and practice above, there are a number of important limitations to note about the research described in this study. The first is that the findings derived from this study are unique to the accessible population of farm managers who are members of the farming organisations. Non-members are not selected in this study because there is no theoretical reason to suspect population differences¹³. Previous studies have demonstrated that the individuals' cognitive processes are relatively stable across their life span (Dormann *et al.*, 2006; Judge *et al.*, 1998). Thus, the effect of individuals' personality traits on work-related outcomes is not likely to differ between members and non-members. For example, a national survey on American adults (n = 2,379) by Wright and Hyman (1958) indicates that there is no significant evidence of psychological and behavioural differences between American citizens who are voluntary members and those who are non-members of formal organisations. However, members differ from non-members relative to the types of benefits provided by the organisations (Berlin, Lidestav, & Holm, 2006). Similarly, Rickenbach, Guries, and Schmoldt (2006) found members (n=100) and non-members (n=389) are not significantly different in their perception and experience on a range of

¹³ The statistics on farmers who are/are not members of a farming organisation are not readily available in New Zealand.

farming practices and management issues. However, members are more likely to engage in managerial activities than non-members.

The second limitation concerns the administration of the survey questionnaires. Since the surveys were administered by the farming organisation, the researcher was not able to monitor the collection procedures as closely as if it were a self-survey distribution. The survey questionnaires distributed and collected by the organisation could have been biased because the members that were solicited for this study were not clearly defined, in regard to whether they were randomly selected or based on any specific criteria (such as membership fees paid). For instance, the participants sent an email or contacted the researcher by phone to get verification of whether they were eligible to participate. With respect to this point, many farm managers who viewed themselves as not qualified to participate in the survey neither returned nor participated in the survey. Further, neither the invitation letter nor the informed consent form described in great detail the type of farming (such as beef/sheep, venison, edible and non-edible farming) as classified in the Australian and New Zealand Standard Classification of Occupations 2006 (ANZSCO). For instance, some participants returned incomplete surveys with a note stating that they were either semi-retired or felt that their work did not fall into the farming category.

The third limitation concerns the anonymous survey method. This method did not allow the researcher to follow up with the participants when the returned surveys included inconsistent or incomplete responses and/or misunderstood statements written by the respondents. For instance, a respondent who states, “If I had being thru (*sic*) a drought or sufficient stock losses in the last 3 months, these answers might be different” (respondent 1, 2007)¹⁴. Thus, the researcher was not aware of the characteristics of the participants who did not respond to the survey.

¹⁴ The quotes in the conclusion chapter were obtained from the postal questionnaires returned.

A fourth limitation of this study is that it revolved around the data gathered from the respondents' self-report measures where the respondents may be biased in responding. The respondents might also provide personality and satisfaction data that artificially inflates the correlations among the variables of satisfaction, stressor, and strain. The respondents might be susceptible to inflationary effects of self-perception because of situational factors (Crampton & Wagner, 1994). For instance, a respondent said, "as we have been experiencing a drought, the answers would normally be different" (respondent 2, 2007).

The fifth limitation is the lack of representation of farm managers from various farming industries. This study has amassed one of the largest sample sizes with the respondents representing the diverse farming industry in New Zealand. However this study does not allow for comparisons across farming sectors and across nations, since the response rate of the workforce significantly varies across the sectors. This is due to the following reasons:

- i. The environmental and contextual considerations were not examined when conducting this research. For example, the study was conducted in New Zealand during a time of booming economic strength, an adequate supply of labour from overseas, and high prices for product. The farm managers were experiencing overall favourable weather in the country, good market prices, and high returns for both dairy and fruit exports relative to the previous years. Conversely, Deary *et al.* (1997) reported that the U.K. farmers were experiencing a "high level of uncertainty due to markets and the uncertainties associated with EU support levels and structures" at the time of the survey (p. 135). Due to the different circumstances occurring in the New Zealand and U.K. farming industries at the

time of the studies, the farm managers were experiencing different levels of stressors. Further, the fact that the majority of the respondents were all working in dairy farms and orchards, raises questions of how well the result will generalise to broader samples of the farming population. Additionally, with the high profitability and good economic prospects at the time, the farm managers who responded to the survey may have been experiencing low strain and high job and life satisfaction.

- ii. The surveys were distributed in July, during the slowest season for the farming industry. As a result, the strain level for farm managers was expected to be at its lowest at that time. In fact, Alpass *et al.* (2004) championed this assertion that the relatively low strain levels maybe reflected by the timing of the survey which were reported among the New Zealand dairy farmers. However, the timing of surveys is a critical feature in the cross-sectional stressor-strain research because of the lack of the influence of third variables (Zapf *et al.*, 1996). This study did not consider third variables in the design as potential confounders of the stressor-strain-satisfaction relationship. Since the unmeasured third variables were not taken into account, it may affect the measurement models.
- iii. The most distressed individuals may not have returned the surveys and the sample of respondents in this study could only reflect those who were emotionally well. Since the participants were guaranteed confidentiality with the internet survey, it was not possible for the researchers to identify them. Thus, sending reminders annoyed and angered some of the recipients. Since the majority of the individuals receiving the online survey did not respond, it raises the question of whether the same relationships would be observed if all individuals had responded.

Specifically, those who were feeling “stressed” were unlikely to take on an additional voluntary activity such as survey completion.

Lastly, this research is not an exhaustive examination of all the variables relevant to the paths studied. Other important variables, such as motivation, emotional stability, performance, and organisation support, were not considered in this research. Since the core self-evaluations construct predicts relationships of the behaviours and performance outcomes (Judge & Hurst, 2007), these relationships are not included as an important part in the work stress context. Furthermore, in relation to Karasek’s (1979) Job Strain Model, the present study does not measure organisation support as a work outcome. According to Karasek and Theorell (1990), individuals with a sense of job control, and with support from organisations, are likely to experience low strain and job satisfaction because they feel that they can influence various outcomes in their job. The Edinburgh Farming Stress Inventory includes the farm environmental assessment of the farm managers’ lives at work and the stresses to which they may have been exposed. However, this inventory does not attempt to cover the causes and extent of stress caused by the recruitment, employment, and management of labour in the agriculture sector (as noted by respondent 3, 2007)¹⁵. This research acknowledges this limitation and considers including these important variables in future research.

6.4 Recommendations for Future Research

The limitations identified provide opportunities to develop an agenda for future research. The validated broad personality traits, core self-evaluations scale and six-item, general farming stress inventory will undergo replication in a wide-range of samples and

¹⁵ The quote is obtained from respondent who wrote it on their questionnaire.

reassessments in cross-sectional and longitudinal designs. Additionally, the experimental design can be employed to evaluate the practical value of the Job Demands-Core Self-Evaluations Model. When conducted in real workplace, experimental design provides valuable information about the direct and causal relations between variables (Searle, Bright, & Bochner, 2001).

Future studies should conduct qualitative in-depth interviews to improve understanding of the phenomena and could provide rich insight into stressors and strain. The six-item general farming stress inventory provides future researchers with a base from which to begin examining general farming stress and to further validate this measure. Furthermore, the results of this study warrant further examination to determine whether the presence of farm stressors or the personal trait characteristics of the individuals are indeed associated with the occurrence of psychological strain in this workforce population (Grant & Langan-Fox, 2007). Specifically, an important question which needs to be further explored is whether a relationship between work characteristics and strain can also be found when work characteristics are measured objectively, that is, when self-reported bias can be ruled out as a possible explanation of the findings. Thus, a challenge for the future will be to employ objective indicators of work characteristics that provide a more *objective* report of the work environment by the individual farm manager.

To conduct personality self-report surveys, future research can actually minimize the effects of the common method variance. First, the issues could be easily resolved by a structural equation modelling technique (Zapf *et al.*, 1996). Second, Judge *et al.* (1998), and Judge *et al.* (2000) suggest personality measures should be taken from a combination of self-reports and other reports of the variables versus all self-report measures, suggesting that the variables of interest are not significantly affected by common method variance. This position is further strengthened by Diener and Larsen (1993) and Judge *et*

al. (2000) who found minor differences between self- and peer-reported characteristics, indicating that self-report measures are reliable measures of actual variables. Third, previous studies indicate that there is no theoretical reason why the variables of interest in this study, particularly the personality traits, will vary much over time (Tait *et al.*, 1989).

The second major future research direction is the extension of the findings presented in this research over time. Because the present study was based on a cross-sectional design, this study did not investigate whether the findings may persist over time. Future research should investigate the multivariate associations with a more controlled design (such as mixed method or longitudinal) to disentangle the constructs.

In particular, the possibility of the direct effect of stress on personality that leads to strain cannot be ruled out in the absence of a longitudinal design (Brunborg, 2008; Grant & Langan-Fox, 2007). Thus, which variable actually affects another variable is impossible to assess when the measures are not repeated over time (Kammeyer-Mueller *et al.*, 2009). It would be interesting to examine changes in patterns of experienced stress under less favourable economic conditions, and over different seasons and farming cycles during the year. While personality traits are stable across time, recent evidence demonstrates that some traits can change as a result of environmental conditions and learning processes (Trzesniewski, Donnellan, & Robins, 2003), particularly those related to self-esteem, which is a central component of core self-evaluations. An individual's personality will change over time from the sustained and intense influence of environmental forces (McCrae, 2002). In contrast, Judge *et al.* (2003) noted some degree of stability in core self-evaluations over a three-month period in their study. Because core self-evaluations is related to work outcomes, such as job and life satisfaction, the stability and sustainability of core self-evaluations across the life span is worthy of future research.

The fourth major future research direction are the negative aspects of high core self-evaluations individuals. Future study should attempt to assess whether a more specific measure of strain would have even greater incremental validity in a study involving the negative aspects of high core self-evaluations individuals. Core self-evaluations does not directly address individuals who have a tendency to worry or become anxious or to experience unfocussed psychological strain due to high core self-evaluations (Kammeyer-Mueller *et al.*, 2009). This is due, in part, to the fact that measures of neuroticism include an anxiety component which broadens the perspective of positive undesired effects on individuals (Judge *et al.*, 2004). Individuals with high self-esteem, for instance, have been known to experience temporary emotional impediments when they have failed to achieve their own goals (Crocker & Park, 2004). Future studies on whether core self-evaluations is more than just over-estimating one's own capabilities would be valuable to researchers. Finally, future research should expand the existing knowledge and gain new insights on the key sources of stressors among farm managers with positive outlooks. Thus, future research could build on this study, taking into account its stated limitations, and explore the possible costs to individuals and organisations of stress among farm managers.

6.5 Final Remarks

This study supports the notion that judgements about self, reflected in the core self-evaluations dimensions, affect the evaluation of external events. This study introduces a sequential model where the cognitive process is central to the overall stress process. The outcome of this study, which tests the specific mechanisms at work, significantly supports the proposition that core self-evaluations is a moderator. When the stress process is assessed concurrently, core self-evaluations minimise/buffer the negative

impacts of farm stressors among the farm managers. For instance, the individuals with low core self-evaluations found that they were unable to maintain or manage their usual rigorousness and job performance in the presence of multiple farm stressors, thus leading to poorer job satisfaction.

We now know, as a result of this study, that core self-evaluations interacts with strain to buffer the negative association between strains and job satisfaction. This suggests that core self-evaluations is an important variable of stress research in the farming context. Since core self-evaluations can buffer stressors by affecting perceptions of stressful workplace events, the results contribute to the construct validity and practical importance of core self-evaluations in the satisfaction domain. This study makes a contribution to the personality literature in general, and to the core self-evaluations concept in particular. As Judge *et al.* (2008) noted, “Any attempt that does not include core self-evaluations is, essentially, leaving potentially explainable variance ‘on the table’” (p. 370).

We now also know, as a result of this study, that no one model is sufficient to explain the role of this broad personality trait in the occupational stressor-strain-satisfaction relationship. The present findings extend prior research because core self-evaluations plays a key role in the stressors and affective outcomes. In this research, the stressor and strain relationship is incorporated with work-life constructs. In this way, multiple stress theories can be explored (Judge *et al.*, 2008). The integrated model tested in this study and the large number of respondents provided significant insights.

In addition, as a result of this study, we know that Karasek’s (1979) Job Strain Model can be expanded to include core self-evaluations as a moderator. According to the findings of this study, and depending on the level of core self-evaluations, individuals

who encounter environmental stressors are likely to report varying levels of psychological strain, which affects the job and life domains.

As a result of this study, we have greater insight into the New Zealand farm managers who experience low strain. Regardless of their level of core self-evaluations, farm managers reported low strain because of the positive factors surrounding New Zealand farming industries. The New Zealand context offers low levels of typical farming stressors: the weather is relatively beneficent; New Zealand regulatory structure and economic interventions are designed to be “farming-friendly”; and there is a history and culture of collectivism amongst the farming community. This results in a broadly supportive context for farm managers, whereby the impact of low stressors, leads to reduced strain and, thus, improves job and life satisfaction among the farm managers. The results of this research have practical relevance to farming organisations and professional practice, as well as to policy-makers.

REFERENCES

- Acock, A. C. (2005). Working with missing values. *Journal of Marriage and the Family*, 67, 1012-1028.
- Aguinis, H., & Stone-Romero, E. F. (1997). Methodological artifacts in moderated , L. multiple regression and their effects on statistical power. *Journal of Applied Psychology*, 82(1), 192-206.
- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage Publications.
- Allan, G., & Skinner, C. (1991). *Handbook for Research Students in the Social Sciences*. London: The Falmer Press.
- Allen, J. (2009). *Rural mentor programme*. Paper presented at the New Zealand Institute of Primary Industry Management 2009 Conference. From http://www.nzipim.co.nz/2009_National_Conference_James_Allen_slides.
- Allik, J. (2002). Towards a theory of personality. In L. Backman, & C. V. Hofsten (Eds.), *Psychology at the turn of the millennium*. (Vol. 2, pp. 179-200). New York: Psychology Press.
- Alpass, F., Flett, R., Humphries, S., Massey, C., Morriss, T., & Long, N. (2004). Stress in dairy farming and the adoption of new technology. *International Journal of Stress Management*, 11(3), 270-281.
- Alreck, P. L., & Settle, R. B. (1995). *The Survey Research Handbook: Guidelines and Strategies for Conducting a Survey* (2nd ed.). Burr Ridge, IL: Irwin.
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3), 411-423.
- Ang, H. B., Lamm, F., & Tipples, R. (2008). The impact of stressors on the psychological wellbeing of New Zealand farmers and the development of an explanatory conceptual model. *Policy and Practice in Health and Safety*, 6(1), 79-96.
- Arbuckle, J. L. (2003). *AMOS 5.0 update to the AMOS User's Guide*. Chicago, IL: Smallwaters.
- Arnold, J., Cooper, C. L., & Robertson, I. T. (1998). *Work psychology understanding human behavior in the workplace* (3rd ed.). Harlow: Pearson Education Ltd.
- Assouline, M., & Meir, E. I. (1987). Meta-analysis of the relationship between congruence and well-being measures. *Journal of Vocational Behavior*, 31(3), 319-332.
- Avery, D. (2009). *Dryland farming: A Marlborough family's journey*. Blenheim, Seddon.
- Bagozzi, R. P., & Yi, Y. (1990). Assessing method variance in multitrait multimethod matrices: The case of self-reported affect and perceptions at work. *Journal of Applied Psychology*, 75(5), 547-560.
- Baker, J. (2002). The Skills Employers Needed. In *S. Maharey WorkINSIGHT* (Vol. 1). Wellington: Department of Labour.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, New Jersey: Prentice-Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise control*. New York: Freeman.
- Bandura, A., & Locke, E. A. (2003). Negative self-efficacy and goal effects revisited. *Journal of Applied Psychology*, 88(1), 87-99.

- Banks, M. H., Clegg, C. W., Jackson, P. R., Kemp, N. J., Stafford, E. M., & Wall, T. D. (1980). The use of the General Health Questionnaire as an indicator of mental health in occupational studies. *Journal of Occupational Psychology*, 53(3), 187-194.
- Banks, M. H., & Jackson, P. R. (1982). Unemployment and risk of minor psychiatric disorder in young people: cross-sectional and longitudinal evidence. *Psychological Medicine*, 12(4), 789-798.
- Barnett, R. C., Marshall, N. L., Raudenbush, S. W., & Brennan, R. T. (1993). Gender and the relationship between job experiences and psychological distress: A study of dual-earner couples. *Journal of Personality and Social Psychology*, 64(5), 794-806.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173-1182.
- Barrick, M. R., & Mount, M. K. (1991). The big five personality dimensions and job performance: A meta-analysis. *Personnel Psychology*, 44, 1-26.
- Baruch, Y. (1999). Response rates in academic studies-A comparative analysis. *Human Relations*, 52(4), 421-438.
- Bascand, G. (2008). *Demographic trends: 2007*. Wellington: Statistics New Zealand.
- Bascand, G. (2009a). *Labour Force Participation of New Zealanders aged 65 years and over, 1986-2006*. Wellington: Statistics New Zealand.
- Bascand, G. (2009b). *Labour Market Statistics: 2008*. Wellington: Statistics New Zealand.
- Bean, R. (1995). *Comparative Industrial Relations*. London: Routledge.
- Beautrais, A., Joyce, P., & Mulder, R. (1998). Psychiatric contacts among youth aged 13-24 years who have made serious suicide attempts. *Journal of the American Academy of Child and Adolescent Psychiatry*, 37(5), 1-8.
- Becker, H. S. (1996). The epistemology of qualitative research. In R. Jessor, A. Colby, & R. A. Shweder (Eds.), *Ethnography and human development: Context and meaning in social inquiry* (pp. 53-71). Chicago: University of Chicago Press.
- Beehr, T. A. (2001). An organizational psychology meta-model of occupational stress. In C. L. Cooper (Ed.), *Theories of Organizational Stress* (pp. 6-27). New York: Oxford University Press.
- Beehr, T. A., Jex, S. M., Stacy, B. A., & Murray, M. A. (2000). Work stressors and coworker support as predictors of individual strain and job performance. *Personnel Psychology*, 21(4), 391-405.
- Beehr, T. A., Johnson, L. B., & Nieva, R. (1995). Occupational stress: Coping of police and their spouses. *Journal of Organizational Behavior*, 16(1), 3-25.
- Beehr, T. A., & Newman, J. D. (1978). Job stress, employee health and organization effectiveness: A facet analysis, model and literature review. *Personnel Psychology*, 31(4), 665-699.
- Ben-Zur, H., & Zeidner, M. (1991). Anxiety and bodily symptoms under the threat of missile attacks: The Israeli scene. *Anxiety Research*, 4(2), 79-95.
- Berlin, C., Lidestav, G., & Holm, S. (2006). Values placed on forest property benefits by Swedish NIPF owners: Differences between members in forest owner associations and non-members. *Small-scale Forest Economics, Management and Policy*, 5(1), 83-96.
- Berkowitz, A. D., & Perkins, H. W. (1984). Stress among farm women: Work and family as interacting systems. *Journal of Marriage and the Family*, 46(1), 161-166.

- Best, R. G., Stapleton, L. M., & Downey, R. G. (2005). Core self-evaluations and job burnout: The test of alternative models. *Journal of Occupational Health Psychology, 10*(4), 441-451.
- Bhagat, R. S., McQuaid, S. S., Lindholm, H., & Segovis, J. (1985). Total life stress: A multi-method validation of the construct and its effect on organizationally valued outcomes and withdrawal behaviors. *Journal of Applied Psychology, 70*(1), 202-214.
- Bland, J. M., & Altman, D. G. (1996) Transformation, means, and confidence intervals, *British Medical Journal, 312*, 7038.
- Bland, J. M., & Altman, D. G. (1996a). Transforming data, *British Medical Journal, 312*, 7033.
- Blascovich, J., & Tomaka, J. (1991). Measure of self-esteem. In J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), *Measures of Personality and Social Psychological Attitudes* (pp. 115-160). San Diego: Academic Press.
- Blau, G. (1993). Testing the relationship of locus of control to different performance dimensions. *Journal of Occupational and Organizational Behaviour, 66*(2), 125-138.
- Bliese, P. D., & Britt, T. W. (2001). Social support, group consensus and stressor-strain relationships: Social context matters. *Journal of Organizational Behavior, 22*(4), 425-436.
- Bohle, P., & Quinlan, M. (2000). *Managing occupational health and safety: A multidisciplinary approach* (2nd ed.). Melbourne: MacMillan.
- Bohrstedt, G. W. (1983). *Measurement*. Orlando, Florida: Academic Press.
- Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley-Interscience.
- Bollen, K. A., & Stine, R. A. (1993). Bootstrapping Goodness-of-fit measures in structural equation models. In K. A. Bollen, & J. S. Long (Eds.), *Testing structural equation models* (pp. 111-135). Newbury Park, CA: Sage Publications, Inc.
- Bonanno, G. A. (2004). Loss, trauma, and human resilience; Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist, 59*(1), 20-28.
- Bond, F., & Bunce, D. (2003). The role of acceptance and job control in mental health, job satisfaction, and work performance. *Journal of Applied Psychology, 88*(6), 1057-1067.
- Bono, J. E., & Colbert, A. E. (2005). Understanding responses to multi-source feedback: The role of core self-evaluations. *Personnel Psychology, 58*(1), 171-203.
- Bono, J. E., & Judge, T. A. (2003). Core self-evaluations: A review of the trait and its role in job satisfaction and job performance. *European Journal of Personality, 17*, S5-S18.
- Bookstein, F. L. (1990). Least squares and latent variables. *Multivariate Behavioral Research, 25*, 75-80.
- Booth, N. J., & Lloyd, K. (2000). Stress in farming. *International Journal of Social Psychiatry, 46*(1), 67-73.
- Boyar, S. L., & Mosley Jr., D. C. (2007). The relationship between core self-evaluations and work and family satisfaction: The mediating role of work-family conflict and facilitation. *Journal of Vocational Behavior, 71*(2), 265-281.
- Boyd, S. L. (2006). Core self-evaluations as a moderator of job stress-burnout relationship (Doctoral dissertation, Alliant International University, Los Angeles). Retrieved from *ProQuest Digital Dissertations*. (AAT 3205057)

- Braden, C. J., McGlone, K., & Pennington, F. (1993). Specific psychosocial and behavioral outcomes from the systemic lupus erthematosus self-help course. *Health Education & Behaviour, 20*, 29-41.
- Brayfield, A. H., & Rothe, H. F. (1951). An Index of Job Satisfaction. *Journal of Applied Psychology, 35*, 307-311.
- Brenmuhi, F. (2007). *Economics woes worry dairy farmers*. Retrieved July 17, 2007, from <http://www.ruralnews.co.nz>
- Brief, A. P., Burke, M. J., George, J. M., Robinson, B. S., & Webster, J. (1988). Should negative affectivity remain an unmeasured variable in the study of job stress? *Journal of Applied Psychology, 73*(2), 193-198.
- Brief, A. P., Butcher, A. H., George, J. M., & Link, K. E. (1993). Integrating bottom-up and top-down theories of subjective well-being: the case of health. *Journal of Personality and Social Psychology, 64*(4), 646-653.
- Brockner, J. (1988). *Self-eseem at work*. Lexington, Mass:Lexington Books.
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen, & J. S. Long (Eds.), *Testing structural equation models* (pp. 136-162). Newbury Park, CA: Sage.
- Brunborg, G. S. (2008). Core Self-Evaluations: a predictor variable for Job Stress. *European Psychology, 13*(2), 96-102.
- Bryman, A. (1989). *Research methods and organization studies*. London: Unwin Hyman.
- Bryman, A., & Bell, E. (2007). *Business research methods* (2nd ed.). New York: Oxford University Press.
- Bryman, A., & Cramer, D. (2009). *Quantitative data analysis with SPSS 14, 15 and 16 - A guide for Social Scientists*. New York, NY: Routledge.
- Burgess, M. (2007). Panic buying hits global dairy trade. *The New Zealand Herald*, p. 1,
- Burke, M. J., Brief, A. P., & George, J. M. (1993). The role of negative affectivity in understanding relations between self-reports of stressors and strains: A comment on the applied psychology literature. *Journal of Applied Psychology, 78*(3), 402-412.
- Burrow, S. (2002). *Occupational stress: The union perspective*. Paper presented at the Academy of the Social Sciences Australia Workshop on Occupational Stress, Adelaide, South Australia, Australia.
- Burton, W. B., Chen, C., Conti, D. J., Schultz, A. B., Pransky, G., & Edington, D. W. (2005). The association of health risks with on-the-job productivity *Journal of Occupational & Environmental Medicine, 47*(8), 769-777.
- Byrne, B. (2001). *In Structural equation modeling with Amos: Basics concepts, applications and programming*. Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Campbell, A., Walker, J. L., & Farrell, G. (2003). Confirmatory factor analysis of the GHQ-12: Can I see that again? *Australian and New Zealand Journal of Psychiatry, 37*(4), 475-483.
- Casper, W. J., & Buffardi, L. C. (2004). Work-life benefits and job pursuit intentions: The role of anticipated organizational support. *Journal of Vocational Behavior, 65*(2), 391-410.
- Cavana, R. Y., Delahaye, B. L., & Sekaran, U. (2001). *Applied business research: Qualitative and quantitative methods*. Milton, Qld: John Wiley & Sons Australia, Ltd.
- Cavanaugh, M. C., Boswell, W. R., Roehling, M. V., & Boudreau, J. W. (2000). An empirical examination of self-reported work stress among U.S. managers. *Journal of Applied Psychology, 85*(1), 65-74.

- Chambers, R., Hentges, A., & Zhao, X. (2004). Robust automatic methods for outlier and error detection. *Journal of Royal Statistical Society*, 167(2), 323-339.
- Chay, Y. W. (1993). Social support, individual differences and well-being: a study of small business entrepreneurs and employees. *Journal of Occupational and Organizational Psychology*, 66, 285-302.
- Chen, G., Gully, S. M., & Eden, D. (2001). Validation of a new general self-efficacy scale. *Organizational Research Methods*, 4(1), 62-83.
- Chen, Y., & Spector, P. E. (1991). Negativity affectivity as the underlying cause of correlations between stressors and strains. *Journal of Applied Psychology*, 76(3), 398-407.
- Child, D. (1990). *The essentials of factor analysis* (2nd ed.). London: Cassell Publisher.
- Chin, W. W. (1998). Issues and opinion on structural equation modeling. *Management Information System Quarterly*, 22(1), vii-xvi.
- Coakes, S. J., & Steed, L. (2007). *SPSS: Analysis without anguish: Version 14.0 windows*. Qld: John Wiley & Sons Australia, Ltd.
- Coggan, C. A., Fanslow, J. L., & Norton, R. N. (1995). *Intentional injury in New Zealand. Analysis and monitoring report 4*. Wellington: Public Health Commission.
- Cohen, A. (1997). Facing pressure. *Sales and Marketing Management* 149(4), 30-38.
- Cohen, J., & Cohen, P. (1975). *Applied multiple regression/correlation analysis for the behavioral sciences*. Hillsdale, N. J.: Erlbaum.
- Collins, D. (1998). *Organisational change: Sociological perspectives*. London: Routledge.
- Constantine, M. G., & Ponterotto, J. G. (2006). Evaluating and selecting psychological measures for research purposes. In T. L. Leong, & J. T. Austin (Eds.), *The Psychology Research Handbook* (2nd ed., pp. 104-113). Thousand Oaks, CA: Sage Publications.
- Cook, L. (1998). Agriculture Statistics 1996, July 1998. Wellington: Statistics New Zealand.
- Cooksey, R. W., & McDonald, G. (2009). *Surviving and thriving in postgraduate business research* (Vol. 36). Prahran, Vic: Tilde University Press.
- Cooper, C. L., & Bramwell, R. S. (1992). A comparative analysis of occupational stress in managerial and shopfloor workers in the brewing industry: Mental health, job satisfaction, and sickness. *Work & Stress*, 6(2), 127-138.
- Cooper, C. L., Dewe, P. J., & O'Driscoll, M. P. (2001). *Organizational stress: A review and critique of theory, research, and applications*. Thousand Oaks: Sage Publisher.
- Cooper, C. L., Liukkonen, P., & Cartwright, S. (1996). *Stress prevention in the Workplace: Assessing the costs and benefits for organizations*. Dublin: Paper presented at the European foundation for the improvement of living and working conditions.
- Cooper, D. R., & Schindler, P. S. (2008). *Business research methods* (10th ed.). New York: McGraw-Hill International Edition.
- Costa, P. T., & McCrae, R. R. (1992). Normal personality assessment in clinical practice: The NEO personality inventory. *Psychological Assessment*, 14(1), 5-13.
- Couper, M. P. (2000). Web surveys: A review of issues and approaches. *Public Opinion Quarterly*, 64(4), 464-494.
- Cozzarelli, C. (1993). Personality and self-efficacy as predictors of coping with abortion. *Journal of Personality and Social Psychology*, 65(6), 1224-1236.

- Crampton, S. M., & Wagner, J. A., III. (1994). Percept-percept inflation in micro organizational research: An investigation of prevalence and effect. *Journal of Applied Psychology, 79*(1), (67-76).
- Cranny, C. J., Smith, P.C., & Stone, E. F. (1992). *Job satisfaction: How people feel about their jobs and how it affects their performance*. New York: Maxwell Macmillan.
- Crocker, J., & Park, L. E. (2004). The costly pursuit of self-esteem. *Psychological Bulletin, 130*, 392-414.
- Cryer, P. C., & Fleming, C. (1987). A review of work-related fatal injuries in New Zealand 1975-84, numbers, rates and trends. *New Zealand Medical Journal, 100*(816), 1-6.
- Daily, C. M., & Near, J. P. (2000). CEO satisfaction and firm performance in family firms: Divergence between theory and practice. *Social Indicators Research, 51*(2), 125-170.
- Davidson, R. J. (2000). Affective style, psychopathology, and resilience: brain mechanisms and plasticity. *American Psychologist, 55*(11), 1196-1214.
- Davis-Blake, A., & Pfeffer, J. (1999). Just a mirage: The search for dispositional effects in organizational research. *Academy of Management Review, 14*(3), 385-400.
- Dawis, R. V., & Lofquist, L. H. (1976). Personality style and the process of work adjustment. *Journal of Counseling Psychology, 23*(1), 55-59.
- Dawis, R. V., & Lofquist, L. H. (1984). *A psychological theory of work adjustment*. Minneapolis, MN University of Minneapolis Press.
- de Jonge, J., Dollard, M. F., Dormann, C., Le Blanc, P. M., & Houtman, I. L. D. (2000). The demand-control model: Specific demands, specific control, and well-defined groups. *International Journal of Stress Management, 7*(4), 269-287.
- De Lange, A., Taris, T., Kompier, M., Houtman, I., & Bongers, P. M. (2003). The very best millennium: Longitudinal research and the demand-control-(support) model. *Journal of Occupational Health Psychology, 8*(4), 282-305.
- De Rijk, A. E., Le Blanc, P. M., Schaufeli, W. B., & De Jonge, J. (1998). Active coping and need for control as moderators of the job demand-control model: Effects of burnout. *Journal of Occupational and Organizational Psychology, 71*, 1-18.
- De Vaus, D. A. (2000). *Research Design in Social Research* London: Sage.
- Deary, I. J., Willock, J., & McGregor, M. (1997). Stress in Farming. *Stress Medicine, 13*(2), 131-136.
- Decker, P. J., & Borgen, F. H. (1993). Dimensions of work appraisal: Stress, strain, coping, job satisfaction and negative affectivity. *Journal of Counseling Psychology, 40*(4), 470-478.
- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology, 86*(3), 499-512.
- Denison, D. R., & Mishra, A. K. (1995). Toward a theory of organizational culture and effectiveness. *Organization Science, 6*(2), 204-223.
- Denzin, N. K., & Lincoln, Y. S. (2003). *The landscape of qualitative research - theories and issues* (2nd ed.). Thousand Oaks: Sage.
- Devereux, J., Rydstedt, L., Kelly, V., Weston, P., & Buckle, P. (2004). *The role of work stress and psychological factors in the development of musculoskeletal disorders: The stress and MSD study*. Surrey: Robens Centre for Health.
- Dewey, R. (1974). Six pillars of the social sciences' Tower of Babel. *A Review of General Semantics, 31*, 239-247.
- Diener, E. (1984). Subjective well-being. *Psychological Bulletin, 95*(3), 542-575.

- Diener, E. (2005). *Guidelines for National Indicators of Subjective Well-being and ill-being*, John Templeton Foundation, Pennsylvania: Positive Psychology Center.
- Diener, E., & Larsen, R. J. (1993). The experience of emotional well-being. In M. Lewis & J.M. Haviland (Eds.), *The handbook of emotions* (pp.405-415). New York: Guilford Press.
- Diener, E., Larsen, R. J., & Emmons, R. A. (1984). Person X situation interactions: Choice of situations and congruence response models. *Journal of Personality and Social Psychology*, 47(3), 580-592.
- Diener, E., Suh, R. E., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being; Three decades of progress. *Psychological Bulletin*, 125(2), 276-302.
- Dillman, D. A. (2000). *Mail and internet surveys: The tailored design method*. New York: Wiley.
- Donner, A. (1982). The relative effectiveness of procedures commonly used in multiple regression analysis in dealing with missing values. *The American Statistician* 36(4), 378-381.
- Dormann, C., Fay, D., Zapf, D., & Frese, M. (2006). A state-trait analysis of job satisfaction: On the effect of core self-evaluations. *Applied Psychology: An International Review*, 55(1), 27-51.
- Doty, D. H., & Glick, W. H. (1998). Common methods bias: Does common methods variance really bias results? *Organizational Research Methods*, 1, 374-406.
- Duncan, C., Jones, K., & Moon, G. (1995). Psychiatric morbidity: a multilevel approach to regional variations in the UK. *Journal of Epidemiological Community Health*, 49, 290-295.
- Eberhardt, B. J., & Pooyan, A. (1990). Development of the Farm Stress Survey: Factorial structure, reliability and validity. *Education and Psychological Measurement*, 50(2), 393-402.
- Erez, A., & Judge, T. A. (2001). Relationship of core self-evaluations to goal setting, motivation, and performance. *Journal of Applied Psychology*, 86(6), 1270-1279.
- Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory analysis in psychological research. *Psychological Methods*, 4(3), 272-299.
- Fan, X., & Sivo, S. A. (2005). Sensitivity of fit indexes to misspecified structural or measurement model components: rationale of two-index strategy revisited. *Structural equation modeling: A multidisciplinary journal*, 12(3), 343-367.
- Federated Farmers of New Zealand, (2006). Federated Farmers Update. *Federated Farmers Update*, 1.
- Field, A. (2006) *Discovering statistics using SPSS* (2nd ed.). Thousand Oaks: SAGE Publications.
- Firth, H. M. (2001). Health of farmers in Southland: An overview. *New Zealand Medical Journal*, 114, 426-428.
- Firth, H. M., Williams, S. M., Herbison, G. P., & McGee, R. O. (2006). Stress in New Zealand Farmers. *Stress and Health*, 23(1), 51-58.
- Fletcher, B. (1989). The epidemiology of occupational stress. C. L. Cooper, & R. Payne (Eds.), *Causes, coping and consequences of stress at work* (pp. 3-49). Chichester, UK: John Wiley & Sons.
- Fletcher, B. (1991). *Work Stress, Disease, and Life Expectancy*. New York: Wiley.
- Fletcher, T. D., Selgrade, K. A., & Germano, L. M. (2006). *On the use of partial covariances in structural equation modelling*. Paper presented at the 21st Annual Conference of the Society for Industrial and Organizational Psychology, Dallas, TX.

- Fletcher, B. C., & Jones, F. A. (1993). A refutation of Karasek's demand-discretion model of occupational stress with a range of dependent variables. *Journal of Organizational Behaviour*, 14(4), 319-330.
- Fletcher, B. C., & Payne, R. L. (1980). Stress at work: A review and theoretical framework, Part II. *Personnel Review*, 9(2), 4-8.
- Flett, R., Biggs, H., & Alpass, F. (1995). Job stress and professional practice: Implications for rehabilitation educators. *Rehabilitation Education*, 9(4), 275-291.
- Fogarty, G., Macklin, A., Albion, M., Sutherland, I., Leloir, G., & Refit, S. (1999). Predicting occupational strain and job satisfaction: The role of stress, coping, personality, and affectivity variables. *Journal of Vocational Behavior*, 54(3), 429-453.
- Fonterra Co-operative Group Limited (2008), Crisis as farms turn to dust: brutal summer hits farmers hard. *The Dominion Post*. Retrieved February 17, 2011, from <http://www.stuff.co.nz/environment/259237/Crisis-as-farms-turn-to-dust>.
- Fragar, L., & Franklin, R. (2000). *The health and safety of Australia's farming community – A report of the national farm injury data centre for the farm safety join research venture*. Rural Industries Research and Development Corporation and Australian Centre for Agriculture Health and Safety.
- Fraser, C. E., Smith, K. B., Judd, F., Humphreys, J. S., Fragar, L. J., & Henderson, A. (2005). Farming and mental health problems and mental illness. *International Journal of Social Psychiatry*, 51(4), 340-349.
- Frazier, P., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology*, 51, 115-134.
- Frederickson, B. L., Tugade, M. M., Waugh, C. E., & Larkin, G. R. (2003). What good are positive emotions in crises? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th. 2001. *Journal of Personality and Social Psychology*, 84(2), 365-376.
- French, J. R. P. Jr., Caplan, R. D., & Van Harrison, R. (1982). *The mechanisms of job stress and strain*. Chichester, England: Wiley.
- Frese, M., & Zapf, D. (1988). Methodological issues in the study of work stress: objective vs. subjective measurement of work stress and the question of longitudinal studies. In C. L. Payne, & Payne, R. (Ed.), *Causes, coping, and consequences of stress at work*. (pp. 375-412). Chichester, UK: Wiley.
- Furnham, A., & Zacherl, M. (1986). Personality and job satisfaction. *Personality and Individual Differences*, 7(4), 453-459.
- Ganster, D. C., Fox, M. L., & Dwyer, D. J. (2001). Explaining employees' health care costs: A prospective examination of stressful job demands, personal control, and physiological reactivity. *Journal of Applied Psychology*, 85(5), 954-964.
- George, J. M., & Brief, A. P. (1992). Feeling good-doing good: A conceptual analysis of the mood at work-organizational spontaneity relationship. *Psychological Bulletin*, 112, 310-329.
- Gerbing, D. W., & Anderson, J. C. (1988). An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research*, 25(2), 186-192.
- Ghiselli, E. (1973). The validity of aptitude tests in personnel selection. *Personnel Psychology*, 26(4), 461-477.
- Gilner, B. V. H. (1971). *Industrial and organizational psychology*. New York: McGraw-Hill.

- Ginexi, E. M., Howe, G. W., & Caplan, R. D. (2000). Depression and control beliefs in relation to reemployment: What are the directions of effect? *Journal of Occupational Health Psychology, 5*, 323-336.
- Goldberg, D. (1972). *The detection of psychiatric illness by questionnaire*. London: Oxford University Press.
- Goldberg, D., & Williams, P. (1991). *A user's guide to the General Health Questionnaire*. Windsor: NFER-Nelson.
- Goodland, R., & Daly, H. (1993). *Poverty alleviation is essential for environmental Sustainability, Environmental working paper number 42*, The World Bank, Environmental Department. Washington, D. C., USA.
- Gorsuch, R. L. (1990). Common factor analysis versus principal component analysis: Some well and little known facts. *Multivariate Behavioral Research, 25*, 33-39.
- Grant, S., & Langan-Fox, J. (2007). Personality and the occupational stressor-strain relationship: The role of the big five. *Journal of Occupational Health Psychology, 12*(1), 20-33.
- Gray-Little, B., Williams, V. S. L., & Hancock, T. D. (1997). An item response theory analysis of the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin, 23*(5), 443-451.
- Grice, J. W. (2001). A comparison of factor scores under conditions of factor obliquity. *Psychological Methods, 6*(1), 67-83.
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin, & Lincoln, Y. S. (Eds.), *Handbook of qualitative research* (pp. 105-117). Newbury Park, CA: Sage.
- Gureje, O. (1991). Reliability and the factor structure of the Yoruba version of the 12-item General Health Questionnaire. *Acta Psychiatrica Scandinavia, 84*, 125-129.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* (6th ed.). Upper Saddle River: New Jersey: Pearson International Edition.
- Hall, R. J., Snell, A. F., & Foust, M. S. (1999). Item parceling strategies in SEM: Investigating the subtle effects of unmodeled secondary constructs. *Organizational Research Methods, 2*(3), 233-256.
- Hammersley, M. (1996). The relationship between qualitative and quantitative research: Paradigm loyalty versus methodological eclecticism. In J. T. E. Richardson (Ed.), *Handbook of qualitative research methods for psychology and the social sciences* (pp. 159-174). Leicester, UK: British Psychological Society Books.
- Harewood, G. C., Yacavone, R. F., Locke, G. R., & Wiersema, M. J. (2001). Prospective comparison of endoscopy patient satisfaction surveys: E-mail versus standard mail versus telephone. *The American Journal of Gastroenterology, 96*(12), 3312-3317.
- Harris, K. J., Harvey, P., & Kacmar, K. M. (2009). Do social stressors impact everyone equally? An examination of the moderating impact of core self-evaluations. *Journal of Business Psychology, 24*(2), 153-164.
- Harvey, T. R., & Drolet, B. (1995). *Building teams, building people: Expanding the fifth resource* (2nd ed.). Lancaster, CA: Technomic Publishing Co.
- Hattie, J. (1985). Methodology review: Assessing unidimensionality of tests and items. *Applied Psychological Measurement, 9* (June), 139-164.
- Hawton, K., Fagg, J., Simkin, S., Harriss, L., Malmberg, A., & Smith, D. (1999). The geographical distribution of suicides in farmers in England and Wales. *Social Psychiatry and Psychiatric Epidemiology, 34*(3), 122-127.
- Heitjan, D. F., & Rubin, D. B. (1991). Ignorability and course data. *Analysis of Statistics, 19*(4), 2244-2253.

- Heller, D., Judge, T. A., & Watson, D. (2002). The confounding role of personality and trait affectivity in the relationship between job and life satisfaction. *Journal of Organizational Behavior*, 23(7), 815-202.
- Heller, D., Watson, D., & Ilies, R. (2006). The dynamic process of life satisfaction. *Journal of Personality*, 74(5), 1421-1450.
- Heller, D., Watson, D., & Ilies, R. (2004). The role of person vs. situation in life satisfaction. *Psychological Bulletin*, 130(4), 574-600.
- Hembry, O. (2009). Farmers on long road to recovery. *The NZ Herald*, p. 3, Retrieved Mar 05, 2009 from http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10560019
- Heppner, P. P., Cook, S. W., Strozier, A. L., & Hepper, M. J. (1991). An investigation of coping styles and gender differences with farmers in career transition. *Journal of Counseling Psychology*, 38(2), 167-174.
- Hiller, N., & Hambrick, D. C. (2005). Conceptualizing executive hubris: The role of (hyper-) core self-evaluations in strategic decision-making. *Strategic Management Journal*, 26, 297-319.
- Hochwarter, W. A., Perrewe, P. L., & Kent, R. L. (1993). The impact of persistence on the stressor-strain and strain-intentions to leave relationships: A field examination. *Journal of Social Behavior and Personality*, 8(3), 389-404.
- Hoel, H., Sparks, K., & Cooper, C. L. (2001). *The cost of violence/stress at work and the benefits of a violence/stress-free working environment*. Geneva: International Labour Organization.
- Holt, R. (1993). Occupational stress. In L. Goldberger, & S. Breznitz (Eds.), *Handbook of stress: Theoretical and clinical aspects* (2nd ed., pp. 342-367). New York: The Free Press.
- Hope, A., Kelleher, L. H., & Hennessy, T. (1999). Health and safety practices among farmers and other workers: a needs assessment. *Journal of Occupational Medicine*, 49(4), 231-235.
- Horner, K. L. (1996). Locus of control, neuroticism, and stressors: Combined influences on reported physical illness. *Journal of Personality and Individual Differences*, 21(2), 195-204.
- Horticulture New Zealand. (2008). Horticulture New Zealand Homepage: *New Zealand fresh vegetable industry*. Retrieved April 4, 2008, from <http://www.freshvegetables.co.nz/research.html>
- Horticulture New Zealand. (2010). *Horticulture New Zealand Homepage*. Retrieved April 16, 2010, from <http://www.hortnz.co.nz>
- Hu, L. T., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*, 3(4), 424-453.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Model: Multidiscipline Journal*, 6, 1-55.
- Hulin, C. L., Roznowski, M., & Hachiya, D. (1985). Alternative opportunities and withdrawal decisions: Empirical and theoretical discrepancies and integration. *Psychological Bulletin*, 97(2), 233-250.
- Humphreys, J., Hegney, D., Lipscombe, J., Gregory, G., & Chater, B. (2002). Whither rural health? Reviewing a decade of progress in rural health. *Australia Journal of Rural Health*, 10, 2-14.

- Hurrell, J. J., Nelson, D. L., & Simmons, B. L. (1998). Measuring job stressors and strains: Where we have been, where we are, and where we need to go. *Journal of Occupational Health Psychology, 3*(4), 368-389.
- Hussey, J., & Hussey, R. (1997). *Business Research: A Practical Guide*. New York and Basinstoke: Palgrave Macmillian.
- International Labour Organization. (2003). *Employment by Sectors. Key indicators of the labour market (3rd ed.)*. 139-160, New York: Routledge.
- Jain, V. K., Lall, R., McLaughlin, D. G., & Johnson, W. B. (1996). Effects of locus of control, occupational stress, and psychological distress on job satisfaction among nurses. *Psychological Reports, 78*(3), 1256-1259.
- Jamal, M. (1990). Relationships of job stress and type-A behavior to employees' job satisfaction, organizational commitment, psychosomatic health problems and turnover motivation. *Human Relations, 43*(8), 727-738.
- Jaumotte, F. (2003). *Female labour force participation: Past trends and main determinants in OECD countries*. Paris: Organization for Economic Co-operation Development.
- Jex, S. M., Beehr, T. A., & Roberts, C. K. (1992). The meaning of occupational stress items to survey respondents. *Journal of Applied Psychology, 77*(5), 623-628.
- Jex, S. M., & Bliese, P. D. (1999). Efficacy Beliefs as a moderator of the impact of work-related stressors: A multilevel study. *Journal of Applied Psychology, 84*(3), 349-361.
- Jex, S. M., & Elacqua, T. C. (1999). Self-esteem as a moderator: A comparison of global-based measures. *Journal of Occupational and Organizational Psychology, 72*(1), 71-81.
- Jex, S. M., & Spector, P. E. (1996). The impact of negative affectivity on stressor-strain relations: A replication and extension. *Work and Stress, 10*(1), 36-45.
- Jimmieson, N. L. (2000). Employee reactions to behavioral control under conditions of stress: The moderating role of self-efficacy. *Work & Stress, 14*(3), 262-280.
- Johnson, J. V., & Hall, E. M. (1988). Job strain, work place social support and cardiovascular disease: A cross-sectional study of a random sample of the Swedish working population. *American Journal of Public Health, 78*, 1336-1342.
- Johnson, E. C., Kristof-Brown, A. L., Van Vianen, A. E. M., De Pater, I. E., & Klein, M. R. (2003). Expatriate social ties: Personality antecedents and consequences for adjustment. *International Journal of Selection and Assessment, 11*(4), 277-288.
- Johnson, R. E., Rosen, C. C., & Levy, P. E. (2008). Getting to the core of core self-evaluation: A review and recommendations. *Journal of Organizational Behavior, 29*(3), 391-413.
- Joreskog, K. G. (1993). Testing structural equation models. In K. A. Bollen, & Long, J. C. (Ed.), *Testing structural equation models* (pp. 294-316). Newbury Park: Sage Publisher.
- Jourard, S. (1971). *Self-disclosure*. New York: Wiley Interscience.
- Judd, F., Jackson, H., Fraser, C., Murray, G., Robins, G., & Komiti, A. (2006). Understanding suicide in Australia farmers. *Social Psychiatry and Psychiatric Epidemiology, 41*(1), 1-10.
- Judge, T. A. (2009). Core self-evaluations and work success. *Current Directions in Psychological Science, 18*(1), 58-62.

- Judge, T. A., & Bono, J. E. (2001). A rose by any other name: Are self-esteem, generalized self-efficacy, neuroticism, and locus of control indicators of a common construct In B. W. Roberts, & R. Hogan (Eds.), *Personality psychology in the workplace: Decade of behavior* (pp. 93-118). Washington, DC: American Psychological Association.
- Judge, T. A., Bono, J. E., Erez, A., Locke, E. A., & Thoresen, C. J. (2002). The scientific merit of valid measures of general concepts: Personality research and core self-evaluations. In J. M. Brett, & , F. Drasgow (Eds.). *The Psychology of Work: Theoretically Based Empirical Research* (pp. 55-77). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Judge, T. A., Bono, J. E., & Locke, E. A. (2000). Personality and job satisfaction: The mediating role of job characteristics. *Journal of Applied Psychology, 85*(2), 237-249.
- Judge, T. A., Boudreau, J. W., & Bretz, R. D., Jr. (1994). Job and life attitudes of male executives. *Journal of Applied Psychology, 79*(5), 767-781.
- Judge, T. A., Erez, A., & Bono, J. E. (1998b). The power of being positive: The relation between positive self-concept and job performance. *Human Performance, 11*(2/3), 167-188.
- Judge, T. A., Erez, A., Bono, J. E., & Thoresen, C. J. (2003). The core self-evaluations scale: Development of a measure. *Personnel Psychology, 56*(2), 303-331.
- Judge, T. A., Heller, D., & Klinger, R. (2008). The dispositional sources of job satisfaction: A comparative test. *Applied Psychology: An international Review, 37*(3), 361-372.
- Judge, T. A., & Hurst, C. (2007). Capitalizing on one's advantage: Role of core self-evaluations. *Journal of Applied Psychology, 92*(5), 1212-1227.
- Judge, T. A., Locke E. A., Durham, C. C., & Kluger, A. N. (1998a). Dispositional effects on job and life satisfaction: The role of core evaluations. *Journal of Applied Psychology, 83*(1), 17-34.
- Judge, T. A., Locke, E. A., & Durham, C. C. (1997). The dispositional causes of job satisfaction: A core evaluations approach. In L. L. Cummings, & B. M. Staw (Eds.), *Research in organizational behavior* (Vol. 19, pp. 151-188). Greenwich, CT: JAI Press.
- Judge, T. A., Van Vianen, A. E. M., & De Pater, I. E. (2004). Emotional stability, core self-evaluations, and job outcomes: A review of the evidence and an agenda for future research. *Human Performance, 17*(3), 325-346.
- Judge, T. A., & Watanabe, S. (1993). Another look at the job satisfaction-life satisfaction relationship. *Journal of Applied Psychology, 78*(6), 939-948.
- Kahn, K. L., & Byosiere, P. (1992). Stress in organizations. In M. D. Dunnette, & L. M. Hugh (Eds.), *Handbook of industrial and organizational psychology* (2nd ed., pp. 571-630). Palo Alto, CA: Consulting Psychologists Press.
- Kahn, R. L., & Quinn, R. P. (1970). A framework for analysis. In A. McLean (Ed.), *Occupational mental health* (pp. 50-115). New York: Rand McNally.
- Kahn, R. L., Wolfe, D. M., Quinn, R. P., Snoek, J. D., & Rosenthal, R. A. (1964). *Organizational stress*. New York: Wiley.
- Kain, J., & Jex, S. (2010). Karasek's (1979) job demands-control model: A summary of current issues and recommendations for future research. In Perrewe, P. L., & Ganster, D. C. (Eds.) *New developments in theoretical and conceptual approaches to job stress: research in occupational stress and wellbeing* (Vol. 8, pp. 237-268). UK: Emerald Group Publishing Ltd.

- Kalliath, T., O'Driscoll, M., & Brough, P. (2004). A confirmatory factor analysis of the General Health Questionnaire-12. *Stress and Health, 20* (1), 11-20.
- Kammeryer-Mueller, J. D., Judge, T. A., & Scott, B. A. (2009). The role of core self-evaluations in the coping process. *Journal of Applied Psychology, 94*(1), 177-195.
- Kaplan, D. (1995). Statistical power in structural equation modeling In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 100-117). Thousand Oaks, CA: Sage Publications Ltd.
- Kaplan, D. (2009). *Structural equation modeling -Foundations and extensions* (2nd ed. Vol. 10). Thousand Oaks, CA: Sage Publications Ltd.
- Karasek, R. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly, 24*(2), 285-308.
- Karasek, R., & Theorell, T. (1990). *Healthy work: Stress, productivity, and the reconstruction of working life*. New York: Basics Books.
- Karasek, R., Triantis, K. P., & Chaudhry, S. S. (1982). Coworker and supervisor support as moderators of associations between task characteristics and mental strain. *Journal of Occupational Behaviour, 3*, 181-200.
- Kendall, E., Murphy, P., O'Neill, V., & Bursnall, S. (2000). *Occupational stress: Factors that contribute to its occurrence an effective management*. Shenton Park: Western Australia.
- Kenny, D., & Judd, C. M. (1984). Estimating the non-linear and interactive effects of latent variables. *Psychological Bulletin, 96*(July), 201-210.
- Keon, T. L., & McDonald, B. (1982). Job satisfaction and life satisfaction: An empirical evaluation of their interrelationships. *Human Relations, 35*(3), 167-180.
- Kerlinger, F. N. (1986). *Foundations of behavioral research*. Philadelphia, Holt: Rinehart and Winston Inc.
- Kessler, R. C., & Cleary, P. D. (1980). Social class and psychological distress. *American Sociological Review, 45*(3), 463-478.
- Kidd, S. A. (2002). The role of qualitative research in psychological journals. *Psychological Methods, 7*(1), 126-238.
- Kiesler, S., & Sproull, L. (1986). Response effects in the electronic survey. *Public Opinion Quarterly, 50*(3), 402-413.
- Kim, Jae-On & Mueller, C. W. (1978). *Factor analysis: Statistical methods and practical issues*. Beverly Hills, California: Sage Publications, Inc.
- King, K. A., Pealer, L. N., & Bernard, A. L. (2001). Increasing response rates to mail questionnaires: A review of inducement strategies. *American Journal of Health Education, 32*(1), 4-15.
- Kinman, G. (2001). Pressure points: A review of research on stressors and strains in UK academics. *Educational Psychology, 21*(4), 473-492.
- Kivimaki, M., & Kalimo, R. (1996). Self-esteem and the occupational stress process: Testing two alternative models in a sample of blue-collar workers. *Journal of Occupational Health Psychology, 1*(2), 187-196.
- Klein, K. J., Dansereau, F., & Hall, R. J. (1994). Levels issues in theory development, data collection, and analysis. *Academy of Management Review, 19*(2), 195-229.
- Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York: Guilford Press.
- Kline, T. J. B., Sulsky, L. M., Rever-Moriyama, S. D. (2000). Common method variance and specification error: A practical approach to detection. *The Journal of Psychology, 134*(4), 401-421.
- Kohn, M. L., & Schooler, C. (1982). Job conditions and personality. *The American Journal of Sociology, 87*(6), 1257-1287.

- Koslowksy, M. (1998). *Modeling the stress-strain relationship in work settings*. London: Routledge progress in psychology.
- Kristensen, T. S. (1996). Job stress and cardiovascular disease: A theoretical critical review. *Journal of Occupational Health Psychology, 1*(3), 246-249.
- Laing, J. (1988). Self-report: Can it be of value as an assessment technique? *Journal of Counseling and Development, 67*(1), 60-61.
- Landis, R. S., Beal, D. J., & Tesluk, P. E. (2000). A comparison of approaches to forming composite measures in structural equation models. *Organizational Research Methods, 3*(2), 186-207.
- Landsbergis, P.A. (1988). Occupational stress among health care workers: A test of the job demands-control model. *Journal of Organizational Behaviour, 9*, 217-239.
- Landsbergis, P. A., Schnall, P. L., Deitz, D., Friedman, R., & Pickering, T. (1992). The patterning of psychological attributes and distress by 'job strain' and social support in a sample of working men. *Journal of Behavioral Medicine, 15*, 379-405.
- Lazarus, R., & Folkman, S. (1984). *Stress, appraisal and coping*. New York: Springer.
- Lazarus, R. S. (1990). Theory-based stress measurement. *Psychological Inquiry, 1*(1), 3-13.
- Lawrence, G., & Vanclay, F. (1993). Environmental and social consequences of economic restructuring in Australian agriculture. *International Journal of Sociology of agriculture and Food, 3*, 97-118.
- Lee, T. W., Mitchell, T. R., & Sablynski, C. J. (1999). Qualitative research in organizational and vocational psychology, 1979-1999. *Journal of Vocational Behavior, 55*(2), 161-187.
- Leong, F. T. L., & Austin, J. T. (2006). *The Psychology Research Handbook* (2nd ed.). Thousand Oaks, California: Sage Publications, Inc.
- Lightsey, O. W., Burke, M., Ervin, A., Henderson, D., & Yee, C. (2006). Generalized self-efficacy, self-esteem, and negative affect. *Canadian Journal of Behavioral Science, 38*(1), 72-80.
- Lindell, M. K., & Whitney, D. J. (2001). Accounting for common method variance in cross-sectional research design. *Journal of Applied Psychology, 86*(1), 114-121.
- Linn, J. G., & Husaini, B. A. (1987). Determinants of psychological depression and coping behaviours of Tennessee farm residents. *Journal of Community Psychology, 15*(4), 503-512.
- Litt, M. D. (1988). Self-efficacy and perceived control: Cognitive mediators of pain tolerance. *Journal of Personality and Social Psychology, 54*, 149-160.
- Lo, K., & Lamm, F. (2004). Occupational Stress in the Hospitality Industry: An employment relations perspective. *New Zealand Journal of Employment Relations, 30*(1), 23-48.
- Lobley, M., Johnson, G., Reed, M., with Winter, M., & Little, J. (2004). *Rural stress review final report*. UK: Centre for Rural Research, University of Exeter.
- Lochlin, J. C. (1990). Component analysis versus common factor analysis: A case of disputed authorship. *Multivariate Behavioral Research, 25*, 29-31.
- Locke, E. A. (1976). *The nature and causes of job satisfaction*. Rand McNally: Rand McNally.
- Locke, E. A., McClear, K., & Knight, D. (1996). Self-esteem and work. *International Review of Industrial and Organizational Psychology, 11*, 1-32.
- MacCallum, R. C., & Austin, J. T. (2000). Applications of structural equation modeling in psychological research. *Annual Reviews Psychology, 51*, 201-226.

- MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1*(2), 130-149.
- MacKenzie, S. B., Podsakoff, P. M., & Jarvis, C. B. (2005). The problem of measurement model misspecification in behavioral and organizational research and some recommended solutions. *Journal of Applied Psychology, 90*(4), 710-730.
- Marcus, G., & Fischer, M. (1986). *Anthropology as cultural critique: An experimental moment in the human sciences* Chicago: University of Chicago Press.
- Margolis, B. L., Kroes, W. H., & Quinn, R. P. (1974). Job stress: An unlisted occupational hazard. *Journal of Occupational Medicine, 16*(10), 659-661.
- Markey, R. (2010). *Employee participation and well-being: Denmark and New Zealand*. Paper presented at the 9th European Congress of the International Industrial Relations Association, Copenhagen: Denmark.
- Masten, A. S. (2001). Ordinary magic-resilience processes in development. *American Psychologist, 56*(3), 227-238.
- Matterson, M. T., & Ivancevich, J. M. (1982). *Managing job stress and health: The intelligent person's guide*. New York, NY: The Free Press: A Division of Macmillan Publishing Co., Inc.
- McCrae, R. R. (2002). The maturation of personality psychology: Adult personality development and psychological well-being. *Journal of Research in Personality, 36*(4), 307-317.
- McGrath, J. E. (1976). Stress and behavior in organizations. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology* (pp. 1351-1395). Chicago: Rand McNally.
- McGregor, M., Willock, J., & Deary, I. J. (1995). Farmer stress. *Farm Management, 9*, 57-65.
- McGregor, M. J., Willock, J., Dent, B., Deary, I. J., Sutherland, A., & Gibson, G. (1996). Links between psychological factors and farmer decision making. *Farm Management, 9*, 228-239.
- McHenry, J. J., Hough, L. M., Toquam, J. L., & Hanson, M. A. (1990). Project a validity results: The relationship between predictor and criterion domains. *Personnel Psychology, 43*, 335-354.
- McQuitty, S. (2004). Statistical power and structural equation models in business research. *Journal of Business Research, 57*(2), 175-183.
- Melberg, K. (2003). Farming stress and psychological well-being: The case of Norwegian farm spouses. *Sociological Ruralis, 43*(1), 56-76.
- Michel, J. (2003). The quantitative imperative: Positivism, naive realism and the place of qualitative methods in psychology. *Theory & Psychology, 13*(1), 5-31.
- Miller, H. E., & Rosse, J. G. (2002). Emotional reserve and adaptation to job dissatisfaction. In J. M. Brett, & F. Drasgow (Eds.), *The Psychology of Work: Theoretically Based Empirical Research* (pp. 205-231). Mahwah, NEW JERSEY: Lawrence Erlbaum Associates.
- Mineka, S. (2007). *An integrative perspective on the origins of emotional disorders: Time 1 and initial prospective results from a longitudinal study*. Paper presented at the Australian Association for Cognitive and Behaviour Therapy: 30th Annual National Conference, Brisbane, Australia.
- Ministry of Agriculture and Forestry. (2007). *Total agricultural, forestry, and horticultural exports*. Retrieved 4th April 2007, from <http://www.maf.govt.nz/mafnet/rural-nz/agriculture-forestry-horticulture-in-brief/key-facts-1.htm#Employment>.

- Ministry of Youth Development. (2004). Guidelines for primary care providers: Detection and management of young people at risk of suicide. Wellington: The Royal New Zealand College of General Practitioners.
- Mischel, W., & Shoda, Y. (1998). Reconciling processing dynamics and personality dispositions. *Annual Review of Psychology*, 49(1), 229-258.
- Morgaine, K., Langley, J. D., & McGee, R. O. (2006). The FarmSafe Programme in New Zealand: Process evaluation of year one. *Safety Science*, 44(4), 359-371.
- Morgan, G., & Smircich, L. (1980). The case for qualitative research. *Academy of Management Review*, 5(4), 491-500.
- Morgan, R. E., & Berthon, P. (2008). Market orientation, generative learning, innovation strategy and business performance inter-relationships in Bioscience firms. *Journal of Management Studies*, 45(8), 1329-1353.
- Motowidlo, S. J. (1996). Orientation towards the job and organization. In K. R. Murphy (Ed.), *Individual Differences and Behavior in Organizations* (pp. 175-208). San Francisco: Jossey-Bass.
- Mount, M. K., & Barrick, M. R. (1995). *Manual for the personal characteristics inventory*. Libertyville, IL: Wonderlic Personnel test Inc.
- Moyle, P. (1995). The role of negative affectivity in the stress process: Tests of alternative models. *Journal of Organizational Behavior*, 16(6), 647-668.
- Mulaik, S. A., & Millsap, R. E. (2000). Doing the four-step right. *Structural Equation Modeling*, 7(1), 36-73.
- National Institute for Occupational Safety and Health. (2002). *Occupational exposure to hot environments, revised criteria* Washington, DC: Department of Health and Human Sciences.
- Near, J. P., & Sorcinelli, M. D. (1986). Work and life away from work: Predictors of faculty satisfaction. *Research in Higher Education*, 25(4), 377-394.
- Nelson, D., & Cooper, D. L. (2007). *Positive Organizational Behavior - Accentuating the positive at work*. Thousand Oaks, CA: SAGE Publications Ltd.
- Nelson, D. L., & Sutton, C. D. (1990). Chronic work stress and coping: A longitudinal study and suggested new directions *Academy of Management Journal*, 33(4), 859-869.
- New Zealand Department of Statistics. (2005). *New Zealand Agriculture Statistics*. Wellington: Government printer.
- Newton, C. J., & Jimmieson, N. L. (2008). Role stressors, participative control, and subjective fit with organizational values: Main and moderating effects on employee outcomes. *Journal of Management and Organization*, 14(1), 20-39.
- Nikolaou, I., & Judge, T. A. (2007). Fairness reactions to personnel selection techniques in Greece: The role of Core self-evaluation. *International Journal of Selection and Assessment*, 15(2), 206-219.
- O'Driscoll, M. P., & Cooper, C. L. (1996). Sources and management of excessive job stress and burnout. In P. Warr (Ed.), *Psychology at work* (4th ed., pp. 188-223). New York: Penguin.
- Oishi, S., & Diener, E. (2001). Re-examining the general positivity model of subjective well-being: The discrepancy between specific and global domain satisfaction. *Journal of Personality*, 69(4), 641-666.
- Olf, M., Koeter, M. W. J., Haafte, E. H. V., Kersten, P. H., & Gersons, B. P. R. (2005). Impact of a foot and mouth disease crisis on post-traumatic stress symptoms in farmers. *British Journal of Psychiatry*, 186(2), 165-166.
- Olson, K. R., & Schellenberg, R. P. (1986). Farm Stressors. *American Journal of Community Psychology*, 14(5), 555-569.

- Olsson, R. (1988). Management for success in modern agriculture. *European Research*, 15, 239-259.
- Orlikowski, W. J., & Baroudi, J. J. (1991). Studying information technology in organizations: Research approaches and assumptions. *Information Systems Research*, 2(1), 1-28.
- Osborne, J. W. (2008). *Best practices in quantitative methods*. California, LA: Sage Publications, Inc.
- Osborne, J. W., Costello, A. B., & Kellow, J. T. (2008). Best practices in exploratory factor analysis. In J. W. Osborne (Ed.), *Best Practices in Quantitative Methods* (pp. 86-99). Thousand Oaks, CA: Sage Publications Ltd.
- Osborne, J. W., & Overbay, A. (2008). Best practices in data cleaning - How outliers and "Fringliers" can increase error rates and decrease the quality and precision of your results. In J. W. Osborne (Ed.), *Best practices in quantitative methods* (pp. 205-213). Thousand Oaks, CA: Sage Publications, Inc.
- Osipow, S. H., & Spokane, A. R. (1987). *Manual for Occupational Stress Inventory: Research version*, Odessa: Psychological Assessment Resources.
- Ozer, D. J. (1985). Correlation and the coefficient of determination. *Psychological Bulletin*, 97(2), 307-315.
- Packer, E. (1985). Understanding the subconscious. *The Objectivist Forum*, 6(1), 1-10.
- Page, A. N., & Fragar, L. J. (2002). Suicide in Australia farming, 1988-1997 *Australia and New Zealand Journal of Psychiatry* 36(1), 81-85.
- Parkes, K. R. (1990). Coping, negative affectivity, and work environment: Additive and interactive predictors of mental health. *Journal of Applied Psychology*, 75(4), 399-409.
- Parkes, K. R., Mendham, C. A., & Von Rabenau, C. (1994). Social support and the demand-discretion model of job stress: Tests of additive and interactive effects in two samples. *Journal of Vocational Behavior*, 44(1), 91-113.
- Peck, D. F., Grant, S., McArthur, W., & Godden, D. (2002). Psychological Impact of Foot and Mouth Disease on Farmers. *Journal of Mental Health*, 11(5), 523-531.
- Pedersen, C. (2007). Federated Farmers of New Zealand. Federated Farmers Update. *Federated Farmers of New Zealand*, 2.
- Piccolo, R. F., Judge, T. A., Takahashi, K., Watanabe, N., & Locke, E. A. (2005). Core self-evaluations in Japan: relative effects on job satisfaction, life satisfaction, and happiness. *Journal of Organizational Behavior*, 26, 965-984.
- Ping, R. A. (1995). A parsimonious estimating technique for interaction and quadratic latent variables. *Journal of Marketing Research*, 32(3), 336-347.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method variance in behavioural research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903.
- Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management* 12(4), 531-544.
- Politi, P. L., Piccinelli, M., & Wilkinson, G. (2007). Reliability, validity and factor structure of the 12-item General Health Questionnaire among young males in Italy. *Acta Psychiatrica Scandinavica*, 90(6), 432-437.
- Pollock, L., Deaville, J., Gilman, A., & Willock, J. (2002). A Preliminary Study into Stress in Welsh Farmers. *Journal of Mental Health*, 11(2), 213-221.
- Pugliesi, K. (1999). The consequences of emotional labor: Effects on work stress, job satisfaction, and well-being. *Motivation and emotion*, 23(2), 125-154.

- Pulkkinen, L. (2002). Social development and its risk factors. In L. Backman, & C. V. Hofsten, (Eds.), *Psychology at the turn of the millennium* (Vol. 2, pp. 53-76). New York: Psychology Press.
- Quick, J. C., Quick, J. D., Nelson, D. L., & Hurrell, J. J. (1997). *Preventive stress management in organizations* (2nd ed.). Washington, DC: American Psychological Association Books.
- Quick, J. D., Horn, R. S., & Quick, J. C. (1987). Health consequences of stress. *Journal of Organizational Behavior Management*, 8(2), 19-36.
- Rain, J. S., Lane, I. M., & Steiner, D. D. (1991). A current look at the job satisfaction/life satisfaction relationship: Review and future considerations. *Human Relations*, 44(3), 287-307.
- Raine, G. (1999). Causes and effects of stress on farmers: A qualitative study. *Health Education Journal*, 58(3), 259-270.
- Rasmussen, J. L. (1988). Evaluating outlier identification tests: Mahalanobis D square and Comrey Dk. *Multivariate Behavioral Research*, 23(2), 189-202.
- Raudenbush, S. W., & Bryk, A. S. (2001) *Hierarchical linear models: applications and data analysis methods* (2nd ed.). Newbury Park, CA: Sage Publication.
- Remenyi, D., Williams, B., Money, A., & Swartz, E. (1998). *Doing research in business and management: An introduction to process and method*. London: Sage Publication.
- Reynolds, R., & Moore, W. (1990). *Farm prices and costs*. Wellington: Government Publications
- Rhodes, L., & Eisenberger, R. (2002). Perceived organizational support: A review of the literature. *Journal of Applied Psychology*, 87(4), 698-714.
- Rice, R. W., Near, J. P., & Hunt, R. G. (1980). The job satisfaction/life satisfaction relationship; A review of empirical research. *Basic and Applied Social Psychology*, 1(1), 37-64.
- Rickenbach, M. G., Guries, R. P., & Schmoltdt, D. L. (2006). Membership matters: comparing members and non-members of NIPF owner organizations in southwest Wisconsin, USA. *Forest Policy and Economics*, 8, 93-103.
- Robinson, J. P., Shaver, P. R., & Wrightsman, L. S. (1991). Criteria for scale selection and evaluation. In J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), *Measures of Personality and Social Psychological Attitudes* (Vol. Volume 1 of Measures of Social Psychological Attitudes, pp. 1-15). San Diego, Cal.: Academic Press, Inc.
- Rode, J. C. (2004). Job and life satisfaction revisited: A longitudinal test of an integrated model. *Human Relations*, 57(9), 1205-1230.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, New Jersey: Princeton University Press.
- Rossi, P. H., Wright, J. D., & Anderson, A. B. (1983). *Handbook of Survey Research*. New York: Academic Press.
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General & Applied*, 80(1), (1-28).
- Saks, A. M. (1995). Longitudinal field investigation of the moderating and mediating effects of self-efficacy on the relationship between training and new comer adjustment. *Journal of Applied Psychology*, 80(2), 211-225.
- Salanova, M., Peiro, J. M., & Schaufeli, W. B. (2002). Self-efficacy specificity and burnout among information technology workers: An extension of the job demand-control model. *European Journal of Work and Organizational Psychology*, 11(1), 1-25.

- Sauter, S. L. (1989). NIOSH studies of control and worker well-being: Moderating effects of job control on health complaints in office work. In S. Sauter, J. Hurrell, & C. Cooper (Eds.), *Job control and worker health*. Chichester, England: Wiley.
- Sayetta, R. B., & Johnson, D. P. (1980). *Basic data on depressive symptomatology, United States, 1974-75 DHEW Publication No. PHS 80-1666*. Washington DC: GPO.
- Schaeffer, D. R., & Dillman, D. A. (1998). Development of standard e-mail methodology: Results of an experiment. *Public Opinion Quarterly*, 62, 378-397.
- Schafer, J. L. (1999). Multiple imputations: A primer. *Statistic Methods in Medical Research*, 8(1), 3-15.
- Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, 7(2), 147-177.
- Schaubroeck, J., Ganster, D. C., & Fox, M. L. (1992). Dispositional affect and work-related stress. *Journal of Applied Psychology*, 77(3), 322-335.
- Schaubroeck, J., Jones, J. R., & Xie, J. L. (2001). Individual differences in utilizing control to cope with job demands: Effects on susceptibility to infectious disease. *Journal of Applied Psychology*, 86(2), 265-278.
- Schaubroeck, J., & Merritt, D. E. (1997). Divergent effects of job control on coping with work stressors: The key role of self-efficacy. *The Academy of Management Journal*, 40(3), 738-754.
- Schellenberg, R., Olson, K., & Fuller, D. (1985). *Burnout and stress in farmers*. Paper presented at the 1985 Summer Conference on the National Association for Rural Mental Health.
- Schwab, D. P. (1980). Construct validity in organizational behaviour. *Research in Organizational Behaviour*, 2, 3-43.
- Schwarzer, R., & Schulz, U. (2003). Stressful life events. In I. B. Weiner, A. M. Nezu, C. M. Nezu, & Geller, P. A. (Eds.), *Handbook of psychology: Health psychology* (pp. 688). Qld: John Wiley & Sons Australia, Ltd.
- Searle, B.J., Bright, J.E.H., & Bochner, S. (2001). Helping people to sort it out: The role of social support in the job strain model, *Work & Stress*, 15, 328-346.
- Sechrest, L., & Sidani, S. (1995). Quantitative and qualitative methods Is there an alternative? *Evaluation and program planning*, 18(1), 77-87.
- Sekaran, U. (2003). *Research Methods for Business: A Skill Building Approach* (4th ed.). New York: Wiley.
- Selye, H. (1982). History and present status of the stress concept. In L. Goldberger, & S. Breznitz (Eds.). *Handbook of stress* (pp. 7-17). New York: Free Press.
- Selye, H. (1976). *Stress in health and disease*. Boston, MA: The Butterworth Group.
- Semmer, N., Zapf, D., & Greif, S. (1996). 'Shared job strain': A new approach for assessing the validity of job stress measurements. *Journal of Occupational and Organizational Psychology*, 69(3), 293-310.
- Shadbolt, N., & Martin, S. (2005). *Farm management in New Zealand*. Melbourne: Oxford University Press.
- Sikora, P. B., Beaty, E. D., & Forward, J. (2004). Updating theory on organizational stress: The asynchronous multiple overlapping change (AMOC) model of workplace stress. *Human Resource Development Review*, 3(1), 3-35.
- Simkin, S., Hawton, K., Fagg, J., & Malmberg, A. (1998). Stress in farmers: A survey of farmers in England and Wales. *Occupational and Environmental Medicine*, 55(11), 729-734.

- Simmons, B. L., Gooty, J., Nelson, D. L., & Little, L. M. (2009). Secure attachment: Implications for hope, trust, burnout, and performance. *Journal of Organizational Behavior, 30*(2), 233-247-.
- Simmons, B. L., & Nelson, D. L. (2007). Eustress at work: Extending the holistic stress model. In D. L. Nelson, & C. L. Cooper (Eds.), *Positive organizational behavior*. Thousand Oaks, CA: Sage Publishing.
- Skellern, G. (2006, 22 March 2006). Job crises hit Bay Kiwifruit Industry. *Bay of Plenty Times*. Retrieved 19 May 2009, from <http://www.bayofplentytimes.co.nz>.
- Smith, C. A., Organ, D. W., & Near, J. P. (1983). Organizational citizenship behavior: Its nature and antecedents. *Journal of Applied Psychology, 68*(4), 653-663.
- Smith, D., & Tziner, A. (1998). Moderating effects of affective disposition and social support on the relationship between person-environment fit and strain. *Psychological Reports, 82* (3, pt 1), 963-983.
- Smith, W., & Saunders, L. (1995). Agricultural policy reforms and sustainable land management: A New Zealand case study. *Australian Geographer, 26*(2), 112-118.
- Sparks, K., Cooper, C., Fried, Y., & Shirom, A. (1997). The effects of work hours on health: A meta analytic review. *Journal of Occupational and Organizational Psychology, 70*, 391-408.
- Spector, P. E. (1982). Behavior in organizations as a function of employee's locus of control. *Psychological Bulletin, 91*(3), 482-497.
- Spector, P. E. (1987). Method variance as an artifact in self-report affect and perceptions at work: Myth or significant problem? *Journal of Applied Psychology, 72*(3), 438-443.
- Spector, P. E. (1998). A control theory of the job stress process In C. Cooper (Ed.), *Theories of organizational stress* (pp. 153-169). New York: Oxford University Press.
- Spector, P. E. (2006). Method variance in organizational research. *Organizational Research Methods, 9*(2), 221-232.
- Spector, P. E., & Brannick, M. T. (1995). The nature and effects of method variance in organizational research. In C. L. Cooper, & I. T. Robertson (Eds.), *International review of industrial and organizational psychology* (Vol. 10, pp. 249-274). Chichester: Wiley.
- Spector, P. E., Dwyer, D. J., & Jex, S. M. (1988). Relation of job stressors to affective, health, and performance outcomes: a comparison of multiple data sources. *Journal of Applied Psychology, 73*(1), 11-19.
- Spector, P. E., & Jex, S. M. (1998). Development of four self-report measures of job stressors and strain: Interpersonal conflict at work scale, organizational constraints scale, quantitative workload inventory, and physical symptoms inventory. *Journal of Occupational Health Psychology, 3*(4), 356-367.
- Spector, P. E., & O'Connell, B. J. (1994). The contribution of personality traits, negative affectivity, locus of control and Type A to subsequent reports of job stressors and job strains *Journal of Occupational and Organizational Psychology, 67*(1), 1-12.
- Spector, P. E., Zapf, D., Chen, P. Y., & Frese, M. (2000). Why negative affectivity should not be controlled in job stress research: Don't throw out the baby with the bath water. *Journal of Organizational Behavior, 21*(1), 79-95.
- Spillane, J. P., Reiser, B. J., & Reimer, T. (2002). Policy implementation and cognition: Reframing and refocusing implementation research. *American Educational Research Association, 72*(3), 387-431.

- Stamper, C. L., & Johlke, M. C. (2003). The impact of perceived organizational support on the relationship between boundary spanner role stress and work outcomes. *Journal of Management*, 29(4), 569-588.
- Staw, B. M., Bell, N. E., & Clausen, J. A. (1986). The dispositional approach to job attitudes: A lifetime longitudinal test. *Administrative Science Quarterly*, 31(1), 56-77.
- Steven, J. (1996). *Applied multivariate statistics for the social sciences*. Mahwah, New Jersey: Lawrence Erlbaum.
- Stroombergen, J. (2007). *Labour market trends and outlook*. Paper presented at the Labour employment and work in New Zealand 2006: Proceedings of the twelfth conference
- Stumpp, T., Hulsheger, U. R., Muck, P. M., & Maier, G. W. (2009). Expanding the link between core self-evaluations and affective job attitudes. *European Journal of Work and Organizational Psychology*, 18(2), 148-166.
- Sudman, S. (1976). *Applied sampling*. New York: Academic.
- Sulksy, L., & Smith, C. (2005). *Work Stress*. CA: Belmont: Thomson Wadsworth.
- Sutherland, D. J., & Cooper, C. L. (1990). *Understanding stress: A psychological perspective for health professionals*. London: Chapman Hall.
- Swisher, R., Elder, G., Lorenz, F., & Conger, R. (1998). The long arm of the farm: How an occupation structures exposure and vulnerability to stressors across role domains. *Journal of Health and Social Behavior*, 39(1), 72-89.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics*. Boston: Allyn & Bacon.
- Tait, M., Padgett, M. Y., & Baldwin, T. T. (1989). Job and life satisfaction: A re-examination of the strength of the relationship and gender effects as a function of the date of the study. *Journal of Applied Psychology*, 74(3), 502-507.
- Tait, R. J., French, D. J., & Hulse, G. K. (2003). Validity and psychometric properties of the General Health Questionnaire-12 in young Australian adolescents. *Australian & New Zealand Journal of Psychiatry*, 37(3), 374-381.
- Taylor, S. E., Klein, L. C., Lewis, B. P., Gruenewald, T. L., Gurung, R. A. R., & Updegraff, J. A. (2000). Biobehavioral responses to stress in females: tend-and-befriend, not fight-or-flight. *Psychological Review*, 107(3), 411-429.
- Ten Berge, J. M. F., & Knol, D. L. (1985). Scale construction on the basis of components analysis: A comparison of three strategies. *Multivariate Behavioral Research*, 20(1), 45-55.
- Tetrick, L. E., & LaRocco, J. M. (1987). Understanding prediction, and control as moderators of the relationships between stress, satisfaction, and psychological well-being. *Journal of Applied Psychology*, 72(4), 538-543.
- Tharenou, P. (1979). Employee self-esteem: a review of the literature. *Journal of Vocational Behavior*, 15(3), 316-346.
- Theorell, T. (2003). Flexibility at work in relation to employee health. In M. J. Schabracq, J. Winnubst, & C. L. Cooper (Eds.), *The handbook of work and health psychology* (2nd ed., pp. 159-170). West Sussex: Wiley & Sons.
- Theorell, T., & Karasek, R. A. (1996). Current issues relating to psychosocial job strain and cardiovascular disease research. *Journal of Occupational Health Psychology*, 1(1), 9-26.
- Thomas, S. P., & Pollio, H. R. (2002). *Listening to patients: A phenomenological approach to nursing research and practice*. New York: Springer.

- Thompson, B. (1994). The pivotal role of replication in psychological research: Empirically evaluating the replicability of sample results. *Journal of Personality*, 62(2), 157-176.
- Thorn, A. (2010). Horticulture New Zealand Homepage: *Product groups*. Retrieved April 3, 2010, from <http://www.hortnz.co.nz/Overview/Product-groups/Introduction.htm>
- Tipples, R. (2001). Getting and holding seasonal staff. *Winepress*, 102, 18-24.
- Tipples, R. (2005). Self-management and managing employee. In N. Shadbolt, & S. Martin (Eds.), *Farm management in New Zealand* (pp. 182-200). Melbourne: Oxford University Press.
- Tipples, R. S., & Martin, S. M. (2006) Getting Produce from the New Zealand paddock to the European Plate – reducing supply chain vulnerability through the management of employment relations critical control points, *New Zealand Journal of Employment Relations*, 31(1), 60-75.
- Tokar, D. M., & Subich, L. M. (1997). Relative contributions of congruence and personality dimensions to job satisfaction. *Journal of Vocational Behavior*, 50(3), 482-491.
- Tomarken, A. J., Davison, R. J., Wheeler, R. E., & Doss, R. C. (1992). Individual differences in anterior brain asymmetry and fundamental dimensions of emotion. *Journal of Personality and Social Psychology*, 62(4), 676-687.
- Trenberth, L., & Dewe, P. (2006). Understanding the experience of stressors: The use of sequential analysis for exploring the patterns between various work stressors and strain. *Work & Stress*, 20(3), 191-209.
- Truell, A. D., Bartlett, J. E., & Alexander, M. W. (2002). Response rate, speed, and completeness: A comparison of Internet-based and mail survey. *Behavior research methods, Instruments and Computers*, 34(1), 46-49.
- Trzesniewski, K. H., Donnellan, M. B., & Robins, R. W. (2003). Stability of self-esteem across the life span. *Journal of Personality and Social Psychology*, 84, 205-220.
- Tugade, M. M., & Fredrickson, B. L. (2004). Resilient individuals use positive emotions to bounce back from negative emotional experiences. *Journal of Personality and Social Psychology*, 86(2), 320-333.
- Tukey, J. W. (1977). *Exploratory data analysis*. Reading, MA: Addison-Wesley.
- Tziner, A., & Dawis, R. V. (1988). Occupational stress: a theoretical look from the perspective of work adjustment theory. *International Journal of Management*, 5, 423-430.
- Van Der Doef, M., & Maes, S. (1999). The job demand-control (-support) model and psychological well-being: a review of 20 years of empirical research. *Work & Stress*, 13(2), 87-114.
- Velicer, W. F., & Jackson, D. N. (1990). Component analysis versus common factor analysis: Some issues in selecting an appropriate procedure. *Multivariate Behavioral Research*, 25, 1-28.
- Vila, J. (2001). Stress and cardiac response. In N. J. Smelser, & P. B. Baltes (Eds.) *The international encyclopaedia of the social and behavioural sciences* (Vol. 20, pp. 15160-15163). Oxford: Elsevier.
- Wackwitz, J. H., & Horn, J. L. (1971). On obtaining the best estimates of factor scores within an ideal simple structure. *Multivariate Behavioral Research*, 6(4), 389-408.
- Wainer, H. (1976). Robust statistics: A survey and some prescriptions. *Journal of Educational Statistics*, 1(4), 285-312.

- Walker, J., L., & Walker, L. J. S. (1987). *Individual differences in occupational stress and stress symptoms among farmers*. Paper presented at the Applications of individual differences in stress and health psychology, Winnipeg, Manitoba.
- Walker, J., L., & Walker, L. J. S. (1987b). Stressors and symptoms predictive of distress in farmers. *Family Relations*, 36(4), 374-378.
- Walker, J., L., & Walker, L. J. S. (1988). Self-reported stress symptoms in farmers. *Journal of Clinical Psychology*, 44, 10-16.
- Walker, J. L., Walker, L. J. S., & MacLennan, P. M. (1986). An informal look at farm stress. *Psychological Rep.*, 59(2), 427-430.
- Wallenstein, S., Zucker, C. L., & Fleiss, J. L. (1980). Some statistical methods useful in circulation research. *Journal of the American Heart Association*, 47(1), 1-9.
- Wallis, A., Dollard, M., & Ranzijn, R. (2003). *Work stress and well-being of dairy farmers*. Adelaide: University of South Australia.
- Watson, D. (2000). *Book and temperament*. New York: Guilford Press.
- Watson, D., & Clark, L. A. (1984). Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin*, 96(3), 465-490.
- Watson, D., Pennebaker, J. W., & Folger, R. (1987). Beyond negative affectivity: Measuring stress and satisfaction in the workplace. In J. M. Ivancevich, & D. C. Ganster (Eds.), *Job stress: From theory to suggestion* (pp. 141-157). New York: Haworth Press.
- Weber, R. (2004). The rhetoric of positivism versus interpretivism: A personal view. *Management Information System Quarterly*, 28(1), iii-xii.
- Weible, R., & Wallace, J. (1998). The impact of the internet on data collection. *Marketing Research*, 10(3), 19-23.
- Weick, K. E., (2001). *Making sense of the organization*. Oxford: Blackwell publishers Ltd.
- Weiss, H. M., & Ilgen, D. R. (2002). The Ubiquity of Evaluations: A Hulinesque Essay. In J. M. Brett, & F. Drasgow (Eds.), *The Psychology of Work: Theoretically Based Empirical Research* (pp. 79-100). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Werneke, U., Goldberg, D. P., Yalcin, I., & Ustun, B. T. (2000). The stability of the factor structure of the General Health Questionnaire. *Psychological Medicine*, 30(4), 823-829.
- Werner, E. E. (1993). Risk, resilience and recovery: perspectives from the Kauai longitudinal study. *Development and psychopathology*, 5, 503-515.
- Werner, E. E., & Smith, R. S. (2001). *Journeys from childhood to midlife: Risk, resilience and recovery*. New York: Cornell University Press.
- Westerman, M. A. (2006). What counts a "good" quantitative research and what can we say about when to use quantitative and/or qualitative methods. *New ideas in psychology*, 24(3), 263-274.
- Westman, M. (1992). Moderating effect of decision latitude on stress-strain relationships: Does organizational level matter? *Journal of Organizational Behavior*, 13(7), 713-722.
- Wheaton, B. (1987). Assessment of fit in overidentified models with latent variables. *Sociological Methods & Research*, 16 (1), 118-154.
- Wilensky, H. L. (1960). Work, careers and social integration. *International Social Science Journal*, 12(4), 543-560.
- Wilson, O. J. (1995). Rural restructuring and agriculture-rural economy linkages: A New Zealand study. *Journal of Rural Studies*, 11(4), 417-431.

- Winefield, H. R., Goldney, R. D., Winefield, A. H., & Tiggermann, M. (1989). The General Health Questionnaire: Reliability and validity for Australian youth. *Australian and New Zealand Journal of Psychiatry*, *23*(1), 53-58.
- World Development Indicators (2010). Employment in agriculture (% of total employment). Retrieved May 14, 2010 from, <http://data.worldbank.org.ezproxy.auckland.ac.nz/topic/labor-and-social-protection>
- Wright, C. R., & Hyman, H. H. (1958). Voluntary association memberships of American adults: Evidence from national sample surveys. *American Sociological Review*, *23*(3), 284-294.
- Xie, J. L., Schaubroeck, J., & Lam, S. K. (2008). Theories of job stress and the role of traditional values: A longitudinal study in China. *Journal of Applied Psychology*, *94*(4), 831-848.
- Yagil, D., Luria, G., & Gal, I. (2008). Stressors and resources in customer service roles. *International Journal of Service Industry Management*, *19*(5), 575-595.
- Yun, G. W., & Trumbo, C. W. (2000). Comparative response to a survey executed by post, e-mail & web form. *Journal of Computer Mediated Communication*, *6*(1), 1-19.
- Zapf, D., Dormann, C., & Frese, M. (1996). Longitudinal studies in organizational stress research: Review of the literature with reference to methodological issues. *Journal of Occupational Health Psychology*, *1*(2), 145-169.
- Zimmerman, D. W. (1995). Increasing the power of nonparametric tests by detecting and downweighting outliers. *Journal of Experimental Education*, *64*(1), 71-78.

APPENDIX I

Participants Information Sheet

DEPARTMENT OF MANAGEMENT AND
EMPLOYMENT RELATIONS



THE UNIVERSITY OF AUCKLAND
BUSINESS SCHOOL

Commerce C Building
18, Symonds Street
Auckland, New Zealand
Telephone 64 9 373 7599 ext. 85762
Facsimile 64 9 3737 7477

The University of Auckland
Private Bag 92019
Auckland, New Zealand

RESEARCH ASSIGNMENT:

Core self-evaluations as a moderator of the stressor-strain-satisfaction relationships among farm managers in New Zealand

I am currently investigating the job and life factors in farm work, with support from Federated Farmers of New Zealand and Horticulture New Zealand.

This project will help all of us to better understand the working and living conditions on the farm. A summary of the findings will be sent to Federated Farmers of New Zealand who will place it in the members section of their website. I am a PhD student studying at the University of Auckland Business School. This research is being funded by the University of Auckland Postgraduate Research Fund.

If you consent to take part in the study, please complete the questionnaire which takes approximately 15 minutes. Your profile on each of these questionnaires will remain confidential and there is no identifying of individual information.

Thank you very much for your time and help in taking part in this study. If you have any queries or wish to know more, please telephone me on the number or email provided below.

Please complete and return the questionnaire in the post paid envelope provided by 30th June 2007 **to go into a draw and possibly win a prize.**

Andy Ang
PhD Candidate
Department of Management & Employment Relations
The University of Auckland Business School.
Tel: 09-373-7599 ext: 89855, 021-1725959
Email: h.ang@auckland.ac.nz

Ethics approved reference no: **2007/001** on 14 March 2007 for a period of three years.

II: Survey instruments

APPENDIX II

Survey Instruments

SECTION 1: JOB AND LIFE ATTITUDES QUESTIONNAIRE

INSTRUCTIONS: Using the response scale provide, please indicate the response that best describes how you feel about each item by circling on the appropriate number. All of your responses will be completely confidential.									
	STRONGLY AGREE								
	AGREE								
	SLIGHTLY AGREE								
	NEITHER AGREE NOR DISAGREE								
	SLIGHTLY DISAGREE								
	DISAGREE								
STRONGLY DISAGREE									
(1) I feel fairly satisfied with my present job.	1	2	3	4	5	6	7		
(2) I complete tasks successfully.	1	2	3	4	5	6	7		
(3) The conditions of my life are excellent.	1	2	3	4	5	6	7		
(4) Sometimes I feel depressed.	1	2	3	4	5	6	7		
(5) I consider my job to be rather unpleasant.	1	2	3	4	5	6	7		
(6) Overall, I am satisfied with myself.	1	2	3	4	5	6	7		
(7) Each day at work seems like it will never end.	1	2	3	4	5	6	7		
(8) I am capable of coping with most of my problems.	1	2	3	4	5	6	7		
(9) So far I have got the important things I want in life.	1	2	3	4	5	6	7		
(10) I determine what will happen in my life.	1	2	3	4	5	6	7		
(11) I am confident I get the success I deserve in life.	1	2	3	4	5	6	7		
(12) I find real enjoyment in my work.	1	2	3	4	5	6	7		
(13) When I try, I generally succeed.	1	2	3	4	5	6	7		
(14) Sometimes when I fail I feel worthless.	1	2	3	4	5	6	7		
(15) Most days I am enthusiastic about my work.	1	2	3	4	5	6	7		
(16) Sometimes I do not feel in control of my work.	1	2	3	4	5	6	7		
(17) In most ways my life is close to my ideal.	1	2	3	4	5	6	7		
(18) I am filled with doubts about my competence.	1	2	3	4	5	6	7		
(19) If I could live my life over, I would change almost nothing.	1	2	3	4	5	6	7		
(20) I do not feel in control of my success in my career.	1	2	3	4	5	6	7		
(21) I am satisfied with my life.	1	2	3	4	5	6	7		
(22) There are times when things look pretty bleak and hopeless to me.	1	2	3	4	5	6	7		

[Survey instruments continue on next page]

Continue Section 1: Survey instruments

INSTRUCTIONS: Using the response scale provide, please indicate the response that best describes how you feel about each item by circling on the appropriate number. All of your responses will be completely confidential.												
In the last three months, have you...	ALL THE TIME											
	VERY OFTEN											
	OFTEN											
	SOMETIMES											
	VERY OCCASIONALLY											
	NEVER											
(1) been able to concentrate on what you are doing?	1	2	3	4	5	6						
(2) lost much sleep over worry?	1	2	3	4	5	6						
(3) felt you are playing a useful part in things?	1	2	3	4	5	6						
(4) felt capable of making decisions about things?	1	2	3	4	5	6						
(5) felt constantly under strain?	1	2	3	4	5	6						
(6) felt you couldn't overcome your difficulties?	1	2	3	4	5	6						
(7) been able to enjoy your normal day-to-day activities?	1	2	3	4	5	6						
(8) been able to face up to your problems?	1	2	3	4	5	6						
(9) been feeling unhappy or depressed?	1	2	3	4	5	6						
(10) been losing confidence in yourself?	1	2	3	4	5	6						
(11) been thinking of yourself as a worthless person?	1	2	3	4	5	6						
(12) been feeling reasonably happy, all things considered?	1	2	3	4	5	6						

[Survey instruments continue on next page]

SECTION 2: Below are events and situations that represent potential sources of farming related stress. Rate the stress you feel for each item (**severity of stress**) and how often each event occurs (**frequency of stress**).

FREQUENCY OF STRESS	ALL THE TIME											
	FREQUENTLY											
	SOMETIMES											
	RARELY											
	NEVER											
SEVERITY OF STRESS	EXTREMELY STRESSFUL											
	VERY STRESSFUL											
	QUITE STRESSFUL											
	SLIGHTLY STRESSFUL											
	NOT STRESSFUL											
(1) Debt Load	1	2	3	4	5	1	2	3	4	5		
(2) Significant production loss due to disease/pest/weeds	1	2	3	4	5	1	2	3	4	5		
(3) Not enough ready cash	1	2	3	4	5	1	2	3	4	5		
(4) Making major purchases for the farm	1	2	3	4	5	1	2	3	4	5		
(5) Bad weather	1	2	3	4	5	1	2	3	4	5		
(6) Machinery breakdown at busy times	1	2	3	4	5	1	2	3	4	5		
(7) Personal illness during busy times	1	2	3	4	5	1	2	3	4	5		
(8) Decision when to sell produce	1	2	3	4	5	1	2	3	4	5		
(9) Concerns about the continuing viability of the farm	1	2	3	4	5	1	2	3	4	5		
(10) Farming related accidents	1	2	3	4	5	1	2	3	4	5		
(11) No farm help or loss of help when needed	1	2	3	4	5	1	2	3	4	5		
(12) Adjusting to new government regulations and policies	1	2	3	4	5	1	2	3	4	5		
(13) Increased work load at peak times	1	2	3	4	5	1	2	3	4	5		
(14) Unplanned interruptions	1	2	3	4	5	1	2	3	4	5		
(15) Hazardous materials on the farm (dust/chemicals/powders)	1	2	3	4	5	1	2	3	4	5		
(16) Long hours of work	1	2	3	4	5	1	2	3	4	5		
(17) Few holidays away from the farm	1	2	3	4	5	1	2	3	4	5		
(18) Unpredictability of the weather	1	2	3	4	5	1	2	3	4	5		
(19) Feeling isolated on the farm	1	2	3	4	5	1	2	3	4	5		
(20) Having to travel long distances for services, shopping and healthcare	1	2	3	4	5	1	2	3	4	5		
(21) Too much to do and too little time to do it	1	2	3	4	5	1	2	3	4	5		
(22) Keeping up with new technology and procedures	1	2	3	4	5	1	2	3	4	5		
(23) Worrying about market conditions	1	2	3	4	5	1	2	3	4	5		
(24) Having to make decisions without the necessary information	1	2	3	4	5	1	2	3	4	5		
(25) Worrying about owing money	1	2	3	4	5	1	2	3	4	5		
(26) Worrying about keeping the farm in the family	1	2	3	4	5	1	2	3	4	5		
(27) Not seeing enough people	1	2	3	4	5	1	2	3	4	5		
(28) Problems of balancing work and family duties	1	2	3	4	5	1	2	3	4	5		
(29) Financing my retirement	1	2	3	4	5	1	2	3	4	5		
(30) Lack of close neighbours	1	2	3	4	5	1	2	3	4	5		
(31) Not being free to make my own decisions	1	2	3	4	5	1	2	3	4	5		
(32) Risk of injury on the farm	1	2	3	4	5	1	2	3	4	5		
(33) Filling in Government forms	1	2	3	4	5	1	2	3	4	5		
(34) Complying with environmental regulations	1	2	3	4	5	1	2	3	4	5		

Continue Section 3: Survey instruments

SECTION 3:

Please answer the following questions about yourself and your work experience by checking the appropriate box or completing the space provided.

1. Your job title
 Farm Owner Farm Manager Sharemilker
 others (please specify) _____
2. You have worked at your present farm _____ years and _____ months
3. Your farm size is _____ hectares and number of cows (if applicable) _____
4. How many employees work at your farm during the peak season? _____
5. On average, how many hours do you work per week? _____ hours
6. On average, how many days are you sick/year? _____ days
7. Your age: _____ years old
8. Your sex: Male Female
9. Your industry
 Dairy Horticulture others (please specify) _____
10. If horticulture industry, please describe your business _____
11. Region of Residence
 - i. North Island
 Northland Auckland Waikato Hauraki/Coromandel
 Gisborne Hawkes Bay Bay of Plenty Central North
 Taranaki Manawatu/Wanganui Wairarapa others (please specify): _____
 - ii. South Island
 Nelson Marlborough West Coast Canterbury
 Otago Southland others (please specify): _____
12. Your ethnicity NZ Maori NZ Pakeha/European Pacific Islander
 Asian African others (please specify): _____
13. Your marital status Single/Never Married Married Civil Union
 Separated Divorced Widowed

Please check to make sure you have answered all of the questions.

**HELP ME TO HELP YOU
THANK YOU FOR YOUR COOPERATION**

APPENDIX III

Email Reminder

From: [Federated Farmers of NZ \(Inc\)](#)
Sent: Thursday, June 28, 2007 1:02 PM
Subject: Federated Farmers of NZ Inc - Supporting University Research

Dear Members,

Many thanks to those of you who have taken part in the recent "survey on the job and life factors in farm work". We recognise that the topic is important and are hoping to provide practical recommendations based on this study. For those of you who may not yet have completed the survey we would be most grateful if you could complete the survey to go into a draw and possibly win a prize by clicking the link below:

<http://www.business.auckland.ac.nz/surveyengine/survey/93871639/default.cfm>

The closing date of the draw has been extended.

Kind regards,

Andy Ang
(PhD Candidate)
Department of Management & Employment Relations
The University of Auckland Business School.
Tel: 09-373-7599 ext: 89855, 021-1725959
Email: h.ang@auckland.ac.nz

This email communication is confidential between the sender and the recipient. The intended recipient may not distribute it without the permission of the sender. If this email is received in error, it remains confidential and you may not copy, retain or distribute it in any manner. Please notify the sender immediately and erase all copies of the message and all attachments. Thank you.

APPENDIX IV

Email Final Reminder

From: [Federated Farmers of NZ \(Inc\)](#)
To: [undisclosed-recipients:](#)
Sent: Friday, July 06, 2007 10:10 AM
Subject: Final Reminder: Federated Farmers of NZ Inc Supports University Research

Dear Members,

Many thanks to those of you who have taken part in the recent "survey on the job and life factors in farm work". We recognise that the topic is important and are hoping to provide practical recommendations based on this study. For those of you who may not yet have completed the survey we would be most grateful if you could complete the survey to go into a draw and possibly win a prize by clicking the link below:

<http://www.business.auckland.ac.nz/surveyengine/survey/93871639/default.cfm>

The closing date of the draw has been extended.

Kind regards,

Andy Ang
(PhD Candidate)
Department of Management & Employment Relations
The University of Auckland Business School.
Tel: 09-373-7599 ext: 89855, 021-1725959
Email: h.ang@auckland.ac.nz

This email communication is confidential between the sender and the recipient. The intended recipient may not distribute it without permission of the sender. If this email is received in error, it remains confidential and you may not copy, retain or distribute it in any manner. Please notify the sender immediately and erase all copies of the message and all attachments. Thank you.

APPENDIX V

Descriptive analysis of variables

No	Valid	Missing	Percent	Mean	Min	Max
JS 1	1024	2	0.2	6.03	1	7
JS 2	1017	9	0.9	5.81	1	7
JS 3	1021	5	0.5	5.79	1	7
JS 4	1025	1	0.1	5.94	1	7
JS 5	1014	12	1.2	6.01	1	7
LS 1	1016	10	1.0	5.26	1	7
LS 2	1013	13	1.3	5.58	1	7
LS 3	1021	5	0.5	5.79	1	7
LS 4	1020	6	0.6	5.67	1	7
LS 5	1015	11	1.1	4.58	1	7
GHQ 1	1025	1	0.1	1.00	1	7
GHQ 2	1021	5	0.5	1.48	1	7
GHQ 3	1022	4	0.4	1.19	1	7
GHQ 4	1023	3	0.3	.85	1	7
GHQ 5	1022	4	0.4	1.78	1	7
GHQ 6	1016	10	1.0	0.89	1	7
GHQ 7	1025	1	0.1	1.29	1	7
GHQ 8	1023	3	0.3	.95	1	7
GHQ 9	1015	11	1.1	1.05	1	7
GHQ 10	1018	8	0.8	.69	1	7
GHQ 11	1022	4	0.4	.69	1	7
GHQ 12	1023	3	0.3	1.07	1	7
CSE 1	1023	3	0.3	5.43	1	7
CSE 2	1000	26	2.5	4.35	1	7
CSE 3	1013	13	1.3	6.03	1	7
CSE 4	1024	2	0.2	4.97	1	7
CSE 5	1023	3	0.3	6.03	1	7
CSE 6	1020	6	0.6	4.32	1	7
CSE 7	1009	17	1.7	5.85	1	7
CSE 8	1016	10	1.0	5.69	1	7
CSE 9	1021	5	0.5	5.60	1	7
CSE 10	1024	2	0.2	5.42	1	7
CSE 11	1021	5	0.5	6.04	1	7
CSE 12	1021	5	0.5	5.20	1	7
S 1	1014	12	1.2	2.24	1	5

No	Valid	Missing	Percent	Mean	Min	Max
S 2	1006	20	1.9	2.15	1	5
S 3	999	27	2.6	2.34	1	5
S 4	1000	26	2.5	2.14	1	5
S 5	1009	17	1.7	2.63	1	5
S 6	1005	21	2.0	2.59	1	5
S 7	1008	18	1.8	2.52	1	5
S 8	997	29	2.8	1.17	1	5
S 9	1005	21	2.0	2.16	1	5
S 10	1000	26	2.5	2.16	1	5
S 11	1004	22	2.1	2.48	1	5
S 12	1010	16	1.6	2.91	1	5
S 13	1012	14	1.4	2.61	1	5
S 14	1010	16	1,6	2.34	1	5
S 15	1006	20	1.9	1.60	1	5
S 16	1004	22	2.1	2.05	1	5
S 17	998	28	2.7	2.08	1	5
S 18	1004	22	2.1	2.35	1	5
S 19	1011	15	1.5	1.46	1	5
S 20	1005	21	2.0	1.46	1	5
S 21	1010	16	1.6	2.36	1	5
S 22	1003	23	2.2	1.90	1	5
S 23	1002	24	2.3	2.22	1	5
S 24	1004	22	2.1	2.26	1	5
S 25	1006	20	1.9	2.26	1	5
S 26	1001	25	2.4	1.74	1	5
S 27	1005	21	2.0	1.51	1	5
S 28	1006	20	1.9	2.18	1	5
S 29	1010	16	1.6	1.82	1	5
S 30	1005	21	2.0	1.19	1	5
S 31	998	28	2.7	1.78	1	5
S 32	1008	18	1.8	1.88	1	5
S 33	1006	20	1.9	2.73	1	5
S 34	1006	20	1.9	2.75	1	5
F 1	996	30	2.9	2.62	1	5
F 2	999	27	2.6	2.25	1	5
F 3	993	33	3.2	2.66	1	5
F 4	984	42	4.1	2.36	1	5
F 5	989	37	3.6	2.78	1	5

No	Valid	Missing	Percent	Mean	Min	Max
F 6	993	33	3.2	2.47	1	5
F 7	997	29	2.8	2.11	1	5
F 8	984	42	4.1	1.96	1	5
F 9	1000	26	2.5	2.30	1	5
F 10	994	32	3.1	2.07	1	5
F 11	1000	26	2.5	2.38	1	5
F 12	999	27	2.6	2.96	1	5
F 13	993	33	3.2	2.77	1	5
F 14	995	31	3.0	2.54	1	5
F 15	995	31	3.0	1.93	1	5
F 16	995	31	3.0	2.57	1	5
F 17	987	39	3.8	2.47	1	5
F 18	989	37	3.6	2.73	1	5
F 19	994	32	3.1	1.65	1	5
F 20	991	35	3.4	1.74	1	5
F 21	999	27	2.6	2.80	1	5
F 22	992	34	3.3	2.41	1	5
F 23	994	32	3.1	2.56	1	5
F 24	996	30	2.9	2.32	1	5
F 25	990	36	3.5	2.53	1	5
F 26	979	47	4.6	1.94	1	5
F 27	989	37	3.6	1.77	1	5
F 28	990	36	3.5	2.57	1	5
F 29	991	35	3.4	2.09	1	5
F 30	981	45	4.4	1.41	1	5
F 31	990	36	3.5	1.91	1	5
F 32	992	34	3.3	2.16	1	5
F 33	998	28	2.7	2.87	1	5
F 34	999	27	2.6	2.97	1	5