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**THE SOCIAL AND PSYCHOLOGICAL
EFFECTS OF THE RUAPEHU
ERUPTIONS WITHIN THE OHAKUNE
COMMUNITY.**

**A thesis presented in partial fulfilment of the
requirements for the degree of Masters of Arts in
Psychology at Massey University.**

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“The earthquake was over, but disaster had just begun.”

- Dudasik, 1980.

ABSTRACT

It is commonly accepted that exposure to disaster will cause distress and anxiety within affected communities. This distress is due to both the occurrence of disaster and the secondary stressors that result from this event. Previous research has noted the beneficial effects of certain individual characteristics in the healthy recovery of community members following exposure to disaster. These characteristics are sense of community, self-efficacy, problem-focused coping, and access to adequate social support.

This study examined the importance of these characteristics within a rural New Zealand community exposed to a series of volcanic eruptions. A cross sectional survey collected data at two different periods; once in the post-disaster period, and again when the community had returned to levels of non-disaster functioning. The survey measured levels of the characteristics mentioned above and psychological symptomatology. Demographic information was also collected. A number of statistical procedures were run and the results found that age, coping style and self-efficacy were significant predictors of symptomatology during the post-disaster phase. These were mediated by the quality of social support available to the respondents. However, in the non-disaster period, none of the variables included in this study were accurate predictors of psychological outcome.

Future studies need to clarify these results within other rural New Zealand communities exposed to disaster. From this research, practical community response programmes can be installed within communities that will aid in their healthy and effective recovery following exposure to disaster.

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TABLE OF CONTENTS

Chapter	Page
Abstract.....	iii
Acknowledgments.....	iv
Table of Contents.....	v
List of Tables and Figures.....	viii
1. INTRODUCTION.....	1
1.1 Background.....	1
1.2 Physical Effects.....	1
1.3 Economic Effects.....	2
1.4 Disaster Research.....	6
1.4.1 Disaster Characteristics.....	10
1.4.2 Types of Disasters.....	11
1.5 Symptomatology.....	12
1.5.1 Intrusion.....	13
1.5.2 Denial.....	13
1.6 Secondary Stressors.....	14
1.6.1 The Therapeutic Community and Community Fragmentation.....	14
1.6.2 The Threat of Recurrence.....	15
1.7 Intervention.....	16
1.8 The Recovery Environment.....	18
1.8.1 Social Support.....	19
1.9 Individual Characteristics.....	21
1.9.1 Self-Efficacy.....	22
1.9.2 Sense of Community.....	23
1.9.3 Coping Style.....	24
1.10 Previous Research Findings.....	25
1.11 The Present Study.....	26

2. METHOD	30
2.1 Design	30
2.2 Sampling	30
2.3 Data Collection Points.....	31
2.4 Survey Administration	31
2.5 Measures	32
2.4.1 Demographic Measures	33
2.5.2 Psychological Distress	33
2.5.3 Self-Efficacy, Sense of Community and Coping Style...	34
2.5.4 Social Support.....	34
2.6 Sample Description.....	35
2.6.1 Demographic Description of the Sample.....	37
3. RESULTS.....	44
3.1 Variables.....	44
3.1.1 The Experimental Variables.....	44
3.1.2 The Demographic Variables.....	44
3.2 Statistical Procedures.....	44
3.3 Correlation.....	45
3.3.1 Correlation - July.....	45
3.3.2 Correlation - September.....	48
3.3.3 Comparisons - July and September Correlations.....	49
3.4 Principal Components Analysis (P.C.A).....	50
3.4.1 P.C.A - July.....	50
3.4.2 P.C.A - September.....	52
3.4.3 Comparisons - July and September P.C.A.....	54
3.5 Multiple Regression.....	54
3.5.1 Multiple Regression– July.....	55
3.5.2 Multiple Regression – September.....	62
3.5.3 Comparisons - July & September Multiple Regression.....	65
3.6 Analysis of Variance – ANOVA.....	65
3.6.1 ANOVA - July and September.....	66
3.6.2 Comparisons - July and September ANOVA.....	69

3.7 Matched Cases.....	70
3.8 Histograms.....	70
4. DISCUSSION	73
4.1 Hypothesis Testing.....	73
4.1.1 Hypothesis One.....	73
4.1.2 Hypothesis Two.....	74
4.1.3 Hypothesis Three.....	76
4.1.4 Hypotheses Four and Five.....	77
4.1.5 Hypothesis Six.....	79
4.1.6 Hypothesis Seven.....	81
4.2 Self-Efficacy.....	83
4.3 Sense of Community.....	83
4.4 Coping Style.....	84
4.5 Social Support.....	84
4.6 Symptomatology.....	85
4.7 Time Period of the Study.....	86
4.8 Limitations of the Present Study.....	87
4.8.1 Time Restraints.....	88
4.8.2 Sample.....	88
4.8.3 Assessment Instruments.....	88
4.8.4 Method.....	89
4.9 Future Research.....	89
4.10 Future Eruptions.....	90
4.11 Conclusion.....	91
5. REFERENCES	95
6. APPENDICES	104
A Survey	104
B Newspaper Article.....	111
C Information Sheet- July.....	112
D Consent Form.....	114

E Map of Ohakune; Residential and Business Areas.....	115
F Follow-up Letter- July.....	116
G Information Sheet- September.....	117
H Follow-up letter- September.....	119
I Histograms.....	120

LIST OF TABLES AND FIGURES

Table	Page
1 Distribution of age and gender - July and September.....	37
2 Distribution of education level and ethnicity - July and September.....	38
3 Financial dependency and age in July and September.....	40
4 Financial dependency and gender in July and September.....	40
5 Financial dependency and ethnicity in July and September.....	41
6 Financial dependency and education in July and September.....	42
7 Correlations from July (92 cases).....	46
8 Correlations from September (52 cases).....	48
9 Variable loadings on factor one - July.....	51
10 Variable loadings on factor one – September.....	53
11 Beta values and significance levels in the first regression model - July..	55
12 Results from the first regression - July.....	56
13 Beta values and significance levels from the second regression – July..	57
14 Results from the second regression model - July.....	57
15 Beta values and significance levels of the third regression model- July.....	58
16 Results from the third regression model - July.....	59
17 Beta values and significance levels of the fourth regression model - July.....	59
18 Results from the fourth regression model - July.....	60
19 Beta values and significance levels of the final regression model – July	61
20 Results from the final regression model - July.....	61
21 Beta values and significance levels of regression models one and two- September.....	62
22 Beta values and significance levels of the third regression model - September.....	63
23 Beta values and significance levels of the fourth regression model- September.....	63
24 Correlations including PC1 - September.....	64
25 Distribution of age - July & September.....	66

26	Distribution of education level - July and September.....	67
27	Results of ANOVA, age & gender - July ($p < 0.05$).....	67
28	Results of ANOVA, age & gender - September ($p < 0.05$).....	68
29	Significance levels of ANOVA - September ($p < 0.05$).....	69

Figure		Page
i	Factor Scree Plot of P.C.A – July.....	51
ii	Factor Scree Plot of P.C.A – September.....	53

CHAPTER ONE

INTRODUCTION

1.1 Background.

Mount Ruapehu is situated in the centre of the North Island, New Zealand, and is part of Tongariro National Park, which contains three volcanic mountains, Mt Ruapehu, Mt. Ngauruhoe, and Mt. Tongariro. These three mountains form the southern part of a chain of volcanoes that run through the North Island of New Zealand. Many of these volcanoes are active, and erupt frequently, such as White Island, in the Bay of Plenty, and Mt. Ngauruhoe. Others, like the volcanoes in Auckland City, are considered dormant, but may awaken at any time, such as Mt. Ruapehu did at the centre of the North Island in the spring of 1995.

1.2 Physical Effects

Eruptions began at Mt. Ruapehu on 18 September 1995 and continued that year until mid-November. In 1996, a further series of eruptions from Mt. Ruapehu also disrupted much of New Zealand throughout the months of June and July. A pillar of smoke and eruption debris rose 12 kilometres into the atmosphere, and large rocks were thrown up to 1.5 kilometres from the mountain. Lahars were created down three separate valleys around the mountain and ash was deposited up to 300 kilometres away from the volcano. These eruptions disrupted transportation, water supplies and electricity distribution, and caused severe economic loss for the local ski resorts and the communities dependent upon this industry.

The lahars produced by the volcano were the primary physical hazards during the eruptions, yet these did not head directly for any settlement at the base of the mountain. Fortunately, the physical damage caused by the eruptions was minimal. However, as a result of the ash clouds coming from the crater, air transportation was disrupted, and the air space around the mountain was greatly restricted. Road visibility in surrounding areas was also greatly reduced. Approximately 2,000 sheep were killed as a result of eating ash affected pastures. A number of wild deer also died, and minor fish kills were noted. In the horticultural sector, cauliflower growers 250 kilometres downwind suffered major losses to their crops. Alternatively, sheep, beef and dairy farmers who received ash fall did not need to fertilise their land with sulphur (Johnston, Ronan, & Houghton, 1995).

The prevailing wind over Tongariro National Park is a South-Westerly (Department of Conservation, 1998) and blows away from Ohakune, which is situated on the South-West side of the mountain. The eruptions of 1995 and 1996 created large ash clouds, which the prevailing winds carried away from the south, up to the northern and western settlements of the North Island. The communities on the southern and western sides of Ruapehu therefore received very little ash fall and several local communities were at very little risk from physical damage to their property, themselves or their family, even though they were living in the shadow of an exploding volcano. However, it was the development of a secondary stressor that was to create a major source of stress within these communities.

1.3 Economic Effects

The lack of physical effects of the eruptions was offset by the economic effects the volcano created. Although the eruptions did not cause physical life-threatening situations for those communities close to the mountain, they caused significant disruption to many people and businesses. The economic effect of these eruptions was estimated at \$50,000,000 at the end of 1996 (Houghton, Neall & Johnston, 1996). The main economic losses have resulted from the closure of national and international airports, and the consequent disruption of air transportation, and also the disruption of energy generation at Tongariro Hydroelectric Power Station due to the pollution of water supplies by ashfall. Also contributing to the economic impact of the eruptions was the loss of revenue generated within the local area from the disruption of two major ski fields throughout two consecutive years.

Events such as the Ruapehu eruptions often result in less tangible consequences, such as economic effects and the development of significant psychological and social effects that may persist long after the initial event or series of events has terminated. It is the events that result from the initial occurrence, or the secondary stressors, which may be more disruptive because of their perceived unimportance in light of the larger physical event. The secondary stressors involved in the Ruapehu eruptions were created by economic pressures within the local economy. This included the early termination of yearly revenue based on winter tourism and the loss of several hundred jobs in the ski industry. High levels of anxiety were present during the eruptions, yet these were commonly downplayed by the officials. The threat of future eruptions, leading to further economic loss, is another source of stress for local communities. Recovery from this loss may also produce stress within the local area (Johnston, Ronan, and Houghton, 1995). Many locals have found it difficult to meet financial obligations as a result of the economic effects of the eruptions, and due to this,

some community members have moved from the area, or suffered negative impacts in other aspects of their lives. Therefore, the economic impact has created more stress for the local community than did the eruptions that caused this loss of income.

The two local communities most affected by the economic impact of the erupting volcano are National Park and Ohakune. Both of these communities are dependent upon the revenue and income generated by the two ski-fields on Mt. Ruapehu, Whakapapa Ski Field, on the north-western side of the mountain, and Turoa Ski Resort, situated on the southern slopes. However, other towns around the mountain provide support for these settlements, and are also feeling the economic effects caused by the eruptions. These towns include Waiouru, Raetihi, Owango, Turangi and Tokaanu. The present research intends to examine the social and psychological effects of only one of these towns, Ohakune, and how they are responding to the impact the eruptions of 1995 and 1996 have had within their community.

Although the eruptions have, for the present, ceased, community members of local settlements are still feeling the effects. Research has noted that the threat of recurrence can become a major community stressor (Baum, O'Keeffe, & Davidson, 1990, and Bolin, 1988). This stressor may arise not just because of the physical implications a natural disaster has for the safety of the community, but also in terms of livelihood, subsistence and the continuation of the local community. Ohakune is one community that is largely dependent upon the ski industry to support the local economy. If the mountain had erupted seriously again during the 1997 ski season, the future of the town, in economic terms, would have been bleak. This disruption would likely have seriously affected the psychological well being of many of the community residents, and upset, if not destroyed, the local community and both the formal and informal social networks that have developed within it.

In response to the previous eruptions, the Government provided financial aid. Unfortunately, the town of Ohakune did not receive this aid, as it was given for use to clear away ash falls where they were perceived to be a problem. Although Ohakune was the closest community to the erupting mountain, it did not qualify for financial aid from the Government, as it did not suffer any noticeable or damaging physical effects. However, the town suffered badly as a consequence of the eruptions in a financial sense. The revenue for the last 2 months of the 1995 ski season, and almost all of the 1996 season was lost. This loss of income over a two-year period greatly affected both businesses and employees in the Ohakune area. At this time, the Government provided limited financial aid to the

community of Ohakune. However, it was this economic loss and the effects they created within Ohakune, rather than the physical effects of the erupting mountain close by, that caused psychological trauma and increased levels of symptomatology during the post-disaster phase.

To provide some idea of how much revenue was lost in Ohakune as a direct result of the eruptions, the 1997 ski season figures are presented. This was a successful season that ran from the beginning of July until mid-November. During this time, approximately 161,000 people visited Turoa Ski Resort, accessed from Ohakune. This resulted in a total of 157,496 skier days, with each person spending on average \$37.50. This produced an approximate income of over 6 million dollars for the ski resort (Stuart Robinson, 1998). For every dollar spent on the mountain, it is estimated that \$2.00 is spent in the Ohakune township (Bruce Rollinson, 1997), resulting in a turnover of \$18 million dollars in the local Ohakune community during the 1997 ski season.

It is important to examine the effects of any natural hazard, including the Ruapehu eruptions, from a multi-disciplinary perspective that will take into account the physical, economic, social and psychological effects, and the relationship these have with one another. The physical effects of any such event will present a threat to the safety of the exposed community. In addition to this, any economic effects that result directly or indirectly from the natural hazard will also create additional stress upon the local community. Both the physical and the economic impact will combine to produce a social and psychological response within exposed communities. It is therefore crucial to examine the effects of the eruptions from a longitudinal, multi-disciplinary perspective, considering all aspects in which the Ruapehu eruptions of 1995 and 1996 have impacted upon the victims within the local community of Ohakune.

The communities that have been physically affected by the eruptions lie within the drop of ashfall from the volcano and those that were disrupted by air transportation. Looked at from this perspective, all of New Zealand can be classified as affected by the volcanic eruptions, and also many overseas destinations, as flights leaving from Auckland International Airport were often postponed or cancelled due to volcanic activity (Johnston, Ronan & Houghton, 1995). Although the eruptions of Mt. Ruapehu have not created physical damage to the local community of Ohakune, the secondary stressor of lack of income *is* a continuing source of stress within this community. It is this economic impact, rather than the volcanic impact, which is creating problems and stress within Ohakune. Therefore, the eruptions

were not an acute event, but rather a series of chronic events that will have numerous effects that extend well into the future. These effects are likely to be ongoing, and last for a longer period of time in local communities than in those further away from the mountain.

Due to the causal effects of the volcanic eruptions of 1995 and 1996, the Waimarino district, where Ohakune is situated, has suffered major changes to retail businesses, employment and associated tourism activity in the region. The effect on the district is enormous and long lasting. This has cost the local economy an estimated \$10 million. This does not include losses that ski areas have suffered (Taumaranui Safer Community Council – Strategic Action Plan for Waimarino, 1996). Another source (Rollinson, cited in the Bay Of Plenty Times, 18 June 1996) puts this figure closer to \$15 million. The local community has been severely affected by the economic outcomes of the Ruapehu eruptions. This effect cannot be remedied by one single, good ski season. In all reality, the Ohakune community will require 7 to 10 ‘good’ years to recover its economic losses (Rollinson, 1997). Thus far, an estimated 5% of businesses have collapsed within Ohakune. It was predicted that if the 1997 season was not adequate, then 95% of the remaining businesses in Ohakune would have gone bankrupt (Rollinson, 1997).

Ohakune is situated at the base of Mt. Ruapehu on the south-west side of Mount Ruapehu. The permanent population of the town is approximately 1,430 (1996 Census Results). However, during the ski season, the population rises to approximately 3,500 (Ruapehu District Council, 1998). Many temporary, seasonal and transitional workers make their home in Ohakune during the winter months, and are dependent upon the income they receive from seasonal work provided by the ski industry. Ski-ing is Ohakune’s main industry and the local field is Turoa Ski Resort, situated 17 kilometres up the mountain from the township. Other industry in Ohakune includes market gardening, farming, and the Karioi Paper Mills, 20 kilometres out of town. Up until recently, Tangiwai Sawmill provided jobs for 70 local people, but was closed at the beginning of 1998.

This study will examine some of the long-term psychosocial effects the Ruapehu eruptions have had within the Ohakune community, and an attempt will be made to examine the recovery process of the community throughout the 1997 ski season. This study will also examine psychosocial resources that are currently available to local community members, and attempt to identify important resources that are missing. Implementation of these missing resources into the community is a long-term goal of this research. The four main variables which will be examined within this research are the prevailing sense of

community, the coping styles used by community members, levels of self-efficacy within the community (Bachrach & Zautra, 1985), and the quantity and quality of local support systems (Eustace, 1994).

1.4 Disaster Research.

Information on the effects of disasters has been collected periodically during the history of mankind. There are reports of ancient disasters, such as Mt. Vesuvius, which erupted on 24 August, 79 A. D., killing over 16,000 people (Milne & Milne, 1963), and the famous Krakatoa, in Eastern Indonesia, which erupted in 1883, causing tidal waves that claimed the lives of 36,000. In the 1815 eruption of Tambora, also in Indonesia, 47,000 were thought to have perished. These people were not directly killed by the explosions, but died as a result of secondary events, such as tidal waves, and the longer, more desperate onset of disease, famine and starvation (Milne & Milne, 1963).

In more recent times, 2,400 worldwide disasters have been recorded between 1900 and 1986, *excluding* the United States. These events resulted in 42 million deaths and disrupted the lives of 1.4 billion people (Green & Solomon, 1995). The devastating effects of natural disasters have long been known and recorded, however, most records concentrate upon the physical nature of the disaster. It is only during this century that the economic effects of natural disasters have been recognised in disaster research. Even less frequent is the mention of the community and individual effects and how a disaster event may impact upon the mental health of those exposed. However, it is now commonly believed that the disruptions caused by disaster events have physical, economic, social and psychological consequences. These consequences may be temporary and short-term, or may go on to interfere with normal, day to day functioning for the victims of disaster for some time beyond the period of impact.

Research into the social and psychological effects of exposure to disaster events and other traumatic stressors has only been included in the literature since the end of World War II, (Kardiner, 1941, Fritz & Marks, 1954, Lachman, 1960, Fritz, 1961, Caplan, 1964, Lazarus, 1966, Rotter, 1966, Holmes & Rahe, 1967, Lifton, 1967, and Barton, 1969), and more frequently since the 1970's (DHHS Publication # 83-675, 1979). This research, and the subsequent literature it has produced, has identified the importance of examining the total environment of a disaster-affected area. Not only will the physical environment and the local economy be affected by the event, but so will the communities involved, and the lives

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agencies is essential to ensure the provision of necessary and coordinated help to the victims of the disaster.

Because research into the social and psychological effects of a disaster event upon a community is a relatively new area, the terminology used by researchers has not yet become standardised. Disaster has, thus far, proved difficult and clumsy to create a consensus definition. No two definitions of a disaster are identical, and although the basic concept remains the same, a standardised definition of disaster is yet to be developed. The broad range of definitions and ideas is shown, in part, below, by the numerous definitions of disaster that researchers have come up with during twenty-five years of research in this area.

“An occurrence of such magnitude as to create a situation in which the normal patterns of life within a community are suddenly disrupted and people are plunged into helplessness and suffering, and, as a result, may urgently need food, shelter, clothing, medical attention, protection, and other life-sustaining requirements.”

- Skeet, 1977.

“Disasters are...stressful life events which are likely to cause acute problems in everyday living, emotional upset, and transient symptoms of psychological disturbance.”

- DHHS Publication # 83-675. 1979.

“Extraordinary events that cause great destruction of property and may result in death, physical injury and human suffering.”

- Cohern & Ahearn, Jr, 1980.

“Disasters are environmental events which subject human systems to a wide range of disruption and stress.”

- Bolin, 1989.

“An occurrence inflicting widespread distress.” “An occurrence that causes human suffering or creates needs that the victim cannot alleviate without assistance.”

- in Garaventa Myers, 1989.

"A catastrophic event that seriously overtaxes the resources of individuals and their communities."

- Taylor, 1990.

"Traumatic or extreme stressors, (which) are uncommon life events"

- Hobfoll, 1991.

Although these definitions vary widely, all emphasise the stressful nature of a disaster event, and the distress and disruption it causes victims. As a result, a disaster has often been labelled a 'stressor' or a 'traumatic stressor' by researchers (Bachrach et al., 1985, Bolin, 1989, Framer and Shearer, 1988, Paton 1996a, and Green, 1993). Paton, (1996b) has noted that in the past, disasters have had a tendency to be defined as suddenly occurring events that are restricted to a specific time and place. Recent classification of disasters has created an expanded definition. Disasters no longer necessarily have a sudden onset, and may exert a prolonged impact that affects individual, social and community well-being. This expanded definition of disaster is important as it will aid members of a disaster affected community in their recovery to pre-disaster levels of social and psychological functioning, and increase their long term well-being. Bolin (1988) stated that as yet there are no standard definitions for disaster. This is because each disaster is unique and specific, and characteristics of the event, the community and the individual victims are therefore situational.

It is currently accepted that disasters are any type of event that cause a stress reaction amongst those who experience the occurrence. Bachrach & Zautra, (1985), have defined a stressor as "an event which is expected to be perceived as stressful by the majority of the population." These stressors have the potential to create long-term, abnormal stress reactions amongst the victims that will affect their ability to cope with day to day functioning, and may lead to more severe symptomatology and mental illness. It is the role of the mental health worker in disasters to reduce the onset of long term psychological disturbances. The mental health worker must also accurately predict those victims' who are most 'at risk' for developing this type of reaction to the disaster, and refer them for further treatment (Cohern and Ahearn, 1980). In addition to this, the mental health worker in the disaster environment must work closely with the other agencies involved in disaster recovery to define the risk of the disaster population in a multi-disciplinary context (Paton, 1996a). This embraces the physical, economic, social

and psychological factors of disaster. All these factors combine to influence the development of long term mental health problems within a disaster population.

Each disaster event is unique and isolated, not only in its cause, onset and time frame, but also in terms of the effects it creates within affected communities. It is now accepted that the results of a disaster are a combination of a number of event characteristics rather than the event per se. In addition, the recovery environment in which the victims' find themselves, and the personal risk status of the individuals concerned also influence impact and recovery.

Once the disaster event has occurred, the characteristics of the physical impact cannot be changed. However, the recovery environment and individual characteristics are part of a dynamic, constantly changing system within a community. The community can prepare itself for the onset of a disaster before the physical impact affects it. This can be achieved through the establishment of community prevention and mitigation plans. Not only do these plans assist in developing a beneficial recovery environment before the onset of any disaster, but they may also encourage helpful individual behaviour and attitudes amongst potential victims. The development of these plans within any community will aid the area in any type of disaster situation by encouraging a quick and appropriate response, and providing the community with any resources it may need to successfully manage it's own recovery.

Although the characteristics of a disaster event will be different every time, a number of common factors have been identified that are present in every disaster event. The presence of these factors has implications for community planning and recovery. These common elements are discussed below.

1.4.1 Disaster Characteristics.

A set of common physical characteristics can be identified over a wide range of disasters. These characteristics include the duration and the visibility of the disaster or the threat of disaster, the length of the event, the presence of traumatic stimuli, and the accepted degree of responsibility for the cause of the disaster. Identification and understanding of these event characteristics will allow for accurate identification of high-risk populations, anticipating the intensity of their reactions, and allow intervention programmes to be flexible and provide adequate needs to the victims (Paton, 1996a).

All disasters will have an impact upon community well being (Paton & Bishop, 1996). Some authors have found that the cause of the disaster will influence the negative effects on those exposed (Paton & Bishop, 1996, Paton, 1996b, Green, 1993, Bolin, 1988, Baum, Fleming, Israel & O'Keeffe, 1992, Skeet, 1977, and Paton, 1996b). Therefore, disasters can be partly classified by cause. This partial classification of disaster aids the mental health worker in determining the likely severity and length of both the social and the psychological response to the disaster. This classification of disasters is discussed below.

1.4.2. Types of Disasters.

Two classifications are commonly used when defining the cause of a disaster event. These are *natural disasters* and *man-made disasters*. Man-made disasters can further be classified as either *human-caused disasters* or *technological disasters*. The occurrence of either natural disasters or man-made disasters can be placed on a continuum that runs from naturally occurring events to human-caused events. Some naturally occurring events may be indirectly due to human actions. An example of this includes global warming, which in turn, creates polar melting. Both of these potential disasters are naturally occurring phenomena, yet can be indirectly linked to pollution created by industrial development over the past two hundred years. Therefore, the classification of a disaster due to its cause may not always be a clear-cut issue.

Natural disasters are naturally occurring phenomena such as earthquakes, floods and volcanic eruptions. These events are often perceived as unavoidable 'Acts of God', and are viewed as incidents that could not be prevented, and are often unanticipated. Research has found that natural disasters *may* have less psychological impact than human-caused disasters, as the occurrence of the disaster was not due to human negligence or intent (Paton, 1996b, Green, 1993, Bolin, 1988, Baum, Fleming, Israel & O'Keeffe, 1992). Baum et. al. (1992), found that previous studies of natural disasters indicated that stress in these situations often abates fairly quickly after the event has passed. However, human-caused disasters are the direct result of human action and behaviour, and are directly attributable to a specific action, or series of actions. Fault and blame are involved, and it is these factors that can heighten the psychological response of the victims. The stress response to human induced disasters is longer lasting and more persistent than response to a natural disaster. These events are more likely to cause a chronic stress response that is ongoing and may interfere with everyday functioning for the victims (Baum, et. al., 1992). Paton (1996b) has further divided human-caused disasters into 'acts of omission' and 'acts of commission'.

Acts of omission are events that are caused due to human negligence or inattention. This is often due to a lack of resources. Examples include toxic leaks, nuclear plant explosions and oil spills. Alternatively, acts of commission result from direct intent to maim and destroy and can be directly traced to the actions of a specific individual or group. These events may result in enormous psychological and social consequences for the victims, and may take years to overcome. Examples of acts of commission include events such as murder, massacre, terrorism, and sabotage.

The stress response invoked by any disaster event will, in part, be influenced by the cause of the disaster. It is important to identify the disaster cause when anticipating and predicting the response of the victims to the event. An accurate identification of the cause of the event will aid in assessment of the victims' response and their recovery from the disaster.

1.5 Symptomatology.

A number of responses may occur as a reaction to exposure to disaster. It is now commonly accepted that exposure will result in an emotional disturbance of some kind (Gibbs, 1989, Chamberlain, 1980). This reported emotional response to disaster is a 'normal reaction to an abnormal situation' (Paton, 1996c, Green & Solomon, 1995, Bolin, 1988, Raphael & Meldrum, 1994, Gist & Lubin, 1989, Friedman, Framer & Shearer, 1988, Horowitz, 1993). This response is often short-lived and easily overcome, but in some individuals they may go on to produce more severe psychopathology that leads to mental illness. The majority of the victims will become survivors, yet a small proportion of the exposed population will retain negative psychological consequences for a longer period of time.

Responses to disaster are varied and broad, and may last for a period of weeks, or may develop into long term emotional disorders (Gibbs, 1989, McCaffrey, Hickling, & Marrazo, 1989, Friedman, Framer & Shearer, 1988, Eranen & Liebkind, 1993, McCammon, Durham, Allison, Jr., & Williamson, 1988, Harrison, 1980, Van der Kolk & Saporta, 1991). Victims may experience one or any number of symptoms. The length of time the symptoms remain with the victim is also an individual factor. Commonly reported symptoms of disaster response are apathy, indecisiveness, mechanical behaviour, shame, fear, personal weakness and a loss of control. Other symptoms which may arise in response to a disaster event are a loss of concentration, fragmentation of thoughts and memories, sleep disturbances, hypervigilance, a startle response to minor stimuli, memory impairment, inability to control mental tension and an avoidance of events that may trigger memories of the disaster. The

victim will often appear dazed, and suffer from emotional and psychological disturbances, and tend to lose their sense of humour (Friedman, Framer & Shearer, 1988). Perhaps the two most reported symptoms of a stress reaction are those of intrusion and denial. These responses have a unique and distinct set of characteristics associated with each, and are often pre-cursors to the development of Post Traumatic Stress Disorder (PTSD) as defined by the Diagnostic and Statistical Manual (DSM-IV) of the American Psychological Association (1994). In victims whose symptoms of inadequate stress response linger, PTSD is the most likely emotional disturbance to develop. However, other mental illness may also arise, such as anxiety disorders, depression, learned helplessness, psychosomatic problems and sleep disturbances, and aggressive and antisocial behaviour.

1.5.1 Intrusion.

Intrusive recollections are a category of PTSD, and are perhaps the most obvious and the most frightening of all the symptoms. Intrusion involves the continuous reliving of the event through flashbacks and nightmares, and random intrusive thoughts and images of the event. The individual is likely to feel a loss of control, and feel that they are 'going crazy'. The family and close friends of the victim will also suffer, as the victim relives the event continuously, and this will add to the overall stress levels within the recovery environment.

Intrusive thoughts and memories may continue to plague the victim for a prolonged period of time after the event. It is when these symptoms interfere with normal functioning after a reasonable period of time has passed, depending upon the severity of the event, that intrusive symptoms are considered to be a manifestation of PTSD, and treatment is required for the individual victim.

1.5.2 Denial

Denial is also often tagged as psychic numbing or avoidance, and is regularly referred to in the literature on disaster research. These symptoms include the denial of the occurrence of the disaster event, and denial of the emotional consequences it has had upon the victim. The mind attempts to block out the overwhelming implications of the disaster. The victim will feel numb in relation to their own emotions and feelings, and tend to lose their sense of humour and rely more upon other people. The victim may become dependent upon one or two close family members or friends, and withdraw from all other contacts.

Again, this response is normal in unusual situations, but only if it does not persist. If these symptoms become chronic and ongoing, the victim should seek professional help to relieve the symptoms of the stress response before they interfere with the normal functioning of the victim's life.

The majority of the victim population will return to a normal level of emotional functioning within a few weeks of the event. It is important to relay to the victims that these symptoms are a normal reaction to an abnormal situation, and are likely to be temporary.

1.6 Secondary Stressors.

Secondary stressors may have large consequences upon the resulting mental health of disaster victims. These stressors place further stress upon the victims of disaster and result directly in response to the disaster event itself. Yet these events are separate and unique to the initial event. Examples of secondary stressors include moving to alternative accommodation, rebuilding, and reducing property damage following disaster. All these require extended economic resources, and increase the levels of stress created by the disaster. Secondary stressors may affect victims well beyond the actual period of impact, and create further stress reactions. These secondary stressors will affect the well being of the victim, and the length of time that it takes for them to recover (Paton, 1996a).

The secondary effects of a disaster event will usually occur in the post-impact phase, or *after* the disaster has struck. Secondary stressors of a disaster are created by the demands and responses of individuals and the community placed upon them by the physical impact of the disaster. Common secondary stressors that place major stress on victims include economic pressures, evacuation, temporary housing and relocation to other areas, community fragmentation, and the threat of recurrence of the disaster event.

1.6.1 The Therapeutic Community and Community Fragmentation

Not all aspects of involvement in a disaster are negative. Many positive and beneficial effects can arise from exposure to disaster. Family solidarity and marital satisfaction may increase (Bolin, 1988). Supportive post-disaster networks develop, and unlikely friendships emerge. A therapeutic community may develop, which will increase the sense of community commitment, strengthen social bonds between community members, and increase altruism, levels of social support and helping behaviour. Maintaining and

encouraging the natural community networks and interactions increases a sense of community, and helps to establish a therapeutic community (Paton, 1996b). Disasters can increase community cohesion by creating this therapeutic community. The morale of the community may increase during the post-impact phase of disaster if the therapeutic community is encouraged (Bolin, 1988).

The therapeutic community which arises from community cohesiveness and support networks will occur only if the community remains physically and socially intact, as in the Ohakune community. Conflict can just as easily develop within the disaster community, and this will cause 'community fragmentation'. Fragmentation will increase levels of stress and recovery time. 'The greater the ratio of damaged to undamaged areas in the community, the greater the likelihood of community members experiencing negative psychosocial effects' (Quarantelli, 1985), such as community fragmentation. This fragmentation of the community will increase the difficulty of generating community consensus to create action to solve the problems created by the disaster and secondary stressors. It is useful to consider the extent of community cohesion prior to the event to predict the likely reaction of the community in response to the secondary stressors.

In Ohakune differential economic impact is a secondary stressor that has resulted from the Ruapehu eruptions. This differentiation may develop into community fragmentation. Those dependent upon the tourist industry are most likely to be affected by lack of income. However, those providing support will also be affected. Most of the community of Ohakune will suffer as a result of loss of income into the area. Those who are not affected will be those whose source of income has not been disrupted by the secondary effects of economic loss as a result of the eruptions. However, these individuals will experience the downturn in the local economy through observation and involvement in the community. Yet the community of Ohakune has remained largely both physically and socially intact, and this may aid in encouraging a therapeutic community.

1.6.2 The Threat of Recurrence

The threat of recurrence of the disaster is a high source of stress for victims (Paton, 1996b). This threat is a subjective perception by each victim, and will create stress if the victims perceive the recurrence as a likely event (Bolin, 1988). This source of stress can be minimised by the development and application of an adequate community response programme. Victims may be less threatened if they feel they have the skills and training to

adequately deal with a similar disaster. Therefore, community prevention and mitigation plans should be established, distributed and practised within the community to increase feelings of control amongst members of the community. Intervention programmes and mitigation plans not only provide necessary services after the disaster has struck, but can also aid the community in its response to the occurrence of another disaster, and increase individual's feelings of control, usefulness, and confidence, both before, during, and after a disaster has struck.

1.7 Intervention

Much of the literature concentrates upon the development and application of effective intervention programmes. A crisis intervention programme is applied in the disaster-affected community, and is designed to relieve disaster-related stress, and encourage positive community behaviour to help alleviate the negative social effects of the disaster event. These programmes also provide community help by identifying the needs of the victims and attempting to provide resources within the community that will match these needs. There is a need for these intervention programmes to be developed from within the community, and utilise existing community resources (Paton, 1997). This allows affected communities to help themselves and promote their own recovery, thus relying less upon external agencies and provisions.

In order for an intervention programme to be effective, the installation of the programme within the community must be properly managed and professionally applied. It is important for all the agencies involved in the intervention to be coordinated in their response. Agencies that are likely to be involved in the disaster response include local health services and hospitals, emergency services, such as fire service and police, the local council, local church groups and other community groups, and local mental health professionals. These groups must have a central liaison officer, and hold regular meetings to update the response of the community and re-assess their needs. Liaison between response agencies, and the coordination of activities and tasks is essential for providing accurate information and referring victims for further treatment. If effective communication channels do not remain open, this will limit the amount of information reaching the victims, and reduce the effectiveness of the programme. A multi-disciplinary approach is therefore required if the intervention and response programmes are to be effective.

Assessment issues are also central to effective intervention programmes. All professional groups involved need to make their own accurate assessment of local needs in relation to the services they offer. Assessment by mental health professionals can help to identify those who may go on to develop more severe reactions to the disaster. Assessment must be conducted as soon as possible, and should be continuous throughout the length of the intervention as the needs of the victims and the community as a whole change constantly (Harrison, 1980). The recovery environment is also important to consider, as the type that emerges will influence the response and recovery of the community members. In this regard, it is often useful to examine the dynamics and structure of the community before the impact of the disaster, as this will also play a role in the recovery environment that emerges (Paton, 1996a, 1996b).

Cohern & Ahearn (1980) identified certain population groups that may emerge as more 'at risk' of developing psychopathology than others. Special risk groups include children, older adults, recent immigrants, and those with previous mental health problems. Socioeconomic factors also affect risk (Raphael & Meldrum, 1994, Paton, 1996b). The vulnerability of at risk groups can be assessed prior to the disaster event, which will aid post-event identification of where resources may be required. Intervention strategies need to be specifically tailored to cater for the often diverse needs of these different risk groups. Interventions need to be specific and flexible, and, if effective, will cater for the needs of all potential victims, ensure prompt implementation of response, prioritise support and intervention, define outreach, helpline and de-briefing needs, define advisory service needs, and design information leaflets.

It is now a common practice to use community based intervention programmes following a disaster (Creamer, 1994). Because each disaster is unique and the community that it affects is also unique and dynamic, each disaster requires a tailored intervention programme that addresses the specific needs of the community. It is therefore difficult to develop an overall plan that can meet the needs of all communities and all victims following exposure to disaster. However, because a number of common characteristics have been identified in the disaster event, the recovery environment, and those victims most likely to be at risk of developing long term emotional disturbances, a number of guidelines have been developed which can help in the establishment of an effective intervention programme in a disaster-affected community.

“Planning must start from within the community” (Paton, 1996b). This internal organisation of disaster response increases the involvement of community members, and so lessens their feelings of loss of control, frustration, and helplessness. Internal response also increases a sense of community and encourages higher self-efficacy and problem-focused coping styles. These three response behaviours have been found to encourage a healthy and speedy recovery from any negative effects of exposure to disaster (Bachrach & Zautra, 1985).

1.8 The Recovery Environment.

Another variable that will affect recovery of an individual after exposure to disaster is the recovery environment. The recovery environment is the environment the victims find themselves in *after* the event, and where emotional and psychological healing begins. The recovery environment includes the availability and use of support networks, the characteristics of the community, and the effect of the secondary stressors upon the victims (Green, 1993). A number of factors will influence the effectiveness of this environment for a complete and healthy recovery from exposure to the event. These essential factors of a healthy recovery environment may have been destroyed by the disaster itself, and thus the recovery environment will need more resources, more external aid, and a more extensive intervention programme.

A number of authors (Paton, 1996a, 1996b, Hodgkinson & Stewart, 1991, Green, 1993, and Lyons, 1991) have noted the importance of the recovery environment in the effective recovery from exposure to disaster. Recovery from disaster can be viewed as an interaction between the victim, the recovery environment and the resources they utilise in their recovery (Paton, 1996a). Differences in the recovery environment will also influence response and recovery rates of the victims. The factors that influence positive recovery in the post-disaster environment include good health, adequate finances, the continuation of pre-disaster roles, and access to a supportive social network. Some of these resources can be developed within the community prior to the disaster event. Adequate pre-disaster community planning will play a useful role in the post-disaster recovery environment. Access to adequate resources in the recovery environment will greatly reduce the stress of the victims, and positively influence the psychological and emotional recovery process.

It is likely that other people who have also experienced the event will be in the same recovery environment. It is important to know if the victims are already linked to one

another before the onset of the event, such as in the case of a community disaster. If the victims already perceive themselves as a group, as in the case of a community disaster, the recovery environment is likely to be linked by known individuals. It is therefore important to encourage the positive aspects of the groups' dynamics, and encourage naturally forming support groups to reduce the onset of mental health problems. The utilisation of internal resources is extremely important in an effective recovery environment. The group must be made aware that it is primarily responsible for its' own recovery (Paton, 1996b, Hodgkinson & Stewart, 1991), and utilise the resources available within the community in the post disaster period. It is important to ensure equal access for all to community resources, and treat victims as part of the greater community group. However, victims must also be viewed as individuals with different characteristics and different response patterns (Hodgkinson & Stewart, 1991).

Community resources in the post disaster period may be low or depleted as a direct result of the event. However, it has been noted that social support is possibly the most important factor of the recovery environment (Paton, 1996a, Green, 1993, Lyons, 1991).

1.8.1 Social Support.

To enhance the effectiveness of social support networks, communication channels must be opened and encouraged within the community. A lack of social support can lead to greater victimisation and an increase in the onset of psychopathology within the victim population.

Effective disaster intervention programmes must encourage and promote the development of both informal and formal social support groups, provide organised and accessible support resources to victims, and promote the use of social support groups by all of the affected population. Social support is an important resource for disaster victims and should be unconditionally available. Some authors note that it is the quality not the quantity of the support offered which is important in the victims' recovery (Horowitz, Stinson & Field, 1991, Eranen & Liebkind, 1993). Social support should come from family and friends of the victim, and other previously established support networks, and also through networks developed as a result of the disaster. Organisation and assignment of tasks will encourage developing support networks and the development of a therapeutic community. This will aid recovery in the long term.

Seeking social support and developing and strengthening existing social ties is an important coping strategy in the post disaster environment (McCammon, Durham, Allison, Jr., & Williamson, 1988), and will help to alleviate the stressors created by the event and the resulting secondary stressors. Different types of support exist in the post disaster environment, which will be appropriate during different stages of the recovery process. Support offered must be matched to the requirements of the individual victims at various stages of their recovery, and come from an appropriate source. Emotional support may be most effective if offered by those who are close to the individual. Information and advice may be more readily accepted if offered by a professional (Lyons, 1991, Paton, 1996a). Green and Solomon, (1995), suggest that mid-range support may be more beneficial than high levels of support. This could be because mid-range levels of support may mirror everyday routine more accurately, and therefore provide a sense of normality in an otherwise unusual environment. An effective recovery environment must prioritise the maintenance or establishment of community support and encourage the development of both formal and informal networks (Paton, 1996a).

The event itself may disrupt support networks through death, injury, and breakdown of communication resources. When disaster occurs, the resources that remain have limited effectiveness within the community, and social support diminishes (Hobfoll, 1991). It is therefore essential to utilise the resources available to the community. The most available resource is likely to be social support, and every effort should be made to quickly re-establish communication channels and existing social networks. The distress of the survivors may also cause significant others to withdraw because they do not know how to behave around the victim. Different support issues will arise at various stages of the recovery process, and will need to be dealt with in different ways.

It is essential that support networks are maintained and nurtured in the recovery environment (Paton, 1996b). Group membership, and the extended support networks that result, increase the likelihood of a normal response (Sawtell & Bottomly, 1989). Internal, informal support networks that naturally occur can alleviate the negative effects during the post-disaster period. If these support levels are reduced, due to secondary stressors or an ineffective recovery environment, the psychosocial effects of the disaster may be exacerbated and lead to long term mental illness in a large proportion of the affected population (Paton & Bishop, 1996).

Support can vary and be offered in numerous ways in the recovery environment. Support can be offered through the provision of information, outreach programmes, helplines, peer support, debriefing, counselling, contact with family and friends, and simply by having positive social contact with another individual. The media can be useful in providing information on the support that is available within the recovery environment. Mental health workers are also providers of social support in the recovery environment. These workers can provide information, education services, advice, and support during an overwhelming period of stress and distress. Support systems should be developed around the victims. Mental health workers involved in disaster recovery must be facilitators of support as well as reducing the number of demands placed upon the victims, (Cohern & Ahearn, 1980), and promoting beneficial aspects of the recovery environment.

1.9 Individual Characteristics.

The amount of stress that results within a disaster population is determined by the disaster event, the characteristics of the recovery environment, and also by individual characteristics of the victims. Individual characteristics will affect the social and psychological outcome of an individuals' response to disaster (Gibbs, 1989). The individual evaluation and appraisal of a situation will strongly influence the victim's recovery and influence vulnerability to long-term mental health problems. The social responses of those exposed to disaster stem from pre-disaster characteristics of the individual. These factors determine levels of vulnerability to the disaster event and resulting secondary stressors, and the nature of the individuals response to the event (Bolin, 1989). Although individual characteristics cannot guarantee the outcome of a disaster upon an individual, they influence levels of vulnerability and aid in predicting the response.

Various characteristics influence the response of an individual to a disaster. Individual disaster experience for each victim is important in attempting to predict psychological consequences. For example, an earthquake may only last 30 seconds, but a victim may be trapped beneath rubble for hours. This extends the duration and intensity of the event and is likely to cause a more severe psychological response (MacFarlane, 1995). Individuals locus of control will also provide information on how victims' will respond to disaster. Those who possess an internal locus of control tend to exert more control over their lives and circumstances and believe they can influence their outcome. However, individuals with an external locus of control believe that their situations are dependent upon luck and fate, and they cannot influence their outcome. This is related to fatalism, another personality factor

involved in disaster recovery, linked to attribution theory that suggests it is the individuals' *perceptions* about the disaster that last (Norman, 1988), and influence future response behaviour. Mental models and personal schemata can be altered through education and training to encourage positive response behaviour and future preparedness (Paton, 1997). The opposite of this fatalistic viewpoint is unrealistic optimism. People may develop the perception that it 'cannot happen to me.' Unrealistic perceptions of personal invulnerability are normal, but these have disadvantages in individual's underestimating their personal risk. Disaster response will be most effective if the victims have previously fostered realistic appraisals of risk, rather than a fatalistic or overly optimistic perception. However, response to disaster need not be negative. Many individuals involved in disaster not only adjust well, but thrive following exposure. They are strengthened, tougher, and more resilient (Lyons, 1991). Positive affects will arise from disasters. These benefits include opportunities for growth, an increase in self-respect, self-esteem, and self-efficacy, and a positive reassessment of values and priorities (McFarlane, 1995).

Other individual characteristics that may influence recovery are access to support resources (Eustace, 1994), self-efficacy, sense of community and coping strategies (Bachrach & Zautra, 1985, Bishop, Paton, Syme & Nancarrow, 1993).

Bachrach & Zautra (1985) identified three individual characteristics that have influenced victims' response to disaster and stress. Further research (Paton, 1996b, Gibbs, 1989, Baum, O'Keeffe & Davidson, 1990, McFarlane, 1995, Norris & Thompson, 1995, Lyons, 1991, Eustace, 1994) has identified these characteristics as important factors in the response to disaster. These individual characteristics are personal levels of self-efficacy, the sense of community an individual holds, and the coping style that each victim employs in response to the disaster.

1.9.1 Self-Efficacy.

Self-efficacy is a psychological concept developed by Bandura (1977) and identified as an important personality characteristic in aiding recovery from disaster. Bachrach & Zautra (1985) defined self-efficacy as an individuals' appraisal of what they are capable of performing in a given situation. Self-efficacy is the ability to believe in one's own personal strength, and use this to create a successful outcome. Self-efficacy is developed within an individual over time, and is dependent upon personal development and history. This concept is unique to each individual, and is internal to the individuals previous experiences

and outcomes of events. Self-efficacy is similar to personal hardiness, resilience, and self-reliance, and is also associated with locus of control (Rotter, 1966). Those with naturally lower levels of self-efficacy have a greater difficulty coping with traumatic stress (Lyons, 1991). Individuals with high self-efficacy welcome change, rather than fear it, and are most likely to appraise their situation positively. Individuals with high self-efficacy more often use a problem-focused coping style, which is also effective in resolving traumatic stress. Bachrach & Zautra, (1985), suggest that high self-efficacy may reduce the impact that stress has upon psychological well being. Their research also found that those with higher self-efficacy had a higher involvement in community activities, which encouraged a healthy response to disaster exposure.

1.9.2 Sense of Community.

Bachrach & Zautra, (1985), defined 'sense of community' as the feelings of belonging and attachment that an individual has for the people and place where they live. Community members and the environment in which they operate are an interconnected whole. A well-developed sense of community will encourage the individual to take a more active role in the community following disaster. Many people do not possess a strong sense of community, and therefore become isolated and detached from community issues. Following a natural disaster this may go on to reinforce their feelings of isolation, and thus encourage learned helplessness. However, if the individual develops a strong sense of community through involvement in community activities, it is also likely that their access to support resources will increase. In this way the prevailing sense of community and access to social support networks are closely associated.

Bachrach & Zautra (1985) found that those who had a strong sense of community were older and had lived in the community for a longer period of time. Those with a strong sense of community tended to use problem-focused coping styles, and wanted to take action that would alleviate the stressor within their community. A strong sense of community can therefore be helpful in encouraging community members to take action, develop their own intervention programmes, and utilise resources internal to the community following a disaster. This behaviour is likely to reduce their feelings of loss of control over their situation, and encourage them to take an active role in their own response to the disaster. This problem-focused behaviour also encourages the development of high self-efficacy within an individual, which also helps the individual to respond positively to stress (Bachrach & Zautra, 1985).

1.9.3 Coping Styles.

Coping and adaptation styles of the victims will influence recovery after exposure to disaster (Bachrach & Zautra, 1985, Bishop, Paton, Syme & Nancarrow, 1993, Eustace, 1994). Coping has been defined as 'the individual management of the demands and emotions generated by the stressful situation' (McCammon, Durham, Allison, Jr., & Williamson, 1988). Coping is behaviour that protects the individual from internal and external stressors, and behaviour that will prevent, alter, avoid or manage tension and stress. Stress is associated with a crisis and is the physical discomfort felt by individuals experiencing persistent problems or undue demands. Stress may be associated with a particular event or situation. Coping skills and styles integrate stress and crisis, loss and mourning, and support systems. Coping actions change a stressful situation, redefine its significance, and attempt to manage the stress one is experiencing. Health professionals therefore need knowledge of specific coping mechanisms. The coping strategy utilised in the post-disaster phase will depend upon the individual and collective coping styles prior to the event, the amount of loss sustained during the disaster, and the quality of emotional and social support provided in the recovery environment (Cohern & Ahearn, Jr., 1980).

Coping style was defined in Bachrach & Zautra's (1985) research to be an important individual characteristic in victim response following a disaster event. They identified two specific styles of coping that were directly related to outcome following disaster. The first of these was a problem-focused coping style. This coping style involves using strategies and activity to deal with a problem and confront the stressor. Problem-focused coping styles directly address the stressor, and those who advocate this coping style attempt to solve the problem created by the initial stressor or resulting secondary stressors. The second type of coping style is emotion-focused. This coping strategy focuses on suppressing or denying emotional reactions to an event, and blocking out the consequences and sequelae that occur as a result to this exposure. This response is an attempt by the individual to regulate one's own emotional response to the stressor without attempting to physically, or psychologically, tackle the external problem.

Research (Lazarus, 1966, and Bachrach & Zautra, 1985) has indicated that problem-focused coping style is more effective in response to disaster. This is because the individual who employs problem-focused coping is more likely to initiate action that will change their situation. This, in turn, will heighten self-efficacy and a sense of control, which will lead to feelings of competence and effectiveness. This behaviour will transfer to later stressful

experiences, and allow for the effective resolution of future trauma. In comparison, this research has found that the use of an emotion-focused coping style may lead to alcohol and drug abuse, or the victim moving away from the disaster environment. This leads to a decrease in feelings of control, and increases helplessness, fear, and frustration. An emotion-focused coping style is more likely to lead to longer-term psychosocial problems, and renders the individual incapable of solving future emotional trauma. Therefore, active, problem-focused coping styles should be promoted and encouraged in disaster response programmes.

Research has found that a combination of these three individual characteristics may aid in the healthy recovery from exposure to disaster. The conclusions which can be drawn from this indicate the importance of community based action plans in response to a disaster. Effective community intervention programmes are likely to enhance feelings of self-efficacy and control, and increase internal decision making processes (Paton, 1996b), which reduce the need for reliance on external agencies. Each of these individual characteristics has distinct features and influences behaviour in a unique way.

1.10 Previous Research Findings.

Both the study conducted by Bachrach & Zautra (1985), and that undertaken by Bishop, Paton, Syme & Nancarrow, (1993), found that traumatised individuals had not resided in the community for a long period of time, and did not take an active role in community activities. The conclusion drawn from these studies is that the greater the community involvement of the individual, the greater their personal sense of community. In relation to self-efficacy, Bachrach & Zautra (1985), found that a high level of self-efficacy led to a high level of involvement in community activities. Those with high self-efficacy tended to advocate problem-focused coping styles, which, in turn, also increased their level of community involvement. Bishop et. al. (1993), found that self-efficacy was related to both material comfort and the need to control uncertainty. Those with high self-efficacy had a greater sense of control over both material comforts and their individual situations. With regard to coping style Bachrach & Zautra (1985) found that problem-focused coping styles led to a greater involvement in community activities, and encouraged a strong sense of community. The study by Bishop et.al. (1993) found that the use of a problem-focused coping style led to feelings of optimism and a decrease in anxiety levels. The opposite was found for those who utilised an emotion-focused coping style. These individuals were more likely to show pessimistic attitudes, feelings of repression, and higher levels of anxiety.

Many authors, (Paton, 1996a, Lyons, 1991, Horowitz, Stinson & Field, 1991, DHHS Publication # 83-675, 1979, Creamer, 1994, Cohern & Ahearn, Jr., 1980, Raphael & Meldrum, 1994, Paton, 1996b, McCammon, 1996, and Garaventa Myers, 1989), advocate the importance of adequate social support networks in the recovery environment. However, not many researchers have investigated the role that social support plays in the recovery of exposure to a natural disaster. Eustace (1994) found that social support mediated the effects of other individual characteristics to aid in the recovery of victims of a natural disaster. Individuals who have access to strong social support networks are less likely to develop ongoing, negative psychological effects as a reaction to natural disaster. Those victims who do not have access to adequate support resources are more prone to develop long term emotional disturbances, and may develop mental illnesses such as PTSD.

As a result of reviewing the literature, it is expected that the combination of these four factors; high sense of community, high self-efficacy, problem-focused coping skills, and access to adequate social support, will reduce the long term negative effects of exposure to disaster. It is also expected that these traits will assist in the healthy recovery of the victim and community. When considering the community's response to a disaster, it is also important to keep in mind the dynamic nature of community structure, and the changing needs which arise in various factions of the community at various phases of the disaster response and recovery. A community disaster, such as the Ruapehu eruptions and the effects these created within Ohakune, will affect *all* those who live within that community, not only those who are financially dependant upon the local economy. Because of this, it is important to develop a collective approach. This will increase the effectiveness of the response, and help to alleviate the secondary stressors that remain in the community following the initial disaster event.

1.11 The Present Study.

The purpose of the present research is to examine some of the long-term psychosocial effects of a natural disaster within a rural community. In particular, the research intends to focus upon the relationships between the variables identified by Bachrach & Zautra (1985), and social support and how the combined effects of these may reduce the negative effects of exposure to a disaster and the secondary stressors that result. Also to be examined is the interaction between the disaster, the secondary stressor of loss of income, and the utilisation of community resources.

The literature reviewed in this chapter shows that the majority of research has found that natural disasters *do* cause adverse psychological effects amongst exposed populations. Often, these populations are communities, whose members are exposed to the same event, but react in differing ways. The results found from this body of research are often diverse and contradictory, and are difficult to apply within the current disaster population, due to methodological concerns and assessment issues. This study aims to evaluate some of the previous findings in an attempt to confirm some of the contemporary theories in disaster research. Also, this study aims to generate more data from within New Zealand, and determine whether findings from international studies are applicable to a rural New Zealand population that has been exposed to a natural disaster.

Research, thus far, has concentrated upon identifying the psychological effects of exposure to disaster, and how to best solve the negative impacts and develop the positive aspects that result. A number of common elements have been identified in disaster events. These elements are present in disasters of different causes, different disaster populations, and at various points in time. Research in this area now concentrates upon the application of this knowledge to provide positive outcomes within communities following a disaster.

At present, the emergency services in New Zealand are recognising the importance of this research. Not only are the victims of disaster affected, but social and psychological sequelae will also impact upon the emergency service workers. Re-structuring of emergency services is currently under way to incorporate the relief of psychosocial stress due to participation in rescue activities by emergency service workers. Proposals for integrated comprehensive emergency management that are currently before Cabinet require a capability to assess community impact. The results of this study will contribute to this goal.

The present research is important in a community context as it looks at the psychosocial effects of a natural disaster and the secondary stressors that result from it. The disaster event of this research has the potential to recur, and affect a number of rural New Zealand communities. The secondary stressors that result from the disaster event itself may present on-going sources of stress to community members that may pose greater problems than the initial event. The results of this research will provide practical applications to organisation within rural communities in response to natural disaster and resulting secondary stressors. At present, civil defence plans do not provide a basis for dealing with longer term implications associated with the disaster, such as in the Ohakune community and the

economic impact which has resulted from the eruptions. This research intends to identify positive components of individual characteristics, with the long term goal that appropriate services and groups are developed within the community that provide access to these effective community resources during times of stress. By developing adequate social support networks within the community, and encouraging certain types of behaviour through education, training and preparation, the psychological and social impacts of a disaster upon a community can be significantly reduced.

Research has identified that outcomes of disaster are a combination of the disaster characteristics, the recovery environment, and individual characteristics of the victims. The present research will focus on individual characteristics that other researchers have found to be beneficial to community recovery (Bachrach & Zautra, 1985, Bishop, et. al., 1993, and Eustace, 1994). The hypotheses of the present research are therefore:

- Victims who perceive themselves to be in possession of high self-efficacy and a strong sense of community will report a lower number of psychological and stress-related symptoms than those who do not perceive themselves to be in possession of these characteristics.
- Victims with a more problem-focused style of coping will act upon decisions they perceive to be beneficial to them, and will therefore report traits of high self-efficacy and a strong sense of community.
- The combination of these three characteristics, high self-efficacy, a strong sense of community and a problem-focused coping style, are not mutually exclusive. These traits will create an additive affect amongst disaster victims, and will aid in determining their mental health. Those who report the above characteristics will report lower levels of psychological symptomatology.
- Those who do not have access to an adequate social support network will report higher levels of psychological symptoms.
- Social support will be a mediating factor between the individual characteristics above and psychological symptomatology. Social support will contribute to the additive effect on overall mental health.

- These findings will reflect similar findings from disaster research within a New Zealand population (Eustace, 1994).
- The findings from this research will be similar to those found within populations of victims of natural disasters (Bachrach & Zautra, 1985, and Bishop, Paton, Syme & Nancarrow, 1993).

CHAPTER TWO

METHOD

2.1 Design

This study used a cross-sectional survey with two data collection points. A questionnaire (Appendix A) was used to collect information from a sample of the Ohakune population who were exposed to the Ruapehu eruptions of 1995 and 1996. Multiple data collection points were used to examine the longitudinal effects of stress over a three month period, one year following the last serious eruption of Mt. Ruapehu.

The methodology of this study consisted of four phases. The first phase was the development and administration of a survey to a sample of permanent residents in Ohakune. The second phase was a follow-up letter printed in the local weekly paper for subjects who had not yet responded, but wished to take part in the survey. The third phase consisted of sending out a second, identical questionnaire to those subjects who had responded and provided an address, three months after distribution of the first survey. The final phase was a second follow up letter sent to the respondents 3 weeks after receiving the second survey.

2.2 Sampling

Selecting a sample in this study was limited by the need to sample only residents of Ohakune who had experienced the eruptions of Mt. Ruapehu in both 1995 and 1996. Those who were most accessible to the researcher were living in Ohakune at the time of the study, as there was no way to locate those who had moved away from the area as a result of the eruptions. Therefore, only the present residents of Ohakune who had lived in the area since the eruptions began in 1995 would be targeted for inclusion in the study. This became the criteria for participation.

Not all permanent residents of Ohakune were expected to respond positively to the distribution of the questionnaire, and there was no way to anticipate a response rate to the survey. Because of the limitations of money and time, it was decided that approximately one third of the permanent population would be targeted for research participation. 550 questionnaires would be distributed within the community.

2.3 Data Collection Points

The timing of data collection was important. The most salient results were desired, and therefore the two survey distribution dates were chosen carefully. Stress levels within the community were expected to peak prior to, and during the beginning of, the 1997 ski season, as community members awaited the outcome of the season opening and were dependent upon events over which they perceived no control. These events were good snowfall, no eruptions, and the return of winter visitors to the area. The second data collection point was timed so as to measure the response of the local community members to the outcome of the ski season, be it good or bad, and was therefore distributed at the end of September, three months after the season began. The distribution of the first questionnaire within Ohakune is linked to a notable event, as it was distributed during the opening week of Turoa Ski Resort, in the first week of July 1997. The second questionnaire was distributed during the last week of September 1997, and therefore measured community response to a successful ski season. Although the ski resort remained open until mid-November, community members had begun financial recovery by the end of September. This encourages the idea that the community stressor within Ohakune was the economic impact that resulted from lack of tourism due to the eruptions of 1995 and 1996, as no volcanic activity created disruption for the community during 1997. Therefore, in September, the survey measured the community response to initial economic recovery, rather than response to the eruptions and threat of recurrence, as it had done in July. This change of community stress during the course of the study raises questions as to the appropriateness of the variables included in this study, and also raises questions for future research that will not be dealt with presently.

2.4 Survey Administration

Two techniques of participant selection and questionnaire distribution were used to invite individuals to take part in the research. The first technique for selecting participants was advertising in the local weekly newspaper, "The Ruapehu Bulletin". This publication ran an article on the purpose of the research (Appendix B). The week this article was published, one questionnaire was distributed with each newspaper to permanent residents within the township limits of Ohakune. This resulted in 473 questionnaires being distributed throughout Ohakune. Readers were invited to complete the questionnaire, and return it in the freepost envelope provided if they met the inclusion criteria (see Appendix C and D).

The second technique for participant selection was through door-to-door visits by the researcher to invite community members to participate in the study. Permanent residences and businesses were randomly selected, and occupants were invited to participate if they matched the selection criteria. Appendix E shows the breakdown of Ohakune into business, permanent residential and seasonal residential areas. As time was a limiting factor in this study, it was decided that if there was no response at the time of the researcher's visit, that premises would not be re-visited. This selection of participants continued until no questionnaires remained. It was possible for more than one person at any given address to complete the survey, as long as they matched the criteria for inclusion in the sample population. However, it was not possible for any individual to complete the questionnaire more than once. Survey respondents were asked to complete a section with their address, so a second, identical questionnaire could be posted to them in 3 months time for completion. They were not required to include their name on the survey unless they wished too.

These two techniques were used for random distribution of the survey within the community in an attempt to maximise the response rate. A number of problems exist with these methods of distribution. These problems, and attempts made to minimise the effects of these, are discussed in section 4.8.

2.5 Measures

A self-report questionnaire was used in this study. This questionnaire incorporated a variety of previously developed and psychometrically tested surveys. The survey also included some unique questions to obtain demographic data from the subjects.

The present questionnaire consisted of the Hopkins Symptom Checklist – 21 (HSCL-21, Green, Walkey, McCormick, & Taylor, 1988), which was used to collect information on current levels of psychological distress. Individual characteristics scales developed by Bachrach & Zautra (1987) were used to collect information on self-efficacy, coping style and sense of community. A short version of the Social Support Questionnaire (SSQ6, Sarason, Levine, Basham, & Sarason, 1983) was included to measure social support quantity and quality. Unique questions were added to the survey to record respondents' age, level of education, and gender. The majority of this survey was adapted from a questionnaire previously used by Bishop, Paton, Syme & Nancarrow, (1993).

Although most of the scales in the present research have studies supporting their psychometric qualities, it must be remembered that valid and reliable instruments for measuring subjective responses to disaster events are severely lacking. This is because of the lack of agreement on the operational definitions involved and the effects that it has upon victims. The scales used in the present research were all selected on the basis that they had some evidence of accurate and reliable psychometric properties. These will be outlined below.

2.5.1 Demographic Measures:

Information was sought on participants' age, gender, and level of education, ethnicity and dependency on local business for income and financial well being. This information was used to assess the effects of the disaster event dependent upon demographics of the population. These questions were modelled on questionnaires used in previous disaster research (Bishop, Paton, Syme and Nancarrow, 1993, Eustace, 1994).

2.5.2 Psychological Distress

Psychological distress at the time of the two data collection points was measured using the Hopkins Symptom Checklist-21 item version (HSCL-21; Green, Walkey, McCormick & Taylor, 1988). The HSCL is a commonly used measure of symptom distress. Its reliability, validity and sensitivity to change have been well established and widely reported (Deane, Leatham, & Spicer, 1992). The original 58-item HSCL would have been too long for use within the present study. Therefore the more concise, yet accurate version was used. This is the 21-item version of the HSCL, and contains excellent psychometric properties (Green, Walkey, McCormick, & Taylor, 1988). The HSCL-21 consists of three sub-scales that combine to generate a Total Distress (TD) score. The TD score was used to measure symptomatology within the present study.

The normative data for the HSCL-21 was collected from a New Zealand population. The reliability statistics obtained from this group were consistently high. The split-half reliability for the total scale was 0.91, while the alpha coefficient was 0.90. (Green, et al., 1988). This indicates high internal consistency within this measure. A second group provided similar reliability correlations (Deane, Leatham, & Spicer, 1992). Validity of the HSCL-21 was tested in various ways (Deane, et al., 1992), and the results support the

construct validity of the HSCL-21 and suggest that discriminant validity also exists. The HSCL-21 maintains excellent reliability, and shows some evidence of validity.

2.5.3 Self-Efficacy, Sense of Community and Coping Style.

Data was collected on self-efficacy, coping style, and sense of community using scales adapted from Bachrach & Zautra's (1987) personality scales. These original scales had previously been adapted for use by Bishop, Paton, Syme & Nancarrow (1993) to collect data in Australia on subjective perceptions of self-efficacy, sense of community and coping styles. The scales used by Bishop et. al. (1993) have been used extensively within urban communities, and were adapted in 1993 to be more consistent with rural communities. Because they have been tested on both urban and rural communities, these scales will be suitable for use in the present study, as Ohakune is an urban community within a rural environment.

No psychometric data was found in regard to these scales. Therefore, the results obtained from this measure were interpreted with caution, and used as a guide as to what may be occurring within the Ohakune community in regards to levels of self-efficacy, coping style, and sense of community.

2.5.4 Social Support

The six-item short form of the Social Support Questionnaire was used to assess subjective perceptions of social support in the present study. This scale was chosen for the psychometric properties that it displays, and also due to its brevity and accurateness at providing useful data. The original Social Support Questionnaire (SSQ, Sarason, Levine, Basham, & Sarason, 1983) is an instrument that consists of 27 items that measure both support network size, and support satisfaction. The Brief-SSQ is a 12-item measure, and the SSQ6 contains six items. Each instrument measures the same constructs and the responses provide two scores. The number (N) score for each item is the number (quantity) of support people listed by the respondent, and the satisfaction (S) score ranges from 1 (very satisfied) to 6 (very dissatisfied) for each item. Both of these scores are summed across all items and then divided by the total number of items to obtain mean scores.

A number of studies have been conducted to provide information on the reliability and validity of these measures. Both the SSQ and the Brief SSQ yielded high coefficient alphas

and test-retest correlations (Siegart, Patten, & Walkey, 1987). These results suggest high stability within the instrument and high internal consistency. Studies on the Brief SSQ have also provided normative data from within a New Zealand population (Siegart, Patten, & Walkey, 1987). This information is useful, as it shows that the reliability of the SSQ remains within a New Zealand setting. Sarason, Sarason, Shearin, & Pierce, (1987), found comparable internal reliability for the SSQ6 within three different student samples. The coefficient alpha's for these groups ranged from 0.90 to 0.93 within both sub-scales of the measure. Comparisons between the original SSQ and other measures are the only validity studies conducted. Although numerous validity studies have not occurred, those that have support the validity of the SSQ as a measure of social support. Negative correlations were found between the SSQ and unrelated instruments. Evidence for the validity of the SSQ has also been found in comparisons to the Life Experiences Survey, the Rosenberg Self-Esteem Survey, and the Locus of Control Scale.

The SSQ6, in comparison to other social support measures, shows high reliability, and the original version provides adequate evidence of validity. The SSQ6 measures both the network size and the subjective satisfaction of perceived support. The two outstanding features of the SSQ6 is its brevity, which makes it ideal for use in conjunction with other measures in applied research settings, and the fact that normative data is provided based upon a New Zealand population. For all purposes of the present study, the SSQ6 will provide an adequate and relevant indication of levels of social support within the survey population.

2.6 Sample Description

The response in July from distribution of questionnaires was low. Only 92 of the 550 distributed questionnaires were completed and returned to the researcher. Two of these did not provide their addresses for the second questionnaire to be sent to, however the information they provided was included in the statistical analyses of the data.

Many reasons exist for this low response rate to the questionnaire. The first of these is the timing of the first survey distribution. The questionnaires were distributed within Ohakune at a time that coincided with the opening of Turoa Ski Resort. Many community members were involved with this opening and the increase this brought to business within the township, and therefore may not have had time to complete the survey. However, a trade off was made in regard to the time of the survey distribution, and the level of stress within

the community (refer section 2.3), and as it was desirable to measure community attitudes during peak stress, the opening of the ski resort was an appropriate time to seek community response. However, many other reasons also exist as to why the response rate was low. For one, attitudes of community members may have been changing at this time. Many residents of Ohakune may have felt that once the ski season started and tourists came back into the area the problems they had been facing in relation to the eruptions were over, and the survey was not applicable to them. Another problem was the wording of the questionnaire, which many potential participants claimed was misleading, ambiguous, vague and difficult to answer. The survey was also a mail-in questionnaire, which induces a response bias. Only certain people complete and return mail-in questionnaires, and this probably added to the low response rate. This may also result in more positive responses within the sample as compared to the community as a whole, as those who feel isolated from the community as a response to the eruptions were not likely to complete the survey. The final possible reason for the low response rate is that at the time of the July survey distribution, the Ruapehu District Council, and the Ohakune 2000 group, two well publicised local groups, had also distributed mail out questionnaires within the community.

In mid-July, two weeks after the initial distribution, a follow up letter was printed in the local paper (Appendix F). Responses continued to arrive from this data collection point until the end of August. The 92 surveys received from the first data collection point accounted for 17% of the 550 questionnaires that were distributed within the community.

The second survey, identical to the first, was sent to the 90 respondents from July who had provided their address. The second survey was distributed at the end of September, three months after the first survey had been distributed and at a time when the outcome of the ski season was known. The ski season had been successful, therefore this survey was measuring the positive response of the community. This survey was sent with a second information sheet (Appendix G) and a consent form (Appendix D). A follow up letter was posted to these respondents at their home addresses three weeks later (Appendix H). From the second collection point, only 52 responses were returned. This accounts for almost 57% of the original sample group replying to the second survey.

Few reasons exist for this low response rate, but these are important considerations. The first of these is that the ski season had already-proven to be successful, and local community members were enjoying a busy and prosperous time. Therefore, they may now perceive themselves with no problems related to the previous eruptions, and feel that the

survey no longer applies to them. Also due to this busy period respondents may not have had time to complete the survey. Again, the survey was a mail-in response and the expected reply was not large.

2.6.1 Demographic Description of the Sample

Some returned surveys were incomplete, and missing data exists for various components of the survey. However, the majority of subjects completed the demographic questions and it is interesting to know what proportion of the sample group belonged to what demographic group.

In July, 91 of the total 92 subjects provided data on age and gender. This accounts for 99% of the sample population. In September, all 52 of the respondents provided this information. Age and gender of the sample group is presented in table one.

Age	JULY				SEPTEMBER			
	Male	Female	TOTAL	% of Sample	Male	Female	TOTAL	% of Sample
Under 20	2	2	4	4	2	3	5	10
20-29	2	16	18	20	0	11	11	21
30-39	11	17	28	30	3	9	12	23
40-49	9	11	20	22	7	4	11	21
50-59	5	10	15	16	3	5	8	15
60-69	3	2	5	5	3	2	5	10
70-79	0	0	0	0	0	0	0	0
80+	0	1	1	1	0	0	0	0
TOTAL	32	59	91	99	18	34	52	100
% of Sample	35	64	99		35	65	100	

Table One: Distribution of age and gender in July and September.

Almost twice as many women responded to the survey than men in both data collection points. In both July and September, despite the differences in the sample groups, 35% of the respondents were men, while the remaining 65% were women. The majority of the respondents were in the age group between 20-59 years old. In July this group consisted of

81 subjects, or 89% of the sample. Only 4 of the subjects were under 20 (4%), and only 6 were over 60 (7%). None of the respondents were in the age group 70-79, and only one respondent was over 80 years old. In September all respondents were in the age range of under 20 to 69. Those in the 20-59 age group numbered 42 subjects, or 81% of the sample. 5 subjects were under 20 (10%), and 5 were over 60 (10%). The one 80+ respondent from July did not respond in September.

The information regarding education level and ethnic background from July and September is presented in table two. In July, 86 responses were received from subjects on this information, which accounts for 93% of this sample. All 52 respondents (100%) from September completed these questions. No subject in either sample group claimed to have less than a high school education. One Pacific Islander completed the questionnaire in July but did not respond in September.

EDUCATION	JULY		SEPTEMBER	
	Total	% of Sample	Total	% of Sample
Completed Secondary School	31	34	19	37
Trade or Polytech. Qualification	28	30	14	27
Tertiary Education	22	24	14	27
Post-Graduate Qualification	5	5	5	10
ETHNICITY	Total	% of Sample	Total	% of Sample
N.Z of Maori descent	14	15	5	10
N.Z of European descent	65	71	42	80
N.Z of Pacific Island descent	1	1	0	0
Other	6	7	5	10

Table Two: Distribution of education level and ethnicity in July and September.

The level of education was similarly spread throughout the population, except for post-graduate qualifications. Only 5 respondents claimed to have completed, or partially completed, a post-graduate degree, and all five of these respondents completed both questionnaires. This accounted for 6% of the sample population in July, and 10% in September. The biggest group was those who had completed secondary school, and consisted of 31 respondents (36%) in July, and 19 respondents (37%) in September. 33% of

the July sample and 27% of those in September held a trade or polytechnic qualification. Those who had completed a tertiary qualification consisted of 26% of the July sample and 27% of the September sample.

The majority of the respondents were New Zealanders of European descent. This group accounts for 71% of the total sample in July and 80% in September. The next highest group of respondents was Maori, which accounted for only 15% in July and 10% in September. Only one respondent was of Pacific Island descent, and this accounts for just over 1% of the July sample group. This respondent did not complete the second questionnaire. The remaining 7% of the subjects in July were of other descent, European, Australian, and Asian, and these respondents account for 10% of the sample group in September. These figures are similar to the 1996 census results of the Waimarino District, however, the sample is over-represented by New Zealanders of European descent and those from other ethnic origins, and under-represented by New Zealanders of Maori descent and Pacific Islanders. The census results show 58.4% of the people in the Waimarino district are of European descent, 39% belong to the Maori ethnic group, and only 1.1% of Pacific Island descent. Interestingly, according to the census results, 1.4% of people in this district are of other ethnic origin yet 7% of the July sample group and 10% of the September sample replied that they belonged to a different ethnic group than those listed.

The demographic variables of age, gender, ethnicity and education level were compared to levels of financial dependency on the local area within both the sample groups. This variable consisted of two groups, those who were dependent upon local income for financial security, and those who were not. In July only 7 respondents were not dependent upon the local area for their income, which accounted for 8% of the total sample group. In September 5 respondents were not locally dependent, and this made up almost 10% of this sample. Most of those who indicated they were not dependent upon a local income stated that they were beneficiaries of some kind, most often pensioners. The remainder of both sample groups, 92% in July and 90% in September, indicated that they were dependent upon local employment and business for their financial security (see Tables 3-6).

FINANCIAL DEPENDENCY								
	JULY				SEPTEMBER			
AGE	Local Depend	% of Sample	Not Local Depend	% of Sample	Local Depend	% of Sample	Not Local Depend	% of Sample
< 20	4	4.5	0	0	5	10	0	0
20-29	16	17	2	2	10	19	1	2
30-39	28	30	0	0	11	21	1	2
40-49	18	20	2	2	10	19	1	2
50-59	14	15	1	1.3	7	13	1	2
60-69	4	4.5	1	1.3	4	8	1	2
70-79	0	0	0	0	0	0	0	0
80+	0	0	1	1.3	0	0	0	0
TOTAL	84	91	7	8	47	90	5	10

Table Three: Financial dependency and age in July and September.

Both sample groups provided similar findings with regard to age and dependency upon local income. 100% of the respondents under 20 from July and September were dependent upon the local area for their income, and roughly 98% of 20-29 year olds were. Almost all of those aged between 30 and 59 were dependent upon locally generated income. This high dependency of middle aged adults on locally generated income may stem from the need to support families and dependent children. Those in the older age groups probably do not have as many dependents. Only 80% of those in the July sample aged between 70-79 were locally dependent upon income, while in the 80+ age group there was only one respondent. This subject was a beneficiary and did not require local income for financial security. This creates a 100% non-dependency on local income for the 80+ age group.

FINANCIAL DEPENDENCY								
	JULY				SEPTEMBER			
GENDER	Local Depend	% of Sample	Not Local Depend	% of Sample	Local Depend	% of Sample	Not Local Depend	% of Sample
Male	31	34	1	1	17	32	1	2
Female	53	58	6	7	30	58	4	8
TOTAL	84	91	7	8	47	90	5	10

Table Four: Financial dependency and gender in July and September.

Fewer women were financially dependent upon the local area than men were. 10% of the respondents from both groups combined had income from outside the local area, while only 4% (2 respondents) of the men were not locally dependent for financial income.

This difference between gender in regard to financial dependency upon the local area could also be due to families raising children. Traditionally, men provide income for their families. This may explain the high percentages of men that are locally dependent upon income. Most solo parents tend to be women. Therefore, women who are not financially dependent upon the local area may be raising children on their own and receive Government benefits.

FINANCIAL DEPENDENCY								
	JULY				SEPTEMBER			
ETHNIC GROUP	Local Depend	% of Sample	Not Local Depend	% of Sample	Local Depend	% of Sample	Not Local Depend	% of Sample
Maori Descent	14	15	1	1	5	10	0	0
European Descent	62	67	6	7	37	71	5	10
Island Descent	1	1	0	0	0	0	0	0
Other	6	7	0	0	5	10	0	0
TOTAL	83	90	7	8	47	90	5	10

Table Five: Financial dependency and ethnicity in July and September.

This table shows that similar percentages for all groups are dependent upon the local area for their income. In July, 93% of the Maori population were financially dependent upon the local area. 91% of New Zealanders of European descent and 100% of the other two ethnic groups were reliant upon local income. Only 7% of the Maori sample and 10% of the European sample could rely upon financial help from outside of the local area. In the September sample only New Zealanders of European descent were not dependent upon the local area for financial security. 100% of Maori and other ethnic origin groups were reliant upon income generated locally. However, the majority of the New Zealanders of European descent were financially dependent upon the local area (88%), with only 12% relying on income generated outside the local area.

FINANCIAL DEPENDENCY								
	JULY				SEPTEMBER			
Education	Local Depend	% of Sample	Not Local Depend	% of Sample	Local Depend	% of Sample	Not Local Depend	% of Sample
Secondary School	30	33	1	1	16	31	3	6
Trade or Polytech	27	29	1	1	14	27	0	0
Tertiary Qualified	18	20	4	4	12	23	2	4
Postgrad Qualified	4	4	1	1	5	10	0	0
TOTAL	79	86	7	7	47	90	5	10

Table Six: Financial dependency and education level in July and September.

In July 97% of those who had completed secondary school were dependent upon the local area for income. These figures are similarly reflected within the other education levels. 96% of trade and polytechnic qualification holders, 81% of those with a tertiary qualification, and 80% of those with post-graduate education were all reliant upon the local area for their income and financial dependency. These figures are similarly reflected in September. 84% of those who had completed secondary school were financially dependent upon the local area. The remaining 16% received income from elsewhere and consisted of three of the five respondents in the sample that were not reliant upon local income. 86% of those with tertiary education claimed to be financially dependent upon the local area. 100% of respondents in the trade/polytechnic qualification group and the post-graduate qualification group were dependent upon the local area for their financial well being.

Overall, the majority of both groups were dependent upon the local area for their financial security. Only 7.5% of the July sample, or seven respondents, were not financially dependent. One of these respondents was male, the remaining six women. One was of Maori descent, while the others were all New Zealanders of European descent. Those who were not financially dependent upon the local area ranged in age from 20 to 80+, and also ranged in education level, from completed secondary school right through to completing or partially completing a post-graduate degree. The majority of the September respondents were also reliant upon the local area for their financial well being. Only 5 of the

respondents, or 10% of the sample, were not. Four of these people were women, three had a secondary school education while the remaining two held University degrees, and all were of European descent, yet all were from different age groups, ranging from 20 to 60+.

The results obtained from each sample group are similar. However, the July sample was larger, and therefore produced more accurate local demographics. However, in both sample groups women responded twice as much as men, and the age groups were similarly distributed, with most of the respondents aged between 20 and 59. The majority of subjects in both groups had completed secondary school, but had gone no further with their education. Most of the subjects were of European descent and were financially dependent upon local income. The relationships that these demographic factors have upon the experimental variables are presented in chapter three.

CHAPTER THREE

RESULTS

All analyses in this study were performed using the Statistical Package for the Social Sciences, windows version (SPSS for Windows, version 6).

3.1 Variables

The following variables were within the survey. These variables were split into two different variable groups. These were experimental variables and demographic variables.

3.1.1 The Experimental Variables.

This consisted of the variables identified by Bachrach & Zautra (1985). Numerous variables were used to measure these three traits, social support, and also psychological symptomatology. Variables labelled self-efficacy and self-efficacy 2 were used to measure respondents levels of self-efficacy. Sense of community and community group membership were included to measure the respondents sense of community. Only one measure of coping style was included in the survey. Also used were two measures of social support, quantity of support network and perceived quality of relationships. The final experimental variable was the results from the HSCL-21, which was used as a self-report measure of symptom distress.

3.1.2 The Demographic Variables.

These variables were age, gender, ethnicity, level of education, and local financial dependency. These were compared with the experimental group of variables to examine the effects of demographic differences upon disaster outcome.

3.2 Statistical Procedures

A number of statistical procedures were used to investigate whether the data collected from the survey were consistent with the hypotheses developed. These procedures were included to ensure that the raw data had been thoroughly reviewed, and the final results were not misleading. The procedures used were correlation, principal components analysis, multiple

regression, and analysis of variance (ANOVA). These analyses were run on the data collected from July and September. The results were then compared to examine the differences between the two data collection points.

The nature of the study altered during the course of investigation due to the successful outcome of the 1997 ski season and the lack of on-going eruptions. Therefore, the comparison of the data collected in July and September resulted in an analysis of a bleak economic outlook versus a positive economic outlook (see section 2.3).

3.3 Correlation.

The first step in the analysis of the data was to test if the theoretical relationships implied between the constructs do exist, and to identify the strength and direction of these relationships. An examination of the relationships between variables was completed using correlation, and examining the significance levels. In all correlations, the only demographic variable shown is age, as no other produced significant results.

3.3.1 July Correlations.

When all the experimental variables, and the demographic variable of age, were included in a correlation matrix, three produced significant results with the HSCL-21. A number of the other variables also correlated significantly with one another. The correlations between the variables were not strong, nor even moderate and most were not even significant at 5% ($p=0.05$). The correlations are presented on the following page.

A few of these results were significant ($p < 0.05$), indicating that relationships are occurring between some of the variables. However, their effects on one another are not particularly strong, as identified by the low correlations.

The variables that correlated significantly with the HSCL-21 were age, the second measure of self-efficacy, coping style, and social support quality. Age had the most significant result and indicates that the older the respondent, the lower their score on the HSCL-21 is likely to be. The second measure of self-efficacy was also significant when compared to the HSCL-21. This negative correlation indicates that those with high self-efficacy are also likely to score low on the HSCL-21. Both coping style and social support quality had the same level of significance with the HSCL-21. Coping style correlated slightly higher than

social support quality. These suggest that as an individuals coping style becomes more problem-focused, the level of symptom distress decreases. Also, the greater the perceived quality of the respondent's social support network, the fewer symptoms are reported. These findings suggest that age, high self-efficacy, the use of a problem-focused coping style and high quality of social support help decrease the number of symptoms as reported by the HSCL-21.

	HSCL-21	Self Efficacy	2 Self Efficacy	Sense of Comm	Comm Groups	Coping Style	Support Quantity	Support Quality
HSCL-21	1.00							
Self efficacy	-0.16 (p=0.06)	1.00						
2 Self efficacy	-0.27 (p=0.01)	-0.009 (p=0.47)	1.00					
Sense Comm.	-0.01 (p=0.48)	0.003 (p=0.49)	0.045 (p=0.34)	1.00				
Comm. Groups	-0.06 (p=0.30)	-0.03 (p=0.39)	0.198 (p=0.03)	0.109 (p=0.16)	1.00			
Coping Style	0.24 (p=0.02)	-0.13 (p=0.11)	0.035 (p=0.37)	-0.121 (p=0.13)	-0.095 (p=0.19)	1.00		
Support Quan.	-0.14 (p=0.02)	0.03 (p=0.39)	0.084 (p=0.22)	0.21 (p=0.03)	0.113 (p=0.15)	-0.20 (p=0.03)	1.00	
Support Qual.	0.23 (p=0.02)	-0.28 (p=0.01)	-0.159 (p=0.07)	-0.004 (p=0.49)	-0.119 (p=0.14)	0.079 (p=0.24)	-0.30 (p=0.01)	1.00
Age	-0.31 (p=0.01)	0.07 (p=0.28)	0.147 (p=0.10)	0.087 (p=0.22)	0.227 (p=0.02)	-0.251 (p=0.01)	0.166 (p=0.07)	-0.227 (p=0.02)

Table Seven: Correlations from July (92 cases).

A number of the experimental variables correlated significantly amongst themselves. These relationships suggest that the variables are inter-related and do influence one another in various ways. The first significant correlation found was between the first measure of self-efficacy and social support quality. This suggests that those with high self-efficacy also perceive support networks of high quality, and vice-versa. Self-efficacy 2 correlated significantly with community group membership, which suggests that the higher an

individuals self-efficacy, the more community groups they are likely to belong to, and vice-versa. Interestingly enough however, 'sense of community' was not significantly correlated to either of the measures of self-efficacy, even though sense of community and community group membership are attempting to measure the same construct. However, sense of community was correlated significantly with the quantity of social support. This suggests that as an individual's sense of community becomes stronger, more people are added to the individuals support network, and vice-versa. Social support quantity was also significantly correlated with coping style. This negative correlation indicates that the more emotion-focused a respondent's coping style, the less people are included in their support network. The next significant correlation was between social support quantity and social support quality. Due to the direction of the scales, this relationship indicates that as social support quantity increases, so too does the perceived quality of these relationships, and vice-versa. Those who report the greatest number of people within their support network, also report the highest satisfaction with these relationships.

Interestingly enough, the demographic variable of age also correlated significantly with a number of variables. As well as correlating with HSCL-21, age also produced significant results when compared to community group membership, coping style and support quality. The positive correlation between age and community group membership suggests that the older an individual gets, the more community groups they become involved in. The negative correlations found between age and both coping style and support quality suggest that older people within the community are more likely to utilise a problem-focused coping style, and report greater satisfaction with the support that they receive.

These results are interesting in that they show the experimental variables in July to be inter-related. This implies that one variable may affect how a subject will respond on other variables, yet does not suggest that all the variables are significantly related. These relationships are not particularly strong, as indicated by the low correlations, even though some of the variables are attempting to measure similar constructs. The correlation matrix obtained shows that mostly, these variables are all independent of one another. This suggests that no underlying trait is being measured by a combination of these inter-related variables.

3.3.2 September Correlations.

In September none of the experimental variables correlated significantly with the results of the HSCL-21. This suggests that in this sample group, the variables have no influence on reported levels of symptom distress. This may be the result of distortion due to a low number of responses in the September sample, or due to the change in the nature of the investigation between the two data collection points. However, a number of the variables were correlated significantly with one another, and these relationships are presented below. No demographic variable produced significant results, therefore they were not included in the results below.

	HSCL-21	Self Efficacy	2 Self Efficacy	Sense of Comm	Comm Groups	Coping Style	Support Quantity
HSCL-21	1.00						
Self Efficacy	0.150 (p=0.17)	1.00					
2 Self Efficacy	-0.187 (p=0.12)	0.149 (p=0.17)	1.00				
Sense of Comm	-0.049 (p=0.38)	0.219 (p=0.08)	0.205 (p=0.09)	1.00			
Comm Groups	0.177 (p=0.13)	0.192 (p=0.11)	0.226 (p=0.07)	0.316 (p=0.020)	1.00		
Coping Style	-0.128 (p=0.21)	0.169 (p=0.14)	0.070 (p=0.33)	-0.304 (p=0.02)	-0.257 (p=0.05)	1.00	
Support Quantity	-0.126 (p=0.21)	0.150 (p=0.17)	-0.187 (p=0.12)	0.317 (p=0.02)	0.344 (p=0.01)	-0.03 (p=0.43)	1.00
Support Quality	0.109 (p=0.24)	-0.057 (p=0.36)	0.06 (p=0.35)	-0.275 (p=0.04)	0.111 (p=0.24)	0.042 (p=0.39)	-0.048 (p=0.38)

Table Eight: Correlations from September (52 cases).

All of the significant relationships were low to moderate, indicating that interactions are occurring between these variables, although the effects of these are not particularly strong.

The first significant relationship was between social support quantity and community group membership. This relationship suggests that the more community groups an individual belongs to, the greater the number of people within their social support network. The next

significant relationship found was between support quantity and sense of community. This indicates that those with a strong sense of community also have access to a larger support network, and relates to the first correlation between support quantity and community group membership. Support quality was only significantly related to sense of community. This negative relationship indicates that those with perceived low social support quality also report low levels of sense of community, and vice-versa.

Community group membership was significantly related to both sense of community and coping style in September. The positive relationship between community group membership and sense of community indicates that the greater the number of community groups an individual belongs to, the greater their sense of community. Whereas the negative relationship between community group membership and coping style implies that the less community groups an individual belongs to, the more likely they are to utilise an emotion-focused coping style. The final significant correlation found in September was between coping style and sense of community. This relationship indicates that those with emotion-focused coping styles also tend to have a low sense of community, and vice-versa.

Sense of community appears to be substantially related to both social support and coping style within the September sample. The majority of these relationships were not reported in July. The above relationships indicate that there are a number of significant interactions occurring between the experimental variables, but that these do not significantly influence symptom distress levels within the September sample.

3.3.3 Comparisons- July and September Correlations.

Only one correlation from July and September was common to both sets of data. This relationship was between social support quantity and sense of community. This positive relationship indicates that those in both groups reported a higher sense of community when their support networks consisted of a greater number of people. The overall strength of the correlations for each data set were similar, with no correlations being greater than 0.35.

Overall, the July sample produced results that indicate some of these variables had a relationship with symptom distress. None of the variables included in the study were related to symptom distress in September. However, in September there appeared to be a more substantial link between social support and sense of community, and also between sense of

community and coping style, than in July. This implies that in September, sense of community had a stronger impact upon the experimental variables than in July.

3.4 Principal Components Analysis (P.C.A).

The next set of analyses used multiple regression to examine if any of the variables, or a combination of variables, were accurate predictors of stress, as measured by the HSCL-21. However, since the hypotheses suggest that several of the variables are inter-related (Bachrach & Zautra, 1985, Paton, 1996a, 1996b), and these inter-related variables may also be associated with social support (Eustace, 1994), simply applying multiple regression to the data may have produced misleading results due to multicollinearity. To avoid this, a Principal Components Analysis (P.C.A) was conducted first, using the experimental variables to identify if any similar, underlying traits existed. P.C.A is often used in exploratory research to identify common traits or factors among a set of questionnaire results. If it is found that the variables are unrelated to one another then they can be used in multiple regression without problems of multicollinearity.

3.4.1 P.C.A - July.

One P.C.A was completed in July. This analysis was run using the seven variables used to measure self-efficacy, sense of community, coping style, and social support. The results from the HSCL-21 and the demographic variables were not included in this analysis.

The correlations from the initial matrix are consistently low. This consistency suggests a dimension of generality *may* exist. Although it is unlikely from the examination of the correlations that unique and independent factors will result that link a number of the variables, it is worth completing a P.C.A because of the similar, although low, correlational values of the variables included.

Three factors were extracted from this analysis. However, no one factor accounts for significantly more variation than either of the others (see figure one, following page). This suggests that there is not a strong inter-correlation between the measurement scales, even when it is expected there would be.

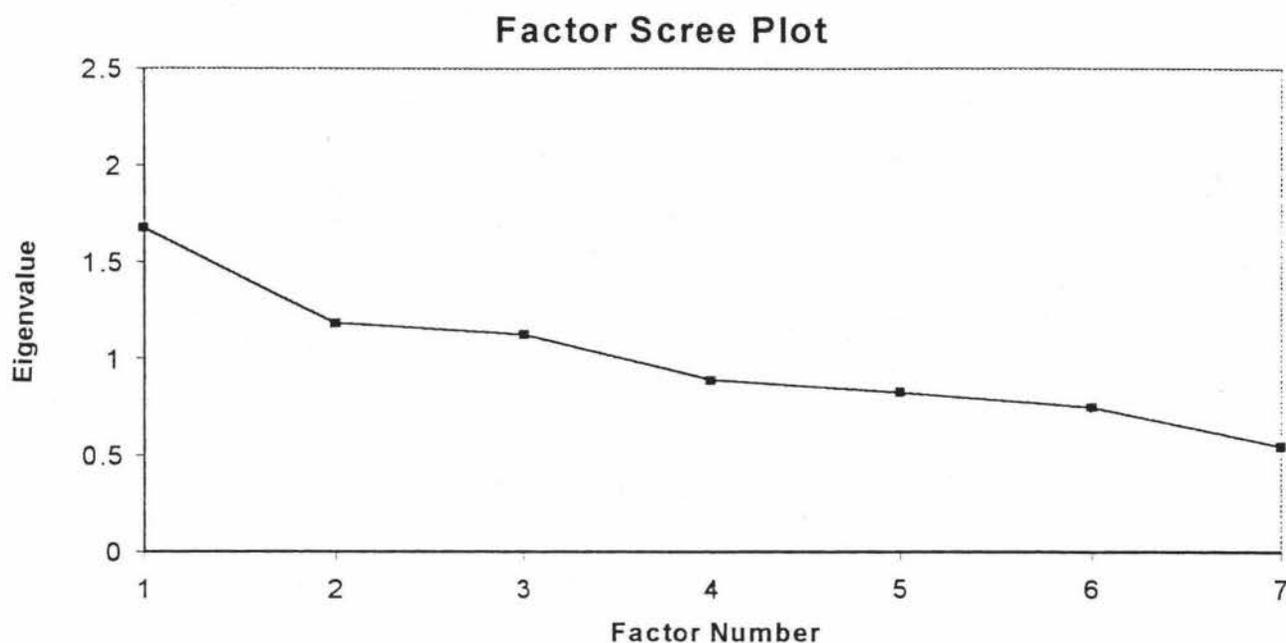


Figure i: P.C.A Scree plot – July.

The variation between these factors is not particularly different, yet the first factor does imply interesting relationships between the variables that load upon it (figure one). These variables are the two measures of social support, quantity and quality. Social support quantity has a factor loading of 0.67, and support quality has a loading of -0.66 . The factor loadings of the variables in this P.C.A. are presented in table nine.

VARIABLE LOADINGS	FACTOR ONE
Social Support Quantity	0.67
Social Support Quality	-0.66
Coping Style	-0.45
Community Groups	0.44
Sense of Community	0.38
Self-Efficacy	0.36
Self-Efficacy 2	0.34

Table Nine: Variable loadings on factor one - July.

None of the Bachrach & Zautra (1985) variables load heavily on this first factor, therefore suggesting that these variables are independent of the social support measures. The other factors calculated by the P.C.A all account for roughly the same proportion of the variance in the data set. This reinforces the initial findings that the Bachrach & Zautra (1985) variables are not highly inter-correlated.

The results of this P.C.A suggest that none of the Bachrach & Zautra (1985) variables are related to a common underlying trait. Yet these results do suggest that the two measures of social support are related. However, it appears that support quality alone is adequate to measure social support, as this was the only measure of social support that was significantly related with the HSCL-21 (see section 3.3.1). This does not propose that support quantity does not have an impact upon symptom outcome. Instead, this implies that the measure of support quality is slightly more dominant in predicting levels of symptom distress than is support quantity. Although both measures of support load heavily onto the first factor extracted from the P.C.A, these results are not startling enough to suggest a common underlying trait associating these variables (refer to figure one).

Because the results of the P.C.A showed that these variables were not related to any common, underlying traits, it was assumed that a multiple regression would be appropriate to extract information from the data set. Multicollinearity was not to be a confounding problem with the variables during the multiple regression analyses.

3.4.2 P.C.A - September.

Again, one P.C.A was completed in this sample to determine if there were links between the experimental variables and any underlying traits. All the significant relationships found within this analysis contained one of the two variables attempting to measure 'sense of community'. This is similar to the results found in section 3.3.3. The results obtained from September show little correlation amongst the variables. This implies that the results from the P.C.A may yield interesting results, due to the fact that all the correlational values are similarly low. The figure below shows that the first factor extracted is more prominent than the others (figure two). This indicates that the variables that load heavily on this factor are possibly related to an underlying trait.

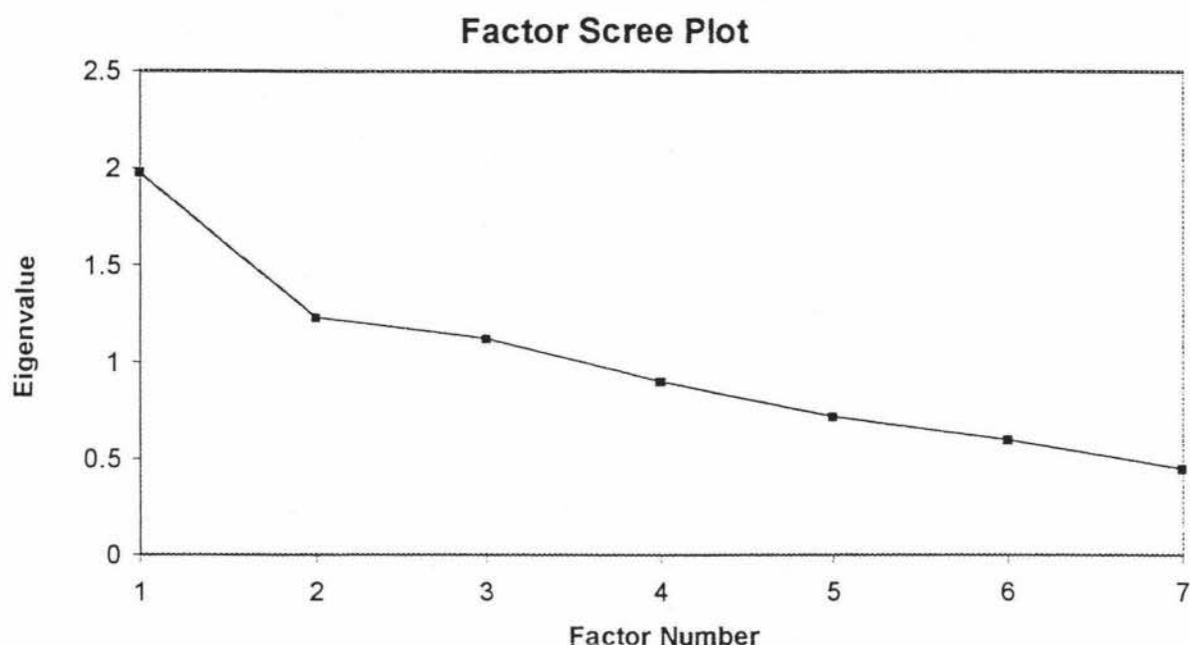


Figure ii: P.C.A Scree plot – September.

The prominence of this first factor accounts for more variation than is expected due to chance. The variables included in this factor are sense of community, community group membership, and social support quantity. The factor loadings for these variables suggest a strong inter-correlation between these measures, as was found in section 3.3.2, and an association with a common underlying trait. The factor loadings of the first factor are shown in table ten below.

VARIABLE LOADINGS	FACTOR ONE
Sense of Community	0.77
Community Groups	0.70
Social Support Quantity	0.61
Self-efficacy 2	0.41
Coping Style	-0.35
Self –Efficacy	0.41
Social Support Quality	-0.23

Table Ten: Variable loadings on factor one - September.

The results from this P. C. A showed that three of the independent variables are possibly related to an underlying trait. It is therefore important to consider these relationships when analysing the results obtained from the multiple regressions.

3.4.3 Comparisons - July and September P. C. A.

The P.C.A from each set of data produced noticeably different results. The July data indicated that the variables were inter-related, yet were not linked by a common underlying trait. All the variables from July were found to be measuring different constructs, even when some were intended to measure similar ones. However, the two measures of social support were found to load heavily upon the first factor, implying a relationship between the two. This factor was not strong enough to indicate an underlying trait. The September P.C.A produced very different results. This analysis suggested that the variables of sense of community, community group membership, and social support quantity were all attempting to measure a similar, underlying construct. This indicates the need for caution when interpreting the results from the September multiple regressions using these variables.

3.5 Multiple Regression.

Multiple regression measures the impact of a number of variables on one dependent variable. The dependent variable in the present study is the HSCL-21. The independent variables are sense of community, self-efficacy, coping style, and social support. Age was also used in the multiple regressions run using the July data, as significant correlations were found between this variable and the HSCL-21 (see section 3.3.1). Multiple regression was appropriate for use in this study, as it assessed the contribution each independent variable made towards explaining the total variance associated with the HSCL-21.

Because it was expected that all the constructs studied would influence stress level, a model of forced entry multiple regression was used. This forced all the predictor variables into the regression model. From this initial model of multiple regression, and the results achieved, it was possible to run further regression analyses based upon the hypotheses and the results of previous models, to determine the best model for the data, and identify the best predictors of symptom distress. Once these results were achieved, it was possible to identify those individual characteristics most involved in healthy recovery following exposure to volcanic eruptions within a rural New Zealand community.

3.5.1 Multiple Regression - July.

Six multiple regression analyses were run using the first data set. These were completed to examine the individual effects of each of the experimental variables, and the influence that these have upon symptom distress outcome, as measured by the HSCL-21. The first regression analysis included the Bachrach & Zautra (1985) variables and the results from the HSCL-21. 92 cases were included in this analysis as none of the subjects provided missing data on these measures.

The correlations from this analysis were similar to those in section 3.3.1, although self-efficacy was now slightly associated to HSCL-21 (-0.2, $p=0.02$). This relationship suggests that as an individual's level of self-efficacy increases, their symptomatology, as measured by the HSCL-21 will decrease. This supports the previously found relationship between self-efficacy 2 and the HSCL-21. The table below shows the beta values of the variables in this analysis, and their significance levels.

VARIABLE	BETA	SIGNIFICANCE
Self Efficacy 2	-0.25	0.02
Coping Style	0.22	0.03
Self-Efficacy	-0.17	0.09
Sense of Community	0.05	0.61
Member of Community Groups	0.03	0.79

Table Eleven: Beta values and significance levels in the first regression model - July.

Self-efficacy 2 and coping style produced significant results ($p=0.05$). These two variables also produced the strongest beta weights. This indicates that these variables have the strongest influence on symptom distress outcome, as measured by the HSCL-21. The direction of the beta values also provides information on the nature of these relationships. The negative relationship of self-efficacy 2 with symptomatology indicates that symptom distress levels will be high when an individual reports low levels of self-efficacy. The positive relationship noted between symptomatology and coping style again is a result of the direction of the scale, and implies that those who report a high number of symptoms will also report the use of an emotion-focused coping style. These results support the findings in section 3.3.1. Other results from this analysis are presented in the following table:

Multiple R	0.378
R Square	0.142
Adjusted R Square	0.930
Standard Error	7.032
Residual Mean Square	49.46
Significant F	0.0193

Table Twelve: Results from the first regression - July.

The multiple R of this analysis was 0.38. This indicates a small linear relationship between the independent and dependent variables. The R square for this analysis was 0.14, accounting for 14% of the total variance within the model. The significance level of this analysis was acceptable at 0.02. The residual mean square and related significant F value can be compared to other models to examine which model explains the most variance and determine the success of each model. Here, the residual mean square value is significant, and predicts a moderate linear relationship between the HSCL-21, and the other variables within the model.

From the first regression analysis, it was found that the variables of self-efficacy 2 and coping style were recognised as the best predictors of symptom distress outcome as measured by the HSCL-21. These results were tested in further multiple regression analyses.

The second regression analysis examined the effects social support quantity and quality had upon symptom distress. 86 cases were included in this analysis. The correlations derived from this analysis were identical to those found in section 3.3.1. Support quantity and support quality were again negatively correlated with one another, and only support quality was significantly related to symptom distress outcome. The beta values and significance levels of social support quantity and quality are shown below. Neither of these results are significant at 5% ($p=0.05$), however, support quality is nearly significant ($p=0.06$). Given that these two measures have one of the greatest correlations within this study and appear to be related on the P.C.A, it would be surprising to find that both were significant, or nearly significant, in this type of analysis.

VARIABLE	BETA	SIGNIFICANCE
Social Support Quantity	-0.08	0.48
Social Support Quality	0.21	0.06

Table Thirteen: Beta values and significance levels in the second regression model - July.

The multiple R from this analysis was 0.25, which suggests a small linear relationship between social support and the HSCL-21. The R square for this analysis was 0.059, which accounts for only 6% of the total variance within the model. These results are not significant at 5% ($p=0.05$). Therefore, the residual mean squares does not imply a stronger linear relationship between the dependent and independent variables within this model, than the previous model. These results are presented below.

Multiple R	0.245
R Square	0.059
Adjusted R Square	0.037
Standard Error	7.304
Residual Mean Square	53.35
Significant F	0.077

Table Fourteen: Results from the second regression model - July.

Previous analyses identified that the Bachrach & Zautra (1985) variables and the social support variables produce some impact upon symptom distress levels. Therefore, all variables were placed into the third regression model. 86 cases were entered on this model. The correlations found in this analysis were identical to those found in section 3.3.1, except for one that occurred between self-efficacy and community group membership (0.2, $p=0.03$). Although this correlation is low, the significance is important, and implies that the more community groups an individual belongs to, the greater their self-efficacy. This relationship has interesting implications for community psychology, and also community recovery from disaster. The beta scores and significance levels of the variables in this analysis are presented in the following table.

VARIABLE	BETA	SIGNIFICANCE
Self Efficacy 2	-0.26	0.01
Coping Style	0.22	0.04
Social Support Quality	0.14	0.22
Self-Efficacy	-0.10	0.38
Social Support Quantity	-0.04	0.70
Sense of Community	0.04	0.72
Member of Community Groups	0.03	0.79

Table Fifteen: Beta values and significance levels in the third regression model - July.

Two of these variables reported overall significance ($p=0.05$). These were self-efficacy 2 and coping style. This is similar to the results of the first regression equation and implies that these two variables produce the greatest impact upon symptom distress when all experimental variables are included in the model. Self-efficacy 2 and coping style are the best predictors of symptom distress, as calculated by this analysis.

It is interesting to note that the social support variables were not significant when included with the Bachrach & Zautra (1985) variables. Because the results of the July P.C.A found that both support measures loaded heavily upon the first factor, it is assumed that there is a link between the social support variables and the significant variables of self-efficacy 2 and coping style. Two significant correlations between these variables were found in section 3.3.1. The first correlation implied that those with low social support quantity adopt a more emotion-focused coping style. The second correlation indicates that low self-efficacy is associated with dissatisfaction of the support network. These relationships imply that those who need the most support during recovery from a disaster have the least access to adequate support networks. These people may also go unnoticed by the community and outside recovery agencies. This creates a group of 'at risk' individuals who may go undetected for years.

When all the variables are entered on the regression, the multiple R is 0.41, which produces a stronger linear relationship between the dependent and independent variables than the previous regression models. This is expected, as a larger number of variables were entered on this regression. A better predictor of the success of this model is the residual mean squares, which was 49.99, (significant $F=0.03$) which suggests a moderate linear relationship between the dependent and independent variables. This result is similar to that

found in the first regression model, and incomparable to the second model, which was insignificant. The R square of this model is 0.17. This implies that when the social support variable is added to the Bachrach & Zautra (1985) variables, a greater percentage of the total variance is accounted for. The overall significance level of this analysis was 0.03. These results are presented below.

Multiple R	0.415
R Square	0.172
Adjusted R Square	0.098
Standard Error	7.070
Residual Mean Square	49.99
Significant F	0.034

Table Sixteen: Results from the third regression model - July.

The results obtained from this analysis suggest that self-efficacy 2 and coping style are the most accurate predictors of symptom distress outcome, as measured by the HSCL-21. These two variables are, in turn, mildly influenced by social support quality and quantity, respectively. Self-efficacy 2 and coping style were then included in another regression to assess their combined impact upon the dependent variable. 92 cases were entered into this model. Both of these variables correlated significantly with the HSCL-21 ($p=0.05$), and mirror the correlations found in section 3.3.1, neither of which was particularly strong, yet both indicate a moderate influence on symptom distress. The relationships between these variables have previously been considered (refer section 3.3.1), and suggest that the higher an individual's level of self-efficacy, the less symptoms they are likely to report on the HSCL-21. Also, those who employ a problem-focused coping style also tend to report less symptoms of distress.

From this regression, it was concluded that the variables of self-efficacy 2 and coping style are the best predictors of symptom distress, as measured by the HSCL-21. The beta values and the significance level of these help to support this notion, and are presented below.

VARIABLE	BETA	SIGNIFICANCE
Self Efficacy 2	-0.24	0.02
Coping Style	0.23	0.02

Table Seventeen: Beta values and significance levels of variables in the fourth regression model - July.

Although the beta weights of these variables are not particularly strong, the level of significance is important. This table indicates that although self-efficacy 2 and coping style do not have a great influence upon symptom distress outcome, they do impact significantly, and will affect the individual's responses on the HSCL-21 during periods of high stress within the community, as during the July data collection point. The previous table also shows that self-efficacy 2 and coping style will impact equally upon outcome, due to the similarity of the beta weights. Table eighteen presents the results from this regression.

Multiple R	0.331
R Square	0.110
Adjusted R Square	0.897
Standard Error	7.045
Residual Mean Square	49.63
Significant F	0.0057

Table Eighteen: Results from the fourth regression model - July.

The multiple R was 0.33, indicating that these variables have a moderate linear relationship with the HSCL-21. The residual mean square was 49.63, thus indicating that this model produced similar results to the first and third regression models, in terms of linearity between the dependent and independent variables. The R square was 0.11. This indicates that these variables alone account for 11% of the total variance associated with the model (significant F= 0.005). This percentage can be compared with the 17% that all the variables combined produced.

Another regression model was run including all the experimental variables and the demographic variables of age, education and gender. Ethnicity was not included due to the low representation of some of the ethnic groups. Interestingly, age was found to be an accurate predictor of symptom distress along with self-efficacy 2 and coping style. A final regression was then completed, using only age, self-efficacy 2 and coping style.

From this analysis, it was concluded that self-efficacy 2, coping style and age are the best predictors of symptom distress, as measured by the HSCL-21. The beta values and the significance levels of these help to support this notion, and are presented in the table below.

VARIABLE	BETA	SIGNIFICANCE
Self Efficacy 2	-0.24	0.02
Coping Style	0.23	0.04
Age	-0.28	0.01

Table Nineteen: Beta values and significance levels in the final regression model - July.

The beta weights of these variables are all roughly similar, yet it is interesting to note that age has the greatest effect on the HSCL-21. This suggests that age is having an effect over and above the psychological factors included in this study. This relationship implies that as an individual gets older they will report lower symptom distress levels on the HSCL-21. This supports other results found in this study (refer section 3.3.1). The above table also indicates that although these variables do not have a great influence on symptomatology, they will affect an individual's response to the HSCL-21 during times of high stress within the community. The results from this analysis are presented in table twenty.

Multiple R	0.40
R Square	0.16
Adjusted R Square	0.14
Standard Error	7.02
Residual Mean Square	49.40
Significant F	0.01

Table Twenty: Results from the final regression model - July.

The residual mean square from this analysis is comparable to those in other significant regression models, and the multiple R was 0.40, indicating that these variables have a moderate linear relationship with the dependent variable. The R square was 0.16, indicating that these variables, without the influence of any other variables, account for 16% of the total variability associated with the model.

From this series of analyses, and in particular the final analysis, the results suggest that three variables, age, coping style and the second measure of self-efficacy, were the best predictors of symptom outcome when community stress was high. A similar set of regression analyses were run using the September data to examine if the same variables are accurate predictors of stress when there is little threat from a community stressor.

3.5.2 Multiple Regression - September.

As in July, a number of regression models were run with the September data. The first of these included the Bachrach & Zautra (1985) variables. None of these variables were significantly related to the HSCL-21 (significant $F=0.46$). The second regression model included the two variables of social support, quantity and quality. Again, no significant results were found (significant $F=0.58$). These results indicate that not one of these variables was a significant predictor of symptom distress outcome during times of low stress within the Ohakune community. The results from these analyses are presented below.

REGRESSION ONE		
VARIABLE	BETA	SIGNIFICANCE
Self Efficacy	0.158	0.34
Self Efficacy 2	-0.244	0.11
Sense of Community	-0.103	0.53
Community Group Membership	0.192	0.23
Coping Style	-0.653	0.68
REGRESSION TWO		
Social Support Quantity	-0.121	0.44
Social Support Quality	0.103	0.51

Table Twenty-One: Beta values and significance levels from regression models one and two - September.

The third regression model included all the variables from the first and second regressions. Again, no significant results were obtained (significant $F=0.43$). The beta values and significance levels from this analysis are in table twenty-two.

VARIABLE	BETA	SIGNIFICANCE
Self Efficacy	0.21	0.22
Self Efficacy 2	-0.23	0.16
Sense of Community	-0.81	0.67
Community Group Membership	0.25	0.18
Coping Style	-0.11	0.52
Social Support Quantity	-0.21	0.24
Social Support Quality	0.52	0.75

Table Twenty-Two: Beta values and significance levels of the third regression model - September.

Due to the insignificant results from these analyses, the September results differ vastly from those found in July. In September, no significant predictors of symptom distress were found. This implies that it is difficult to identify factors that influence impact and recovery within the community when the stressor is not threatening. This creates uncertainty in establishing an effective disaster contingency plan within the pre-disaster community.

However, due to the inter-dependencies of three of the variables within the September P.C.A (refer to section 3.3.6), a final multiple regression was run. This analysis combined the three variables that loaded heavily upon the first factor (sense of community, community group membership, and social support quantity) and re-named them PC1. This variable was included in a multiple regression analysis with the remaining four independent variables, and the beta values and significance levels are presented in table twenty-three. No new results were gained from this analysis, and again, no significant relationship with symptomatology was recorded (significant $F = 0.52$). These results indicate that in September, during a period of low stress within the community, the data did not contain any variable that could accurately predict symptomatology.

VARIABLE	BETA	SIGNIFICANCE
PC1	-0.054	0.813
Self Efficacy	0.240	0.215
Self Efficacy 2	-0.181	0.320
Coping Style	-0.178	0.348
Social Support Quality	0.107	0.509

Table Twenty-Three: Beta values and significance levels of the fourth regression model - September.

However, the new variable, PC1, correlated significantly ($p=0.05$) with coping style, self-efficacy and self-efficacy 2. PC1 also correlated less significantly ($p=0.1$) with the final variable, social support quality. This indicates that in this data set, the independent variables are more strongly related than they were in July. However, PC1 did not correlate significantly with the HSCL-21. These correlations are in the following table.

	HSCL-21	PC1	Self Efficacy	2 Self Efficacy	Coping Style	Support Quality
HSCL-21	1.00					
PC1	0.01 ($p=0.48$)	1.00				
Self Efficacy	0.15 ($p=0.17$)	0.42 ($p=0.01$)	1.00			
2 Self Efficacy	-0.187 ($p=0.12$)	0.41 ($p=0.01$)	0.149 ($p=0.17$)	1.00		
Coping Style	-0.128 ($p=0.23$)	-0.35 ($p=0.01$)	0.169 ($p=0.14$)	0.07 ($p=0.33$)	1.00	
Support Quality	0.109 ($p=0.24$)	-0.23 ($p=0.07$)	-0.057 ($p=0.36$)	-0.057 ($p=0.36$)	0.042 ($p=0.39$)	1.00

Table Twenty-Four: Correlations including PC1 - September.

These relationships all suggest that as an individuals levels of sense of community and support networks increase, and community group membership also increases, so too, does the individuals levels of self-efficacy, the use of a problem-focused coping style, and satisfaction with the support received. These results are similar to those found in section 3.3.2. This implies that all these variables are significantly related to one another, yet while they may aid in the positive adjustment to stressors within the community, they do not accurately predict on-going psychological symptoms that may develop as a result of exposure to disaster, during pre-disaster times.

Another regression was completed including the variable of age, as this variable was significant in July. However, these results are not reported here, as age was not significantly related to any of the other variables in September. This suggests that age may be an important factor for healthy recovery within a disaster population, but in a non-

disaster community during periods of low stress, age does not provide significant information for the development of a community response plan.

3.5.3 Comparisons - July and September Multiple Regressions.

The multiple regressions of July and September differ dramatically, and no significant predictors of symptom distress were found in September. The analyses of the July data, when community stress was high, produced results that identified age, self-efficacy 2 and coping style as the greatest predictors of symptom distress. It was also found that social support quality and quantity, respectively, mediated these effects. The multiple regressions run from the September data, when the threat of a community stressor was low, found that none of the variables were good predictors of symptom distress levels. This provides interesting implications for the community psychologist working within disaster populations, and enforces the importance of timing of assessment following a disaster. These implications will be discussed in more detail in chapter four.

3.6 Analysis of Variance (ANOVA).

The aim of the current research is to answer the hypotheses which been developed from theory. However, further information can be obtained from the data. For example, how do those from different ethnic backgrounds score on the symptom distress measure? Are the social support networks of women as adequate as those reported by men? Do those with a lower education have fewer skills necessary for adequate coping? How does gender affect stress levels? Demographics of the sample population regarding age, gender, level of education and ethnicity were collected and can be compared to the experimental variables using the statistical procedure of ANOVA.

In this set of analyses, the means of different demographic groups were examined to investigate if they were significantly different when compared to the experimental variables. This was completed using analysis of variance (ANOVA). ANOVA is a statistical procedure that compares the means of two or more groups simultaneously, and allows for the identification of differences between the groups. Therefore, this technique can be used to answer the above questions, and also to examine results from the measure of symptom distress, and identify which groups are most at risk of developing long term psychological disorders as a result of exposure to a natural disaster. By doing these

analyses, the researcher can determine if this research identifies the same 'at risk' groups as previous research.

3.6.1 ANOVA - July and September.

A number of ANOVA analyses were run, comparing the means of the demographic groups and the experimental variables. These analyses were run to examine the effects of age, gender, ethnicity and education level on the individual characteristics of self-efficacy, sense of community, coping style, perceived social support quantity and quality, and levels of symptomatology.

Before these analyses could be run, the demographic variables of age and education level were reduced into smaller groups. This was due to the low response, and stopped the groups from becoming ridiculously small, thus providing unreliable information. The demographic variable of age was merged from eight groups to two. These groups consisted of those who were under 50 and those who were over 50. The cut off for age was decided at less than 50, and 50+ in order to keep the two groups fairly even in terms of membership numbers. The age frequencies from July and September are presented below.

JULY	
Age Group	Frequency
Under 50	70
50+	21
SEPTEMBER	
Age Group	Frequency
Under 50	36
50+	12

Table Twenty-Five: Distribution of age - July & September.

Level of education was also merged into smaller groups, and was reduced from five divisions to only two. These consisted of those who had completed secondary school with those with a trade or polytechnic qualification in the first sub-group, and those who had any type of university qualification in the second. The frequencies of each group are shown in table twenty-six.

JULY	
Level of Education	Frequency
Secondary school, Trade, Polytech.	59
University Qualifications	27
SEPTEMBER	
Secondary school, Trade, Polytechnic.	32
University Qualifications	16

Table Twenty-Six: Distribution of education level - July & September.

Once these groups were re-coded into variables with reasonable numbers in each category, it was possible to compare means of various groups, using ANOVA.

The first analyses completed were two way ANOVA's. Age and gender were compared with each of the eight dependent variables, which were now the previous experimental variables, and the HSCL-21. Most of these were insignificant, however, five from July produced significant results, shown in the table below.

	DEPENDENT VARIABLES			
	HSCL-21	Coping Style	Social Support Quantity	Social Support Quality
Age Group	F= 6.8 (p=0.01)	F=4.5 (p=0.04)	F= 4.7 (p=0.03)	F= 4.1 (p=0.04)
Gender	F=0.5 (p=0.83)	F=5.3 (p=0.02)	F= 1.7 (p=0.20)	F= 2.8 (p=0.10)
2-Way Interaction		F= 2.7 (p=0.11)	F= 2.8 (p=0.10)	F= 0.2 (p=0.20)

Table Twenty-Seven: Results of ANOVA, age and gender - July. (p<0.05)

The first significant result from July was between age group and level of symptomatology, as recorded by the HSCL-21. This relationship found that those from the 50+ age group reported fewer symptoms of psychological distress than those in the younger age group. The next result was between age group and coping style. This indicates that people over 50 tend to have a more problem-focused coping style than those in the younger age group. Another significant result occurs between gender and coping style. Interestingly enough, this shows that women tend to possess a more problem-focused coping style than men. The next significant result is between social support quantity and age group. This indicates that the older members of the sample (over 50) report higher levels of social support quantity than those in the younger age group. The older members of the community also reported

the greatest satisfaction with the support they received, as shown in the final significant result between age and social support quality. This supports the previously found relationship between support quantity and quality.

Most of the ANOVA's from September regarding age and gender were also insignificant, only two yielded significant results ($p=0.05$). Neither of these were similar to those found in July. However, four results significant at 10% ($p=0.1$) were also found in September, and these are mentioned below. Two of these were similar to those found in July between age and coping style and age and support quantity. These results are shown in the following table.

	DEPENDENT VARIABLES			
	Sense of Community	Social Support Quality	Coping Style	Social Support Quantity
Age Group	F=3.5 ($p=0.01$)	F=1.6 ($p=0.22$)	F=3.9 ($p=0.05$)	F=0.2 ($p=0.63$)
Gender	F=6.5 ($p=0.50$)	F=5.7 ($p=0.02$)	F=0.4 ($p=0.51$)	F=1.8 ($p=0.19$)
Two-way Interaction	F= 1.5 ($p=0.23$)	F=1.7 ($p=0.21$)	F=3.5 ($p=0.07$)	F=3.5 ($p=0.08$)

Table Twenty-Eight: Results of ANOVA, age and gender - September. ($p<0.05$)

These findings indicate that, mostly, age and gender play no role in determining individuals responses. However, significant results ($p<0.05$) suggest that sense of community is influenced by age, and gender influences perceptions of social support quality. Older people reported a greater sense of community than younger people, and men reported higher levels of support quality than women. Almost significant results hint that older people use a problem-focused coping style more than younger community members. Older men are the *most* likely to utilise a problem-focused coping style, followed by older women, then young women, and young men are most likely to adopt an emotion-focused coping style. These results also hint that older men have the greatest satisfaction with their support networks, and older women are the least satisfied.

These results produce interesting information on the differences between the sub-groups of the respondents from both July and September based upon age and gender. To compare these sub-groups in terms of ethnicity and education levels, one way analyses of variance were run using the eight dependent variables for comparison. None of the results in July and only two in September were significant ($p=0.05$) in these analyses. This indicates that

the demographic variables of education level and ethnicity did not influence levels of individual characteristics, perceptions of social support, or levels of symptom distress in July, when community stress was high. However, an almost significant result was recorded between education level and self-efficacy 2 in July ($p=0.055$). This relationship hints that those with a university level education may have higher levels of self-efficacy than others.

In September, when the community stressor had decreased and community stress was low, level of education significantly affected both symptom distress and self-efficacy 2. These results are presented in the table below, and imply that those with a university level education reported higher levels of self-efficacy 2 and a lower number of psychological symptoms than did those who did not go to university.

	DEPENDENT VARIABLES	
	HSLC-21	Self Efficacy 2
Education Level	F=4.3 ($p=0.04$)	F=4.4 ($p=0.04$)

Table Twenty-Nine: Significance levels of ANOVA - September. ($p<0.05$).

3.6.2 Comparisons - July and September ANOVA.

The ANOVA's of each data set produced only some similar results. In July, older people reported lower levels of symptomatology and a greater use of problem-focused coping styles. Women were also more likely to use a problem-focused coping style. None of these results were duplicated in September, however, those with a higher level of education were likely to report lower levels of symptomatology, and greater levels of self-efficacy 2. In July, older people reported higher levels of both social support quantity and quality. September produced different results, with gender influencing the perceived quality of social support. Men reported greater satisfaction with support quality than women. Age also significantly influenced reported levels of sense of community in September, where it was found that people over 50 reported higher levels of sense of community than those in the younger age group.

Overall, the differences between July and September are fairly substantial, although some similar patterns do emerge. The two sample groups were different in terms of size, yet those in September were also part of the July response. The differences between the two sets of results are most likely caused by the positive recovery from the economic impact

resulting from the eruptions, and the change in the nature of the community stressor between these two points in time.

The results collected in July and September provide interesting relationships and associations between the variables in this study. The implications of these results, and what they mean in practical terms, will be discussed in chapter four. However, because the results between the two data collection points differed dramatically, it was of interest to carry out further analyses in an attempt to understand exactly why these differences occurred.

3.7 Matched Cases

It was possible to match some of the respondents from both July and September, and run the analyses again, using these new groups. The results of these analyses were then compared with one another to examine if the differences still existed when only the same subjects were included. This was completed in order to increase the accuracy of the results by increasing confidence levels of the predictor variables. 31 subjects from both surveys could be accurately identified, and their responses compared. These results were placed into two new data sets, again, July and September responses. Unfortunately, all the results from these analyses were insignificant, thus providing no further insight into the relationship between the variables and symptom outcome. These results suggest that in regard to the matched cases from July and September, no variable was a useful or significant predictor of either effective recovery or symptomatology.

3.8 Histograms

To further examine the differences found in the initial results between July and September, a set of histograms were examined that allowed for visual comparisons to be made. Four sets of histograms were created that compared levels of symptomatology with the experimental variables. Two sets came from the original sets of data from July and September and two from the matched subjects sample groups. These histograms produced an interesting set of results, which provided further insight into the relationship between the predictor variables and their influence upon symptomatology. The results from these are presented below. (Also see Appendix I).

From the original data, the range of responses was greater in July than September. More extreme responses were collected in July. This was found for all the variables, including HSCL-21 results, with the exception of self-efficacy 2 and social support quality. However, although the differences were not particularly strong, some interesting comparisons were found. Levels of sense of community were similar in both July and September. Yet in July one respondent scored very highly on sense of community, who either did not respond in September, or reported a lower level. The range of responses on self-efficacy 2 did not alter between July and September, and social support quality was the only variable that *increased* in range during September. The respondents in July reported access to larger social support networks than did those in September. It is also interesting to note that those who responded in September reported lower levels of satisfaction with their support networks. The number of symptoms reported on the HSCL-21 decreased slightly in September. However, the lowest number of symptoms found was reported within the July sample.

These graphs show that in general, the range of responses decreased in September. These results provide interesting comparisons, yet it is not clear if this decrease in range is due to the absence of extreme respondents in September, or if those reporting extreme levels in July have reported less extreme responses in September. The matched case histograms were examined to determine which of the above two scenarios was more likely. These graphs identified that those with extreme responses in July did not respond in September. This finding supports the idea that those most in need of on-going aid are the least likely to seek help in the non-disaster environment. The results from the matched case histograms are presented below.

The range of community group membership was greater in September than in July, yet the overall number of community groups that an individual belonged to had decreased in September. It was also found that sense of community in September was more extreme than in July. Interestingly, opposite results were found between self-efficacy and self-efficacy 2. Levels of self-efficacy amongst the respondents appeared to decrease in September, whereas self-efficacy 2 increased. This suggests that these two scales are actually measuring opposite constructs, and creates assessment issues for future researchers. Responses to coping style decreased in September, with more subjects indicating the use of problem-focused coping styles. It appears that the respondents have become more problem-focused after the initial economic recovery of the community. Reported levels of both social support quantity and quality were greater in July than in September, and levels of

symptomatology had decreased in September. The maximum number of symptoms dropped from 55 to 47, indicating that either overall levels of psychological symptomatology had decreased with the initial financial recovery of the community, or those still suffering from high levels of symptomatology had not responded in September.

The results obtained from the matched subjects histograms provided interesting information of community levels on the variables at different points in time. These graphs also suggest that the more extreme respondents who replied to the questionnaire in July did not complete the survey in September. This provides information on identifying individuals 'at risk' following a disaster, before recovery begins. These results also suggest that those at risk of developing longer term problems associated with a stressful event are less likely to respond to assessment procedures during times when they perceive a non-disaster situation. These implications, and others gained from the results, will be discussed in chapter four.

CHAPTER FOUR

DISCUSSION

4.1 Hypothesis Testing

Each hypothesis was examined individually and compared to the appropriate results. The implications from these are discussed below. The results of this study were also compared to previous studies, in an attempt to identify and confirm suggested consistencies amongst victims and their response to disaster.

4.1.1 Hypothesis One:

"Victims who perceive themselves to be in possession of high self-efficacy, and a strong sense of community will report a lower number of psychological and stress related symptoms than those who do not perceive themselves to be in possession of these individual characteristics."

The results found from this study do not directly support this hypothesis. The analyses completed did not identify self-efficacy and sense of community to be accurate predictors of psychological outcome independent of other variables. Self-efficacy 2 was found to be an accurate predictor of psychological symptomatology in July. Yet this is not to say that strong sense of community is not helpful in promoting effective recovery within the community following exposure to a natural disaster.

A relationship between self-efficacy and sense of community does exist, but is not strong enough to predict outcome of disaster independently. In July, both measures of self-efficacy were significantly related to community group membership. This relationship suggests that as the number of community groups an individual belongs to increases, so too do their levels of self-efficacy. It is therefore possible that self-efficacy may be increased by involvement in community groups and activities. However, neither measure of self-efficacy was related to sense of community within the July data. Results from September reported a relationship between community group membership and sense of community. This relationship suggests that involvement in community groups increases sense of community, and vice-versa. That these results were found at this time also suggests that sense of community may be greatest when community members perceive little threat from community stressors. Therefore, community response plans developed in periods of non-disaster may be more accepted by the community as a whole as sense of community is

high. This knowledge and acceptance of a response plan will aid in their preparation and response to a disaster, and will also help community members to maintain a realistic appraisal of risk. Results also suggest that community group membership was slightly less in September than July. This decrease may have resulted from the disintegration of formal and informal groups that evolved as a direct response to the economic pressures placed on the community due to the eruptions. Alternatively, these groups may no longer exist as there may be less need for support when community conditions are good. Finally, community members may simply not have the time to remain involved in community groups over the busy winter period.

Although the overall relationship between sense of community and self-efficacy was not convincingly strong, a small relationship did exist. In conclusion, these two variables are not significantly linked in reducing symptomatology amongst disaster victims. These findings do not support the hypothesis that those who report only high self-efficacy and strong sense of community report lower levels of symptoms on the HSCL-21. However, self-efficacy 2 was found to be a significant predictor of symptomatology in July. This negative relationship suggests that those who have greater self-efficacy also report lower levels of symptomatology. This result is interesting from a disaster response perspective. By developing higher levels of self-efficacy within an 'at risk' population, such as the community of Ohakune, the reported number of symptoms following a natural disaster may be reduced. Encouraging and promoting involvement in local projects, groups and activities may increase levels of self-efficacy, due to the positive influence community group membership appears to have upon increasing self-efficacy.

4.1.2 Hypothesis Two

"Victims with a more problem-focused style of coping will act upon decisions they perceive to be beneficial to them, and will therefore report traits of high self-efficacy and strong sense of community."

The results from this study suggest that the use of a problem-focused coping style does aid in the recovery of a community from natural disaster. Coping style and self-efficacy 2, combined with age of the respondent, significantly influenced reported symptomatology in July. Also in July, those who reported a more problem-focused coping style reported higher levels of sense of community. So although there is no indication that a problem-focused coping style *causes* high self-efficacy or a strong sense of community, there is some

evidence that suggests that these three variables are related, and they aid in the reduction of psychological symptoms following exposure to a natural disaster.

In September a relationship was also found between coping style and sense of community, however self-efficacy did not feature significantly. Small relationships were found between problem-focused coping style with both sense of community and community group membership. This indicates that those who adopt a problem-focused coping style have a stronger sense of community and greater involvement in local groups. This relationship may also occur in the opposite way, for example involvement in community groups may encourage the use of a problem-focused coping style.

Implications from the above results suggest that group membership is beneficial to the community in times of disaster response. Group membership appears to encourage higher levels of self-efficacy, create a stronger sense of community, and promote the use of problem-focused coping styles. Group membership encourages community members to learn new skills and develop effective behaviour, promote new relationships, provide continuing education opportunities, and create resources that can be called upon in the future if required.

In September more people reported the use of a problem-focused coping style than did those in July. This suggests that respondents became more problem-focused in their coping styles after the initial recovery from the secondary stressor of economic hardship. Perhaps in July, respondents felt particularly overwhelmed by the prospect of another ski season failing and the subsequent lack of badly needed economic resources. Also, perhaps they perceived the only thing that could save them was not controllable, as they were all dependent upon the success of the upcoming ski season. Once the success of the season was known, they were then able to return to their pre-eruption styles of coping, which were more problem-focused. Alternatively, this result suggests that coping style is learned behaviour. It appears that the respondents coping styles have become more problem-focused *after* the initial economic recovery of the community. This behaviour may be a learned response based upon successful individual and community actions during the post-disaster period. If this is so, and effective coping style is learned behaviour, then this also could be taught at a community level, thus encouraging group membership and higher education, as well as teaching important skills and creating a reserve of community resources.

4.1.3 Hypothesis Three

“The combination of these three individual characteristics, high self-efficacy, a strong sense of community and a problem-focused coping style, are not mutually exclusive. These traits will create an additive effect amongst disaster victims, and will aid in determining their mental health. Those who report the above characteristics will report lower levels of psychological symptomatology.”

Again, this hypothesis was not directly supported by the present study. No significant results were found that suggest that these three variables can independently predict symptom outcome amongst victims of a natural disaster. However, a number of relationships were found between self-efficacy, sense of community and coping style. These relationships indicate that these variables are not mutually exclusive, but are linked to one another in various ways. Also found in this study amongst the July response was that self-efficacy 2 and coping style, combined with age of the respondent, did accurately predict symptomatology amongst disaster victims. Therefore the combination of these variables could be used as identifiers of those most ‘at risk’ of developing long-term psychological disorders during the post-disaster phase of community response.

This result disputes the conclusions of Raphael & Meldrum (1994) and Paton (1996b) who argue that older adults may be more likely to develop long term mental health problems than the general population. The present study found that older community members (50+) had greater access to necessary resources needed for a healthy recovery. The ANOVA’s from this study directly support similar results by Gibbs (1989) and Taylor & Frazer (1982) who found that older people were less distressed after exposure to a disaster. However, these predictor variables were only significant in July, during the post-disaster phase. This suggests that age is a useful predictor of symptomatology during this time, but does not provide information on the nature of individual response during periods of non-disaster.

In July when the variables measuring self-efficacy, sense of community and coping style were entered, only 10% of the total variance within the model was explained. When all variables were included in the model, including the demographic variables, still only 23% of the variance was accounted for. This suggests the absence of other, important variables, that account for the remainder of the variance. The September regression analyses found no significant results, maybe because these variables are only associated with symptomatology during times of distress.

Although the results from this study do not support the hypothesis suggested by Bachrach & Zautra (1985), that the three variables of self-efficacy, sense of community and coping style are accurate predictors of psychological symptomatology, it does suggest that these variables are not mutually exclusive. Some sort of relationship exists between these variables that does aid in the recovery of disaster victims. However, the effects this has upon recovery may vary at different times following the disaster, and does not appear to be all encompassing. Other factors may also play a role in determining symptomatology. The results from this study point towards the involvement of social support as a mediating factor closely associated with self-efficacy, sense of community, coping style and age within the post-disaster environment. Any number of factors may be present in the recovery period of both the individual and the disaster community, and an effective means of identifying all the underlying traits involved in the recovery process is needed to develop an accurate and effective recovery programme for any disaster community.

4.1.4 Hypotheses Four and Five

"Those who do not have access to an adequate social support network will report higher levels of psychological symptoms"

"Social support will be a mediating factor between the Individual Characteristics and psychological symptomatology. Social support will contribute to the additive effect on overall mental health."

Quantity and quality of social support were not related to a common, underlying trait in either July or September. However, a strong correlation was found between the two support variables in July, and the multiple regression analyses found these variables similar enough to need only one to measure the effects of support upon symptomatology. Support quality was slightly more dominant than quantity, and this was therefore significantly associated with symptom outcome, indicating a relationship between social support and symptomatology.

Although social support was found to be significant in a number of ways, it did not emerge as a significant predictor of symptom outcome. Due to the significance of support quality in other analyses from July, a mediating relationship between social support and the predictor variables of age, self-efficacy and coping style is likely. Relationships were found between social support and many of the variables in both data collection points. These findings all

suggest that social support may play an important role in recovery by mediating the effects of disaster.

Correlations between social support and the other experimental variables provided interesting results. Low support quantity tended to relate to emotion-focused coping style. This is interesting when looking at the results obtained from the ANOVA's that show while women report the highest use of problem-focused coping, men report higher quantities of access to support. This implies that it is the perceived adequacy of support quantity that is important rather than the actual number of support relationships. Although women reported fewer people within their support networks, their perceptions of the number of relationships available to them appear to be adequate. Results from July and September were similar in that those who reported low satisfaction with their relationships also reported low levels of self-efficacy. In addition to this, both quantity and quality of support relationships were found to be associated with sense of community. Those who reported higher levels of both support quantity and quality also had a greater sense of community. These findings suggest that increasing individual levels of social support quantity will increase reported levels of support satisfaction. This, in turn, will aid in increasing self-efficacy and sense of community, and promote the utilisation of a more problem-focused coping style. The development of these characteristics will aid in recovery from disaster by reducing the number of symptoms a victim is likely to experience.

Although these findings suggest that support quality is a slightly better predictor of symptom outcome than support quantity, they also imply that support quantity and quality are closely related. The quantity of a support network also increases the perceived quality of the relationships within that network. Those with access to greater numbers of people to provide support also report greater satisfaction with these relationships. This finding disagrees with previous findings from Horowitz, Stinson & Field, (1991), and Eranen & Leibkind (1993) who claim that it is the social support quality, rather than the quantity, that is important in recovery from disaster. The findings from the present study suggest that encouraging social relationships amongst community members will increase levels of support satisfaction, and may also increase feelings of sense of community, self-efficacy, and promote problem-focused coping styles.

4.1.5 Hypothesis Six

"These findings will reflect similar findings from disaster research within a New Zealand population."

Eustace (1994) examined the long-term development of psychological morbidity within a New Zealand population following exposure to a tropical cyclone, which caused extensive damage over a wide area in 1988. Although Eustace did not specifically examine individual characteristics and the effects these have on post disaster recovery, as this study has done, there were some similarities between the two studies, and comparisons can be made between disaster populations within New Zealand in some areas.

Eustace found that a disaster victim is less likely to develop long-term psychological disorders if they are satisfied with the assistance they receive from disaster relief agencies in the period following the disaster. This is indirectly linked to the present disaster population, who reported that higher self-efficacy and a problem-focused coping style, mediated by *support satisfaction*, reduced the number of symptoms experienced that may develop into long-term mental health disorders.

These two results together suggest that developing community response teams, as suggested by few researchers (Paton, 1996b, 1997, and Creamer, 1994), and promoting these positive recovery characteristics amongst community members prior to the occurrence of a disaster, would aid in the reduction of long term mental health problems. If the disaster response team is at the site as the disaster occurs, the planned response will be immediate. The community will feel responsible for it's own recovery (Paton, 1996b, Hodgkinson & Stewart, 1991), and chaos resulting from the event will be minimised, as organisation will be established shortly after the disaster from within the community. Also the community will not have to wait for and rely solely upon outside aid. Training of the community response teams will also promote community education and awareness, and encourage the development of the positive characteristics found to be beneficial to disaster recovery.

Eustace (1994) found partial support for the positive effects of social support on the healthy recovery of disaster victims. This is similar to the findings of the present study in regard to the mediating effects of social support. Similarly, Eustace (1994) found that social support quality, not quantity, played a more dominant role in determining symptom

outcome, as did the present study. However, the present study also found that support quantity directly affected support satisfaction. Little agreement exists in the literature over which facet of social support is the most important in disaster recovery (Solomon, Smith, Robins & Fishbach, 1987, Murphy, 1988, Cook & Bickman, 1990, Horowitz, Stinson & Field, 1991, Eranen & Liebkind, 1993), however the results of the present study suggest that although support quality may be more dominant in mediating the effects of disaster, perceptions on support quantity directly affect the quality of support. Support quantity cannot be regarded as unimportant as an issue of social support and how this mediates the effects of a healthy recovery following exposure to natural disaster.

Eustace (1994) also refers to the findings of Cook & Bickman (1990) who reported that the effects of social support as a mediator in disaster recovery alter over time. Therefore, findings from disaster research in regard to social support would differ depending upon the time period that had elapsed since the disaster. The results from the present study disagree with this conclusion. Eustace (1994) measured social support four years after the disaster event, whereas in this study, support was measured at one year after the last major eruption, and again at fifteen months post-eruption. However, during the measurement period frequent, smaller eruptions were occurring at Mt. Ruapehu, and the threat of another large eruption was ever present. Although the effects of social support may differ at various time points after the disaster event, this study supports the findings of Eustace (1994) that social support has an important mediating effect upon the healthy recovery of disaster victims.

The present study also supports the findings of Eustace (1994) that suggest it is a combination of variables that accurately predict psychological morbidity after a natural disaster, as the study failed to find any single predictor variable that could accurately forecast symptom outcome. The results of this study suggest that it is a combination of variables that cause symptom distress following exposure to a natural disaster, rather than any single variable. The strongest result found in the present study was 17% of the total variance explained. This suggests that there are other variables not identified by this study that are important contributors to recovery from disaster and the reduction of symptomatology. This is similar to the findings from the study by Eustace (1994).

- Where it is appropriate to compare the results of these two studies, the findings of the present study strongly mirror the results found by Eustace in 1994, in another disaster population. This is encouraging, as it suggests that the response to natural disaster by a

New Zealand population is similar. Therefore similar community interventions may be useful in reducing the number of symptoms a victim may experience following exposure to disaster, thus improving their present quality of life and reducing the likelihood of developing a long term mental health problem. Future research needs to concentrate upon establishing these similarities and examining any differences that may arise amongst different disaster populations within the rural New Zealand setting.

4.1.6 Hypothesis Seven

"The findings from this research will be similar to those found within populations of victims of natural disasters."

Apart from the study made by Eustace in 1994, the present study can be compared with results found by Bishop, Paton, Syme & Nancarrow (1993) and Bachrach & Zautra (1985).

The Bishop et al. (1993) study examined the effects of sense of community, self-efficacy and coping styles within communities affected by salination in Australia. Bishop et al. (1993) concluded that coping style did not affect the response to salination. However, in this study, a problem-focused coping style was found to be an important predictor of symptomatology amongst the disaster population during July, in the post-disaster period. Bishop et al. (1993) also found community involvement to be high, though they do not state how this was related to the salinity issue. The only similarity found between Bishop et al. (1993) study and the present research was the conclusion that individual characteristics play an important role in the recovery of a community from a natural disaster.

Bachrach & Zautra (1985) used these individual characteristics to examine how they affected a perceived threat within a rural community. The first conclusion made by Bachrach & Zautra (1985), that increased self-efficacy led to greater community involvement, was not supported by the present study. The second finding by Bachrach et al. (1985) was that emotion-focused coping had a strong negative influence on community involvement. The results from the July sample of the present study again do not support this finding. However, the results from September, when the sample may be likened to a pre-disaster population, (see section 4.7) similar to the sample used by Bachrach & Zautra (1985), significant relationships were found between these variables. Those who utilised an emotion-focused coping style also had less involvement in the local community, and belonged to fewer community groups. The next Bachrach et al (1985) finding was that a

strong sense of community encouraged the use of problem-focused coping, which, in turn, lead to greater community involvement. This relationship was not specifically tested for in the present study, but other results imply links between these variables. A significant relationship was found between sense of community and problem-focused coping style in September. Those with a strong sense of community tended to use problem-focused coping skills. However, this relationship did not necessarily lead to greater community involvement. Another finding of Bachrach et. al (1985) was high self-efficacy and strong sense of community result in greater community involvement. This was supported by the present study, but only in July. Here, community group membership was significantly associated to self-efficacy. Those with high self-efficacy also belonged to the greatest number of community groups. However, self-efficacy was not related to sense of community. The final finding of Bachrach et al. (1985) was that sense of community is positively related to problem-focused coping styles. This result was not found in July, but was supported in September. Emotion-focused coping style promoted a low sense of community and vice-versa.

Although these results are not identical, a number of similarities exist between the two studies that were carried out over ten years apart in different communities responding to different events in different countries. These similarities support the statement of a number of authors (Paton, 1996a, 1996b, Gibbs, 1989, Raphael & Meldrum, 1994, Green, 1993, Hodgkinson & Stewart, 1991, Bolin, 1988, Creamer, 1994) who claim that although each disaster context differs dramatically, similarities do exist within individual victims of disaster that can aid in their healthy recovery.

The Bachrach & Zautra (1985) study examined the effects of a number of personality characteristics that can aid in the healthy recovery of exposure to a natural disaster amongst individuals and communities. However, this study did not assess the role that social support may play in the recovery of disaster victims. Although many authors advocate the importance of social support within the recovery environment (Lyons, 1991, Horowitz, Stinson & Field, 1991, Eranen & Liebkind, 1993, Green & Solomon, 1995, McCammon, Durham, Allison Jr., & Williamson, 1988, Hobfoll, 1991, Norris & Thompson, 1995, Sawtell & Bottomly, 1989, and Paton & Bishop, 1996) very few studies (Eustace, 1994), in this area have associated the personality characteristics with social support, and examined the combined effects that these have upon recovery from disaster.

The results found in this area (Eustace, 1994) support the conclusions from the present study in regard to the mediating effects of social support in the disaster recovery environment (as discussed in section 4.6.5). These findings, and the lack of studies concentrated in this area, suggest the need for more research to fully determine the effects of social support upon positive behaviours within the recovery environment.

The results from studies on psychological recovery amongst disaster populations (present study, Eustace, 1994, Bachrach & Zautra, 1985, and Bishop, Paton, Syme & Nancarrow, 1993) all identify the importance of positive behaviours and characteristics for healthy recovery amongst a disaster population. Future studies in this area need to concentrate on the complex relationships that occur between these variables that aid in recovery. From these studies, community programmes must be developed and applied *before* the occurrence of disaster, so as to increase the resources available to the community after the event.

4.2 Self-Efficacy

It is interesting to note that self-efficacy was *almost* significantly affected by demographic variables in both July and September. Both samples produced relationships between self-efficacy 2 and education level. These relationships imply that those with university level education also report higher levels of self-efficacy. This finding supports Gibbs (1989) who found that individuals from higher social classes, as measured by education and income, coped better with stress. These results imply that ongoing education may help in the reduction of psychological symptoms following exposure to disaster. Perhaps by providing community education on relevant topics in areas prone to natural phenomenon, the frequency of long-term psychological disorders as a response to disaster may decrease.

4.3 Sense of Community

Demographic variables also influenced reported levels of sense of community. In September it was found that age influenced sense of community, with older people reporting greater sense of community than those under 50. This result supports the findings of Bachrach & Zautra (1985) who found that those with the strongest sense of community were the older community members, and those who had been living in the area for the longest periods of time. The present finding may result from older people being in Ohakune for a longer time, and thus they feel more attached to the local area. Alternatively, older

people may expect to spend the rest of their life within this community, and therefore make more of an effort to become locally involved.

The above finding suggests that older people should be utilised in ways that create accessibility to them by younger community members. Some older people may specialise in particular areas that may be of interest to others. Groups could be formed in these areas that encourage community participation and utilise the knowledge of older community members. Older people may also be able to help in local schools and other community organisations, by providing knowledge and information at appropriate times.

4.4 Coping Style

Age and gender affected coping style in different ways throughout the study. In the July sample both age and gender influenced coping style. Older people in the study tended to report a more problem-focused coping style than those under 50. Again, this suggests that coping style is learned behaviour and effective coping style can be taught.

Also found in July was that gender influenced coping style. Women tended to report the use of problem-focused coping style more so than men. This result is interesting when compared to the results that were almost significant ($p=0.06$) from September. Here it was found that age and gender combined impacted upon coping style, and that older men reported the greatest use of problem-focused coping styles. Older women and then younger women were next, and those who largely adopted an emotion-focused coping style were men under 50. This suggests that coping style is more influenced by age than gender. To support this, another almost significant result ($p=0.054$) from September again found that older people utilised a problem-focused coping style more than their younger counterparts. These results indeed support the notion that effective coping style is a resource that can be learned, or developed through experience, and can therefore be taught at the community level. This will benefit the community by providing them with increased resources that can be accessed at times of disaster and aid in the recovery process.

4.5 Social Support

Demographics also influenced social support quantity and quality. In July, age affected both measures of social support. Older people reported greater levels of both support quantity and quality. Again, this could be due to the fact that older people have lived in the

area for longer periods of time, or intend to live there for long periods, and therefore make more of an effort to become involved in community activities and make friends that live close by. Results from September show that men were more satisfied with the quality of the relationships they had developed than women. Almost significant was the relationship between age *and* gender and social support quantity (0.075). Here, older men reported the highest quantity of support, with young men not far behind. Young women were third, while older women had the least amount of access to social support. This finding suggests that groups aimed at women, and older women in particular, need to be developed within the community to increase their access to support resources. Education and ethnicity did not influence reported levels of social support in either July or September.

Most respondents in both July and September reported adequate satisfaction with the social support they had access to. However, satisfaction levels were slightly lower in September than those reported in July. This may be due to the continuation of the busy winter period, and the subsequent lack of time by many community members to stay in touch. Alternatively, this result implies that after community recovery has commenced, the quality of relationships may decrease. Perhaps there is no longer a need for a large support network now that the immediate crisis appears to be over. Similarly, relationships that may have developed as a response to the eruptions may have dissolved now that recovery is under way. This supports comments made by Raphael & Middleton, (1987), and Paton, (1996b) who suggest that the quality of relationships may actually be enhanced during a disaster and the subsequent recovery period, as long as community membership remains intact, as it has in Ohakune. However, from the present study it appears that once the initial recovery period is over, the social support network available to the individual may return to pre-disaster levels.

4.6 Symptomatology

The levels of symptomatology, as reported by the HSCL-21, decreased in September. This indicates that following the initial economic recovery of the Ohakune community, the level of symptomatology reduced amongst the sample. September provided data from a low stress period, similar to the Ohakune community during pre-eruption times. The results from July were taken at a time of high community stress, due to the unknown outcome of the upcoming ski season and the threat of recurrence of the disaster event. Therefore, it may be concluded that levels of symptom distress did increase within the community as a

response to the series of eruptions of Mt. Ruapehu in 1995 and 1996 and the secondary economic stressors these caused.

However, through examination of the matched cases histograms, it was found that those individuals with the most extreme responses, i.e. the lowest levels of sense of community and self-efficacy, the greatest use of emotion-focused coping styles, and the highest levels of symptomatology, were not likely to respond to the survey in September, during periods of non-disaster. This implies that although these are the most 'at risk' victims, and most in need of further help, they are also the least likely to respond to community assessment or seek help in periods of non-disaster. This suggests that assessment procedures will be most beneficial immediately following disaster, and that follow ups by mental health professionals are essential. This supports comments made by Paton (1996a).

Age also significantly affected reported levels of symptomatology in July. Those over 50 reported fewer psychological symptoms. This result may be due to older people being less economically dependent upon the local area, as many are retired or have fewer dependents. Therefore, the eruptions have not caused major economic disruption to them. Younger people are more financially dependent upon the local area, and are therefore facing major problems caused by the secondary stressor of economic loss. Alternatively, older people may report lower levels of symptomatology because they have higher levels of self-efficacy and sense of community, a more problem-focused coping style, and greater satisfaction with their support networks.

September produced a significant relationship between level of education and reported symptomatology. It was found that those with a university level education reported fewer symptoms than those with a secondary school education or a trade or polytechnic qualification. This result is interesting, as education level was not significantly associated with any of the predictor variables in July, and only associated with self-efficacy in September. However, this relationship suggests that those with a university education also had higher levels of self-efficacy, which was found to be directly associated with healthy recovery.

4.7 Time Period of the Study

The present study was completed during the second half of 1997. The ski season was successful, with plenty of snow, allowing the season to run into early November. No further

major eruptions disrupted the operation of the ski fields, and plenty of visitors returned to the area to enjoy the range of activities offered by the ski resort and the local area.

This study had two data collection points. The first of these was July 1997, at the beginning of the ski season. Recovery of the community had been under way for some time, yet members of the community were still feeling the effects of the eruptions due to the secondary stressor of economic loss. At the time of the first data collection the financial outcome of the 1997 ski season was unknown, and the community was still feeling the effects of stress caused by financial difficulties that resulted from the eruptions of the previous years. At this time, the community of Ohakune was still in the *post-disaster* phase. The second data collection point was in September, when the ski season had proven successful, and community members felt themselves in a position where they had partly recovered from the effects of stress caused by financial hardship. Although full financial recovery will take a number of years, members of the community were now able to accept that recovery is possible. At the time of the second survey distribution, initial economic recovery was well under way, and the community stressor had lessened. The Ohakune community was returning to a *pre-disaster* level of functioning.

Because of the success of the 1997 ski season, this study has effectively created two separate sets of data. The information collected in July provides data on the nature of people's responses during the post-disaster phase, and a community's response to the secondary stressor of economic impact. Alternatively, the September data provides information from the pre-disaster, or post-recovery phase, as economic returns were high and the community stressor of economic hardship had lessened. Operatively, the September collection of data is comparable to pre-eruption levels of symptom distress. This provides two points of data that can effectively be divided into post-disaster and post-recovery sets of information. This helps to explain the differences between the data sets, and also provides interesting implications on the nature of community response to disaster.

4.8 Limitations of the Present Study

A number of problems existed within the present study. Some of these remained even though every effort possible was taken to reduce their effects.

4.8.1 Time Restraints

The time limit on the present study was fourteen months. During this time, the entire research programme had to be initiated, developed, administered and produced. This placed time restraints upon developing the methodology, conducting a pilot study, and collecting data.

4.8.2 Sample

The main limitation of the present study was the sample size. Bigger sample groups provide more accurate information, and also reduce the margin of error. In this study, only 17% of the target population responded to the initial questionnaire. This may reduce the generalisability of the results to the overall population, as the responses received may not reflect the true feelings of the community. A larger response would have provided more accurate results. It may have been useful for the researcher to contact community members personally, and conduct face-to-face interviews to increase the response rate. However, this may not have been successful, as some community members may have felt uncomfortable about the lack of anonymity. Also, interviewing was not possible due to time and money constraints. Respondents from July were asked to respond again in September. Only 57% of the original respondents provided information at the second data collection point, despite follow-up letters being sent to all respondents.

4.8.3 Assessment Instruments

A pilot study of the survey used would have been beneficial to minimise any problems associated with the questionnaire. Again, this was not possible due to the lack of time and money. Furthermore, surveys tend to allow for only the most simplistic of answers, which may miss some of the more complex responses that people may wish to provide. This was illustrated in the present study by a number of respondents, who provided additional information in the form of comments written on the returned surveys. Due to the design of the study, this additional information was disregarded, even though it provided interesting insight to the responses people gave. A number of people also sent their uncompleted survey back to the researcher with the comment that the wording was difficult to interpret, and that many double negatives were present, thus making the survey ambiguous and vague. This assessment problem could have been eliminated if a pilot study had been conducted.

The majority of the instruments used to collect information in the present study had information regarding their validity and reliability. However, the adaptation of the Bachrach & Zautra (1987) scales by Bishop et al. (1993) had no psychometric information available, thus making the results they provided questionable. Another assessment problem associated with the present survey is the compatibility of the scales used. No psychometric information is available on how these scales relate to each other and whether they provide reliable and valid results when used in conjunction with one another.

4.8.4 Method

Firstly, with regard to a postal survey, the response rate was not high, even though a freepost envelope was supplied with the survey. This problem was dealt with by providing a follow-up letter (Appendix E) in the 'Ruapehu Bulletin' two weeks after questionnaire distribution, in an attempt to prompt community members to return their completed surveys. Secondly, a problem with survey distribution exists with the door-to-door visits of the researcher. If the householder was not at home at the time of the researcher's visit, they were not re-visited. This is unfortunate, but could not be overcome due to the time restraint. It was attempted to visit the random addresses at an appropriate time of day when the householder was likely to be at home.

4.9 Future Research

A number of implications for future research were identified by the present study.

The first of these was the recognition for future assessment work to be completed in disaster research. The availability of psychometric tools and assessment instruments is, at present, limited. Appropriate and useful assessment measures need to be developed and tested within disaster populations. The scales that are presently used are not necessarily tested for reliability and validity, but are used simply because nothing else is available. Further research needs to concentrate not only on the development of new and versatile tools for measuring traumatic response and traumatic stress, but also on validating those instruments that have already been developed and are used in the absence of a better alternative. The reliability and validity of these measures need to be established. By ensuring these instruments are accurate and reliable, and have acceptable validity, the results from these studies can be taken more seriously, and practical applications of this knowledge can be established within disaster prone communities.

Present and previous research (Eustace, 1994, Paton, 1996a, 1996b, Lyons, 1991, McCammon et al., 1988, Hobfoll, 1991, Sawtell & Bottomly, 1989, Paton & Bishop, 1996) have found an interesting relationship between social support and other positive behaviours associated with healthy recovery from exposure to disaster. This relationship, however, is still ambiguous and ill-defined. Future research needs to concentrate on the importance of social support within the recovery environment, and examine the effects it has upon not only disaster recovery, but also on other identified beneficial traits and behaviour noted amongst victims of disaster.

This research, and previous research (Eustace, 1994), claim that other variables also appear to be important in the healthy recovery of a disaster victim. Future studies also need to examine the myriad of human traits and behaviour in order to successfully identify other characteristics that may be important factors in healthy recovery from disaster.

Finally, future studies in this area need to be concentrated amongst disaster populations from rural settings within New Zealand to confirm or reject the results from this study. Many natural disasters occur every year within New Zealand, and many communities and individuals may go for years without being aware of the negative effects these events may have on their lives. New Zealand is a country of extremes, and is continuously exposed to weather patterns that induce floods, cyclones, droughts and horrific snowfalls, not to mention events that result from other forces, such as volcanic eruptions and earthquakes. These events affect many thousands of people not only physically and economically, but also socially and psychologically. Future research on populations exposed to these events will provide information appropriate for use within the New Zealand context.

4.10 Future eruptions

The Institute of Geological and Nuclear Sciences (IGNS) monitor the seismic activity of Mt. Ruapehu, and have thus far achieved a 75% success rate in predicting volcanic activity (Harry Keys, Department of Conservation, cited in 'the Ruapehu Bulletin,' 1997). However, the IGNS cannot stop further eruptions occurring, no matter how accurate their predictions. It is likely that Mt. Ruapehu will continue to erupt, as it has done throughout 1997, small, impressive yet non-threatening smoke clouds. However, it cannot be ruled out that another major eruption will occur that will again affect not only the local region, but also the entire country.

Recovery of the community of Ohakune cannot be complete until the town has returned to a financial state similar to that before the eruptions occurred, and the same sense of security is installed amongst the members of the community. As volcanic eruptions tend to be sporadic and unpredictable, it will take a number of years until community members feel secure enough not to be afraid of the threat of continuing eruptions.

4.11 Conclusion

The results found from the present study suggest that self-efficacy, coping style and age are accurate predictors of psychological symptomatology following exposure to a natural disaster, but only in the post-disaster phase. Also, high self-efficacy, strong sense of community and a problem-focused coping style are inter-related and aid in healthy recovery from exposure to natural disaster and the secondary effects that result. In addition to this social support is a mediating factor in healthy recovery. Those who have greater access to support networks also report greater satisfaction with the quality of the relationships that they have. These factors, amongst unidentified others, combine to reduce the number of psychological symptoms present within a disaster population. This leads to the reduction in the development of long-term mental health disorders as a result of the disaster.

However, during periods of non-disaster, these variables do not help to predict those who may be most at risk of developing adverse reactions from exposure to disaster. However, certain demographic characteristics influence levels of beneficial variables, and may be used to target individuals for treatment following disaster. Age was identified as an important predictor variable of symptom outcome, and was found to be more accurate than the psychological variables during the post-disaster phase. Older people reported greater levels of both social support quality and quantity, and also were most likely to utilise problem-focused coping styles. and men reported higher levels of support quality than women. Older community members also reported the highest levels of sense of community. Papers by Raphael & Meldrum (1994) and Paton (1996b) suggest that older adults may experience emotional problems as a result of loss of livelihood, economic instability, uncertainty, and a loss of security. These statements have not been supported by the present study, which has found that the older community members have the greatest access to the individual characteristics defined by Bachrach & Zautra (1985) as being beneficial in recovery from disaster. Therefore, older people have developed the important characteristics for healthy recovery, and it is the younger people in the community of Ohakune who lack these skills. It is important for the younger community members (under

50) to develop and utilise these resources as they may be called upon in the future to again deal with secondary economic effects that result from future eruptions. Older people appear to be a valuable resource within the local community, and this resource should be made accessible to all community members.

Other demographic variables also affected response to disaster, although not to the same degree as age. Gender produced differences in response, with women reporting the greatest use of problem-focused coping style. Education level affected self-efficacy. Those with a university level education reported greater levels of self-efficacy than those who had not attended university. In turn, those with higher levels of self-efficacy also reported a greater sense of community. As the results of this study suggest that the development of identified individual characteristics may be beneficial to community recovery from natural disaster, the use of these characteristics should be encouraged amongst community members. Those with less access to these resources should be targeted for community programmes and activities that will help them to increase their personal levels of self-efficacy, sense of community, access to quality support, and use of problem-focused coping styles.

One way to encourage the development of resources amongst all community members is to create and develop a community centre within Ohakune that combines activities and past-times for all members of the community. Many activities, classes and groups are established within Ohakune already, but these are not always available, and are not accessible to all. A centre would provide space for sporting and recreational activities, and also a drop-in centre where community members could go to meet, relax and hold informal meetings. Continuing education classes could be held, targeting all members of the community. This centre could also be the civil defence headquarters and the community could become involved and develop it's own recovery programme in response to the threat of future eruptions.

Older people could also utilise the resources at this community centre. The community may, at present, have limited access to older community members, perhaps because they remain at home most of the time as they find it difficult to get around. The local council could provide a service for community members who do not have independent transport, by providing a shuttle service for transport around town.

Many options are available to the local community that will aid in increasing beneficial resources amongst community members. One important factor has resulted from the present

study. The older members of the Ohakune community are a valuable resource to the rest of the community, and their skills, knowledge, expertise, and use of the key recovery characteristics need to be distributed throughout the entire community. If this occurs, symptomatology that will develop as a result from future disaster will be dramatically reduced, and the recovery time will also decrease. This will benefit the local community in all areas, physically, economically, socially, and psychologically.

Previous research by Cohern & Ahearn (1980) suggest that the role of a mental health worker in disaster recovery is reactive. They imply that it is the duty of the psychologist to enter the disaster area after the event has occurred, and aid the victims and promote healthy recovery by providing intervention in the form of de-briefing, outreach, education, long-term counselling, and professional support. The aim of the present study was not to examine the role of the mental health professional within the disaster environment, however, the results of this study imply that the mental health worker should take on a more proactive approach to disaster environments and the recovery of disaster victims.

The community psychologist is in a perfect position to establish an effective community intervention programme *prior* to the occurrence of a disaster event. This suggestion is not as ridiculous as it may appear. New Zealand is a country of extremes, and many disasters occur on an almost yearly basis within the same areas. Wellington City is situated on a major fault line, and is prone to earthquakes. Auckland and the Far North suffer from the effects of tropical cyclones. The Coromandel Peninsula and Bay of Plenty are predisposed to high rainfalls that repeatedly bring flooding to these areas. The Hawke's Bay and Marlborough regions frequently suffer from drought, and the Deep South is exposed yearly to huge snowfalls that kill stock and repeatedly cripple rural farming communities. A more proactive approach within these areas by both the mental health professional and the community itself will reduce the psychological effects caused by these events, and may even reduce the occurrence of long-term mental health disorders within disaster populations.

This study has provided results that imply planning needs to begin within the community, prior to a disaster event occurring. This supports previous research (Paton, 1996b, Bishop, et. al., 1993, Lyons, 1991, and Gibbs, 1989), and also supports the legislation presently in cabinet that community civil defence plans must breach traditional roles and limitations, and monitor community status and assess likelihood of risk prior to a disaster. More emphasis must be placed upon understanding the nature of each community, and looking

beyond the physical impact in an attempt to reduce the long-term effects created by disaster events.

Not only will the development and application of a community programme aimed at combating the psychological effects of a disaster promote quick and effective recovery, it may also increase the present quality of life amongst community members. This will occur as a result of promoting and encouraging higher education at the community level, the development of new relationships amongst community members, and ongoing involvement in community groups and activities.

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APPENDIX A:

SURVEY

Ohakune Community Survey.

1. How long have you, personally, lived in the Ohakune area? (in years)
.....
2. Are you, at present, working locally?
If yes, go to question 3, if no, go to question 5.
Yes.....1 No.....2
3. Do you work - **Full-time**.....1 **Part-time**.....2
4. Is your job - **Seasonal**.....1 **Permanent**.....2
5. Do you usually work in the local area?
Yes.....1 No.....2
6. Is all your family income earned from local business or local employment?
If yes, go to question 8, if no, go to question 7.
Yes.....1 No.....X
7. Does more than 50% of your income come from local employment or business?
Yes.....2 No.....3
8. Is the business you own or work for dependent upon the visitor industry?
If yes, go to question 10, if no, go to question 9.
Yes.....1 No.....X
9. Does the business you work in cater for the visitor industry in a support role?
ie. Providing accommodation, food, supplies etc. to the local visitor industry.
Yes.....2 No.....3
10. Do you, or any of your family, belong to any of the following local community groups?

Group	Y/N	Group	Y/N
Adult Riding Club		Ohakune Fire Brigade	
Aerobics		Ohakune Karioi Rugby Football	
Ambulance		Ohakune Pony Club	
Arts & Crafts		Ohakune Search & Rescue	
Badminton		Ohakune Senior Citizens	
Basketball		Ohakune Squash Racquets Club	
Bowls (indoor/ outdoor)		Promotion Group Development	
Brass Band		Red Cross	
Bridge		Retailers Association	
Church Group		Returned Services Association	
Civil Defence		Ruapehu College Adult Classes	

- Having challenges and stimulating problems to deal with
- Feeling confident with other people
- Having a peaceful, untroubled life

13. Below is a list of statements that describe ways different people deal with problems. Would you please think of how you have been dealing with the effects the eruptions have had over time, and note which statements describe what you *have done*, what you *have done in part*, and what you *have not done*. Please use the following scale, and circle the appropriate answer.

1.....2.....3

Have done	Have done in part		Have not done
Didn't think about it at all	1	2	3
Feel that only time will tell, and I just have to wait	1	2	3
Talked to someone to find out more about the situation	1	2	3
Went on as if nothing had happened	1	2	3
Kept my worries to myself	1	2	3
Tried to look on the bright side of things	1	2	3
Made a plan of action and followed it	1	2	3
Talked to someone you knew had useful suggestions	1	2	3
Tried to forget the whole thing	1	2	3
Felt you knew what was best for yourself and your family	1	2	3
Refused to let it worry you too much	1	2	3
Discussed the problem with others in the community	1	2	3
Drew on your past experiences of trauma and stress	1	2	3
Wished that the situation could be over with	1	2	3
Discussed the problem with your family	1	2	3

14. Please think about your life in Ohakune at present. Choose a number from the scale below that shows how much you agree or disagree with each of the following statements.

1.....2.....3.....4.....5
Disagree strongly Neither agree nor disagree Agree strongly

I feel I have control over the things
 that happen in my life and in the community

There is no way I can solve some of the
 problems I have by myself (R)

I can't do much to change what happens
 in my life or in the community (R)

Somehow problems in my life
 usually solve themselves (R)

15. The following questions relate to general stress symptoms. Please describe how much each of the symptoms you experienced WITHIN THE PAST SEVEN DAYS. Please use the following scale to record your responses. If they did not occur during this time, please mark the 'not at all' column.

1.....2.....3.....4
Not at all A little bit Quite a bit Extremely

Difficulty in speaking in times of excitement	1	2	3	4
Trouble in remembering things	1	2	3	4
Concerns about sloppiness or carelessness	1	2	3	4
Blaming yourself for things	1	2	3	4
Pains in the lower part of your back	1	2	3	4
Feeling lonely	1	2	3	4
Feeling 'blue'	1	2	3	4
Your feelings being easily hurt	1	2	3	4
Feeling that others do not understand you, or are unsympathetic	1	2	3	4
Feeling that people are unfriendly, or dislike you	1	2	3	4
Having to do things slowly, to ensure that you're doing them properly	1	2	3	4
Feeling inferior to others	1	2	3	4

Muscle soreness	1	2	3	4
Having to check and double check what you do	1	2	3	4
Occasional hot or cold spells	1	2	3	4
Your mind occasionally going blank	1	2	3	4
Either a numbness or a tingling in your body	1	2	3	4
A lump in your throat	1	2	3	4
Trouble in concentrating	1	2	3	4
Feeling a weakness in parts of your body	1	2	3	4
Occasional 'heavy' feelings in your arms and legs	1	2	3	4

The following questions ask about people in your life who give you help or support. Each question has two parts.

Part One: List all the people that you know, but *not* yourself, who you can count on for help or support in the way described. Write in the initials of those people beside the numbers on the scale. (You do not need to complete the whole scale with initials, however, do *not* list more than nine people per question). If you have no support for a question, circle the 0 beside the words 'no one'.

Part Two: Please circle how satisfied you are with the overall support that you have. (Please do this for *all* questions, even where you have ticked 'no one').

Here is a completed example:

Who do you trust with information you know could get you into trouble?

0	no one	3	6
1		4	7
2		5	8

How satisfied are you with this support? Please circle the appropriate number.

1.....	2.....	3.....	4.....	5.....	6.....
Very Satisfied	Fairly Satisfied	A Little Satisfied	A Little Dissatisfied	Fairly Dissatisfied	Very Dissatisfied

16. Who can you *really* count on to take your mind off your worries when you feel under stress?

0	no one	3	6
1		4	7
2		5	8

How satisfied are you with this support? Please circle the appropriate number.

1.....	2.....	3.....	4.....	5.....	6.....
Very Satisfied	Fairly Satisfied	A Little Satisfied	A Little Dissatisfied	Fairly Dissatisfied	Very Dissatisfied

Satisfied Satisfied Satisfied Dissatisfied Dissatisfied Dissatisfied

17. Who can you really count on to help you feel more relaxed when you are under pressure or tense?

0	no one	3	6
1		4	7
2		5	8

How satisfied are you with this support? *Please circle the appropriate number.*

1.....	2.....	3.....	4.....	5.....	6.....
Very Satisfied	Fairly Satisfied	A Little Satisfied	A Little Dissatisfied	Fairly Dissatisfied	Very Dissatisfied

18. Who accepts you totally, including your worst and best points?

0	no one	3	6
1		4	7
2		5	8

How satisfied are you with this? *Please circle the appropriate number.*

1.....	2.....	3.....	4.....	5.....	6.....
Very Satisfied	Fairly Satisfied	A Little Satisfied	A Little Dissatisfied	Fairly Dissatisfied	Very Dissatisfied

19. Who can you really count on to care about you, regardless of what is happening to you?

0	no one	3	6
1		4	7
2		5	8

How satisfied are you with this? *Please circle the appropriate number.*

1.....	2.....	3.....	4.....	5.....	6.....
Very Satisfied	Fairly Satisfied	A Little Satisfied	A Little Dissatisfied	Fairly Dissatisfied	Very Dissatisfied

20. Who can you really count on to help you feel better when you are feeling generally 'down in the dumps'?

0	no one	3	6
1		4	7
2		5	8

How satisfied are you with this? *Please circle the appropriate number.*

1.....	2.....	3.....	4.....	5.....	6.....
Very Satisfied	Fairly Satisfied	A Little Satisfied	A Little Dissatisfied	Fairly Dissatisfied	Very Dissatisfied

21. Who can you count on to help you feel better when you are very upset?

0	no one	3	6
1		4	7
2		5	8

How satisfied are you with this? *Please circle the appropriate number.*

1.....	2.....	3.....	4.....	5.....	6.....
Very Satisfied	Fairly Satisfied	A Little Satisfied	A Little Dissatisfied	Fairly Dissatisfied	Very Dissatisfied

Finally, could you please answer a few questions about yourself.

22. Could you please circle the number next to the category that includes your age.

Under 20	20-29
30-39	40-49
50-59	60-69
70-79	Over 80

23. Are You? Male.....1 or Female.....2

24. Please note your highest level of education.

Some or all of Primary School	Tertiary Qualification
Completed Secondary School	Partial or completed Post-Graduate Qualification
Trade or Polytech Qualification	

25. How many people live in your household?

Adults Children

26. What ethnic group do you belong to? *(Circle only one).*

New Zealander of Maori descent	1	New Zealander of Pacific Island descent	3
--------------------------------	---	---	---

New Zealander of European descent	2	Other, specify	4
		

ANY OTHER COMMENTS. If you have any other comments you would like to make or anything you would like to say about the questionnaire, please write them here.

.....

Ohakune asked to help in eruption effects study

Ohakune people are to be asked this week to fill in a survey about how the recent eruptions of Mt Ruapehu have affected their lives.

The survey is being conducted by Marian Millar, a post-graduate student at Massey University, presently completing a Master of Arts degree in industrial and organisational psychology. As part of this degree, she is writing a thesis on the social and psychological effects of the eruptions of Mt Ruapehu over the past

two years on the community members of Ohakune.

"The eruptions of Mt Ruapehu over the past two years provide a unique and exciting research environment and the chance to examine, first-hand, how a community has responded to the effects of volcanic eruption," said Ms Millar.

"It is essential that I collect attitudes and opinions of the local population to complete this research," said Ms Millar, asking that people complete the survey that they will find in their letterboxes this week.

"Even though this is a social and psychological survey, it in no way implies that those who participate in this study are mentally ill. Psychology is the study of human behaviour, and this is as wide and as varied as the individuals from where it comes. This study intends to measure the response of the community as a whole to the effects that the eruptions have had upon their community and local environment."

She explains that results of this study are intended to benefit the Ohakune com-

munity by identifying necessary community resources and establishing these within the community if they do not already exist.

"Of course, the accuracy of the results depends upon the truthfulness of the response to the survey questions, and the number of people who respond. The more people who complete the questionnaire, the more accurate the results, the greater the benefits for the community," added Marian.

The only requirement for the completion of the questionnaire is that the participants are full-time residents of Ohakune and have lived here since the first eruptions in 1995. Participants will be asked to complete the survey once now and again in 3-4 months' time.

She explained that individuals' results will be completely confidential and that the research complies with the standards set by the Massey University Ethics Board.

A summary of the research findings will be made available through the *Ruapehu Bulletin* and a pamphlet sent to all those who take part.



Marian Millar, asking for research help

NEWSPAPER ARTICLE

APPENDIX B:

APPENDIX C:

INFORMATION SHEET – JULY

My name is Marian Millar, and I am a postgraduate student at Massey University, currently completing my M. A. in Industrial and Organisational Psychology. As a requirement for this degree, I must complete a research paper, and write a thesis on a chosen topic. My interests lie in the effects of trauma and stress upon the mental health of individuals, and how a community responds to the occurrence of a disaster or other traumatic event.

Therefore, I am researching the psychological and social effects that the eruptions of Mt. Ruapehu have had upon the Ohakune community as a whole. I am investigating the behaviour of individuals in their response to the eruptions, and also how well the community has provided for the individual needs of it's members as their lifestyles change in response to the economic effects of the eruptions.

This research will be conducted by myself, and supervised by Associate Professor Douglas Paton, who has a long history in disaster research, and can be contacted through the Psychology Department at Massey University. Doug can be reached during work hours at [REDACTED] and I can also be reached during work hours on [REDACTED] [REDACTED]

You are being invited to participate in this research if you have been a permanent resident in Ohakune since September 1995. To participate in this research, you need only to provide simple answers to a questionnaire. The questionnaire will take approximately 25 minutes to complete. The questionnaire needs to be completed twice, once now, and once in 2-3 months time. If you decide to take part in this study, I will require your address so I can send out the second questionnaire to you. However, for purposes of this study, I do not require your name, and your address will be kept separately from your completed questionnaire for confidentiality of results.

This research is being funded, in part, by the Massey University Research Fund.

You may decline to take part in this study. If you decide to complete the questionnaire, you have the right not to answer any particular questions you may find intimidating or unnecessary. You also have the right to withdraw from the study at any time, and retrieve your completed questionnaire. If you decide to participate in the research, please complete the consent form provided, and the questionnaire. The researcher will return at your convenience to collect the completed questionnaire.

Should the questions in this survey create or provoke uncomfortable memories or feelings, please feel free to contact the researcher with your reaction to the survey. The results of this study are intended to benefit the

local community by identifying necessary community resources and support links, and establishing these within the community where they are missing. The present research is therefore attempting to benefit all members of the local Ohakune community.

A summary of the research findings will be available to those of you who require it. An article will be printed in the 'Ruapehu Bulletin', and a pamphlet will be distributed to all those who take part in the study.

Once the questionnaires have been completed, the data will remain the property of the researcher. However, should you require your own questionnaire returned, you have access to it. Completed surveys will remain in a locked cupboard to ensure confidentiality. The only people with access to the surveys will be the researcher and the research supervisor. Once the information from the surveys is no longer required, the questionnaires will be destroyed.

Any information you provide will remain confidential, and will not be used except for the purposes of the present research and any publications that result from this research. Confidentiality will be maintained at all times, and anonymity of participants will be ensured. Although I require your address, this information will be kept separate from your completed survey, and will only be identifiable through a reference number in case you require your survey returned.

Thank-you for your time.

APPENDIX D:
CONSENT FORM

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I understand I have the right to withdraw from the study at any time, and to decline to answer any particular questions.

I agree to provide information to the researcher on the understanding that my name will not be used without my permission. The information will be used only for this research and publications arising from this research project.

I agree to participate in this study under the conditions set out in the Information Sheet.

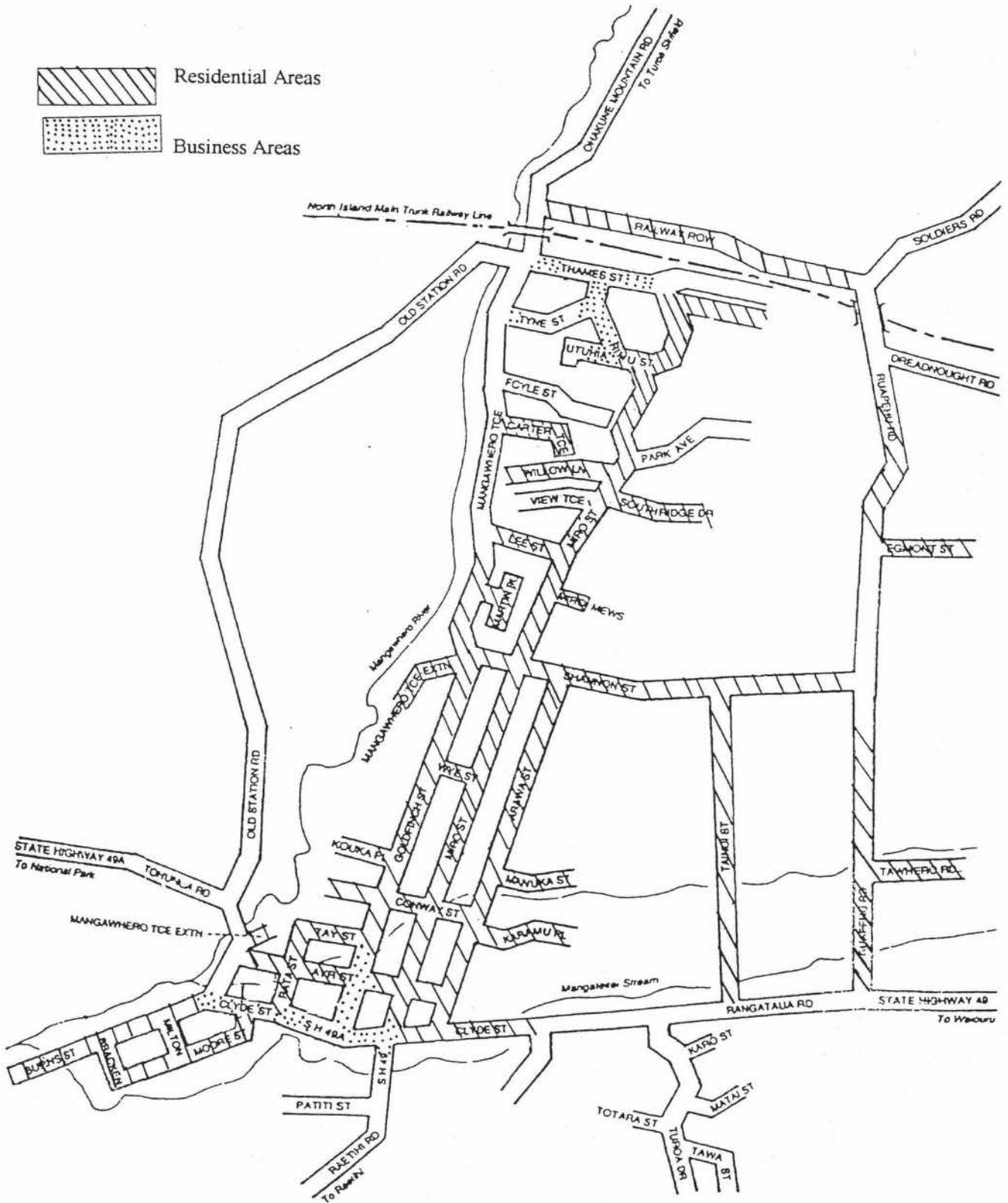
Signed:

Name:

Date:

APPENDIX E:

MAP OF OHAKUNE; RESIDENTIAL AND BUSINESS AREAS.



Map from Ohakune Information Centre, Clyde Street, Ohakune.



APPENDIX F:**FOLLOW-UP LETTER - JULY**

Three weeks ago a questionnaire was delivered to residents of Ohakune from a Massey University research student, Marian Millar. If you have already returned your questionnaire, I would like to thank you for your assistance and co-operation with this research. If you have not yet returned your questionnaire, and if you would like to assist in this research, I would appreciate receiving your questionnaire at your earliest convenience. Please do not hesitate to contact me during business hours on [REDACTED] [REDACTED] with any queries.

(Placed in the Ruapehu Bulletin on 29 July, 1997)

APPENDIX G: INFORMATION SHEET – SEPTEMBER

At the end of July you received and completed a questionnaire on the effects you feel the eruptions of Mt. Ruapehu have had upon you and those within your community. I would like to take this opportunity to thank you for completing and returning this community survey. As mentioned in the previous information sheet the results of this survey are to be used in the completion of my M. A. at Massey University.

The results of this study are intended to benefit the local community by identifying necessary community resources and support links, and establishing these within the community where they are missing. The present research is therefore attempting to benefit all members of the local Ohakune community.

Your response to this survey has been valuable. I would greatly appreciate it if you could find the time to respond to the questionnaire attached. This second survey is identical to the one you completed in July. This is an attempt to measure your response over a period of time.

To participate in this research, you need only to provide simple answers to a questionnaire. This will take approximately 25 minutes to complete. Once you have completed the consent form and the questionnaire, please place it in the freepost envelope provided and post it at your earliest convenience. No stamp is required.

If you decide to complete the questionnaire, you have the right not to answer any particular questions you may find intimidating or unnecessary. You also have the right to withdraw from the study at any time, and retrieve your completed questionnaire. The completed surveys remain the property of the researcher. Once the information from the surveys is no longer required, the questionnaires will be destroyed.

Some of you replied in the first survey that some of the questions asked are ambiguous and contain double negatives. I understand that this is a problem in answering the questionnaire. Please answer the questions as best you can in the manner in which *you* understand them.

This research has been approved by the Massey University Ethics Committee, and the results will remain completely confidential. Any information you provide will not be used except for the purposes of the present research and any publications that result. Confidentiality will be maintained at all times, and anonymity of participants will be ensured.

The study is being funded, in part, by the Massey University Research Fund, and is conducted by myself, Marian Millar, and supervised by Associate Professor Douglas Paton. Any queries you may have, please feel free to contact either Doug, during work hours, on [REDACTED] or myself, during work hours, on [REDACTED]

A summary of the research findings will be posted to you around the New Year. An article will also be printed in the 'Ruapehu Bulletin' on the results of this study.

Thank you for your time.

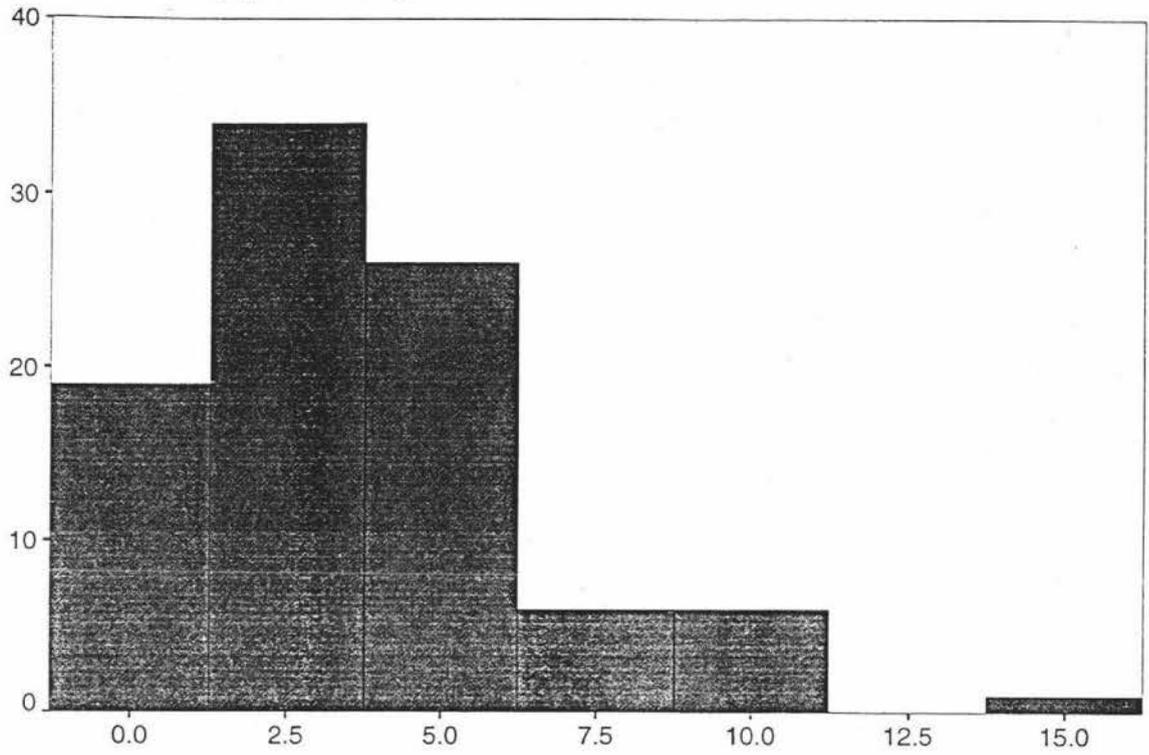
APPENDIX H:**FOLLOW-UP LETTER – SEPTEMBER**

Three weeks ago a questionnaire was delivered to you by Marian Millar, a Massey University research student. This is the final questionnaire to be completed by those who participated with this research in July. If you have already returned your questionnaire, I would like to thank you for your assistance and co-operation. If you have not yet returned your questionnaire, I would appreciate receiving it at your earliest convenience. Please do not hesitate to contact me during business hours on [REDACTED] [REDACTED] with any queries.

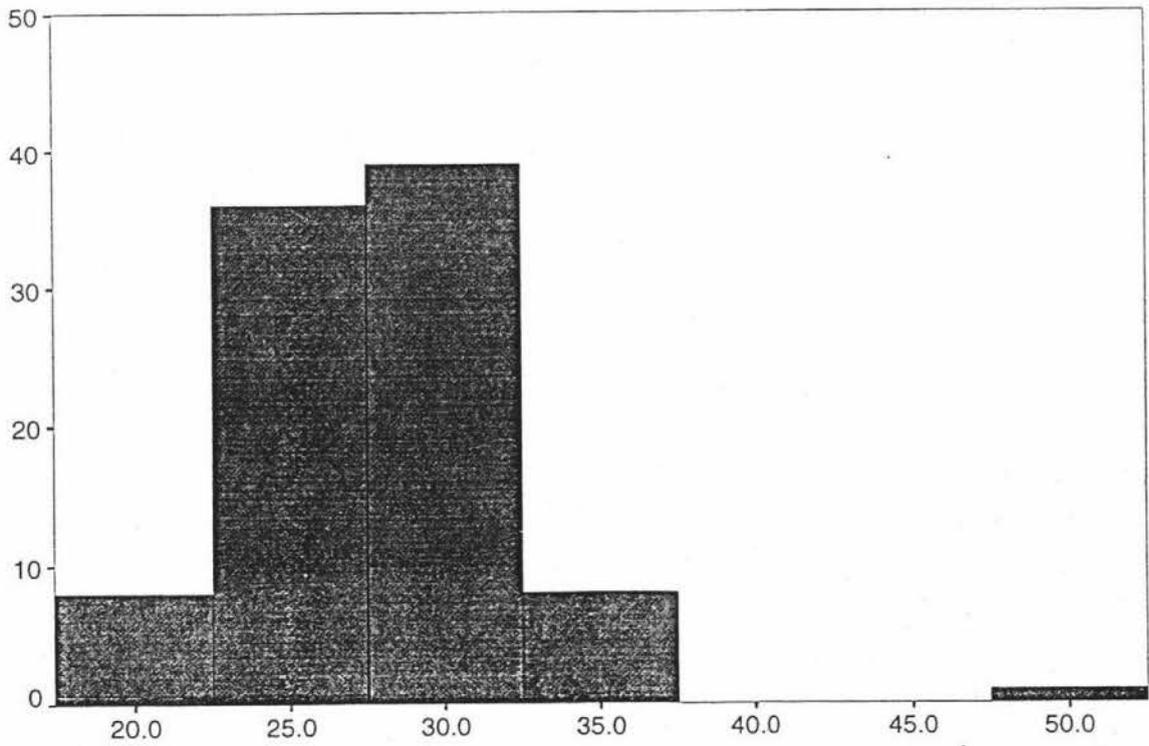
Thank-you.

APPENDIX I:
HISTOGRAMS.

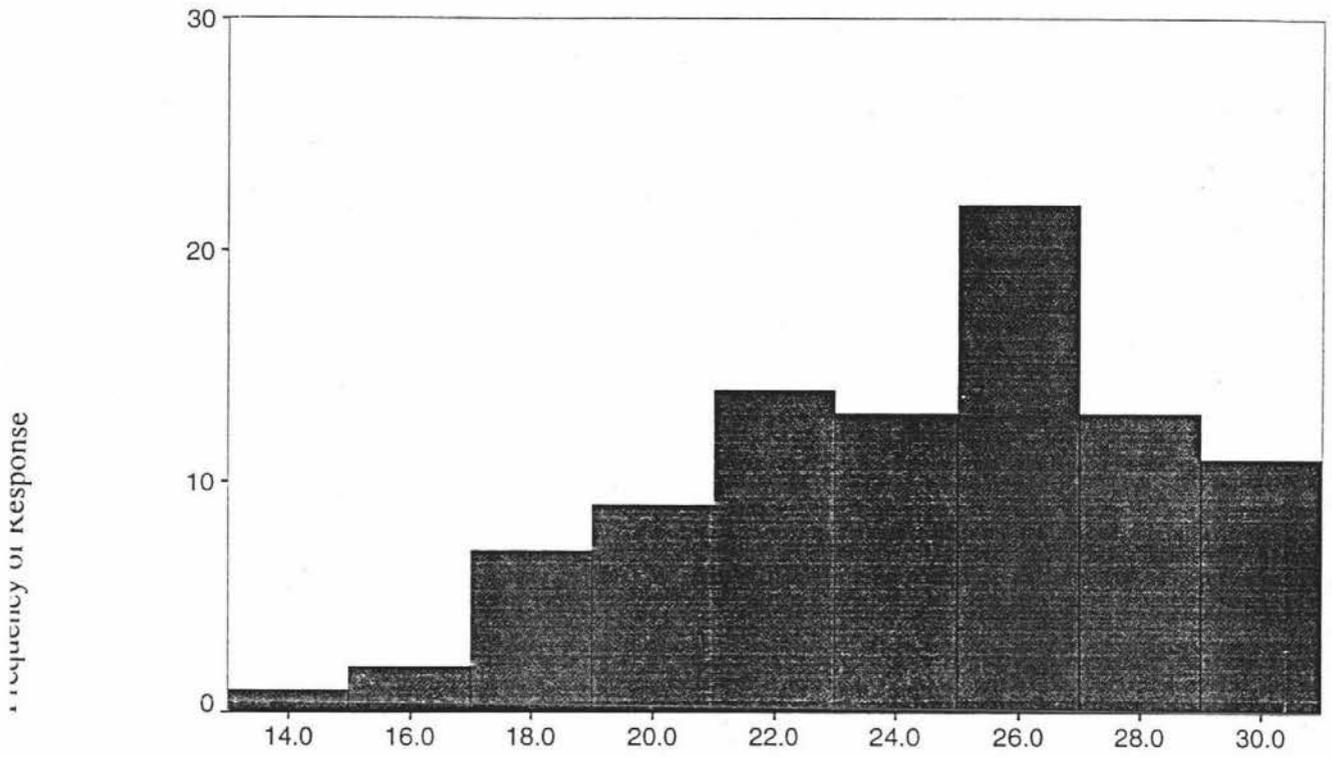
Histograms from the July general sample.



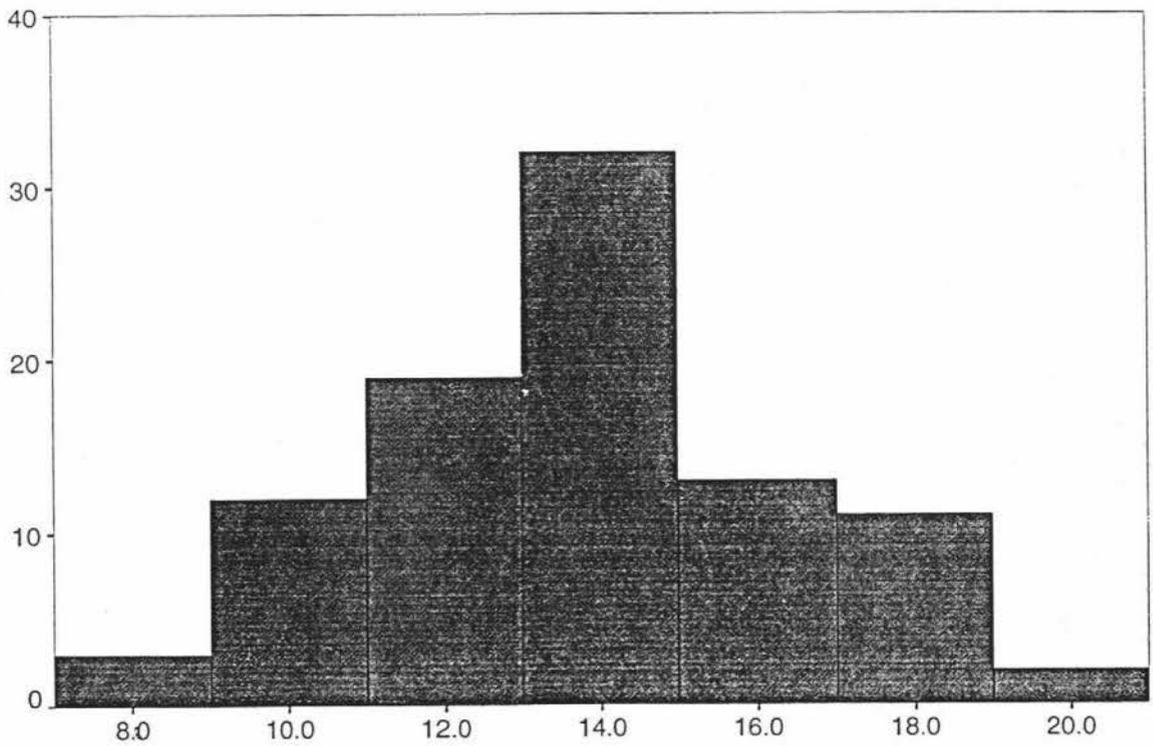
Membership to Community Groups. (Std. Dev. = 2.79, Mean = 3.6, N = 92).



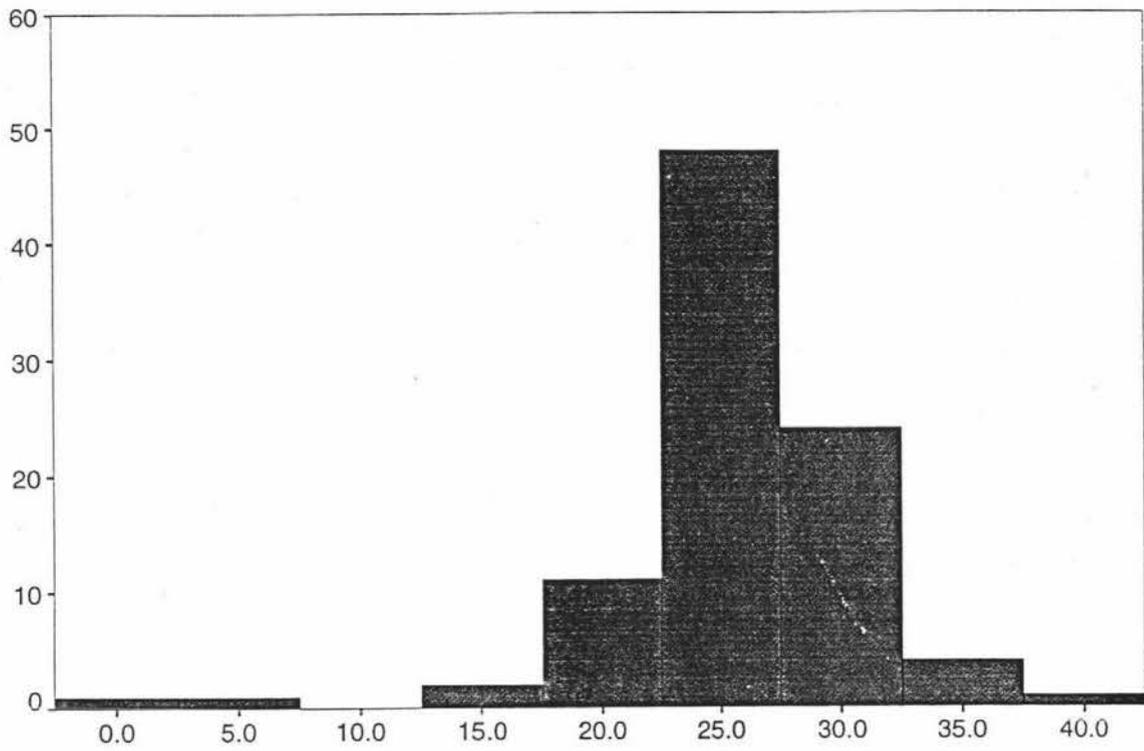
Sense of Community. (Std. Dev. = 4.13, Mean = 27.9, N = 92).



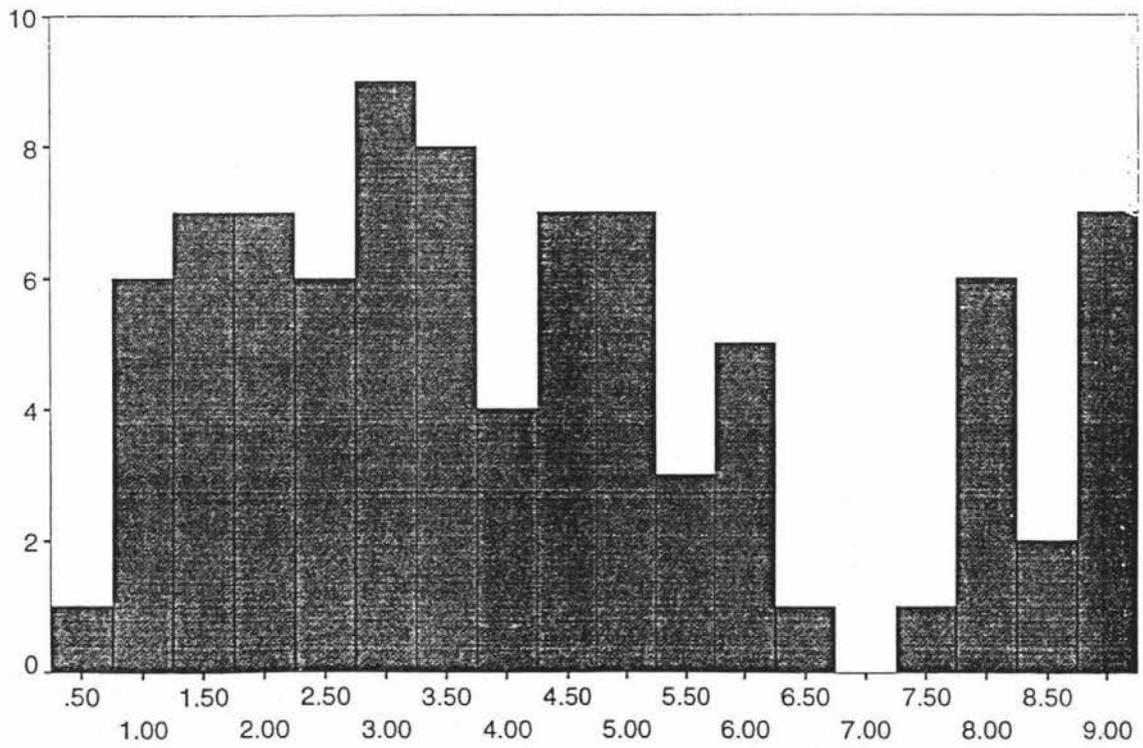
Self-Efficacy. (Std. Dev. = 3.89, Mean = 23.9, N = 92).



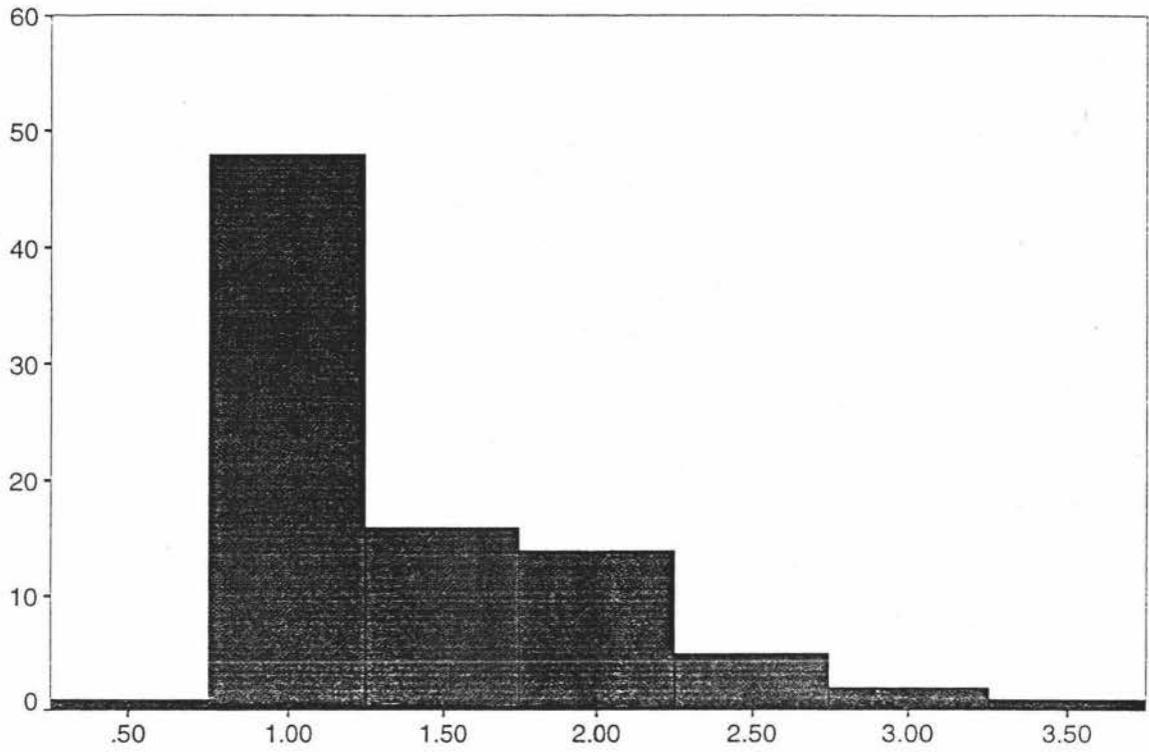
Self-Efficacy 2. (Std. Dev. = 2.70, Mean = 13.3, N = 92).



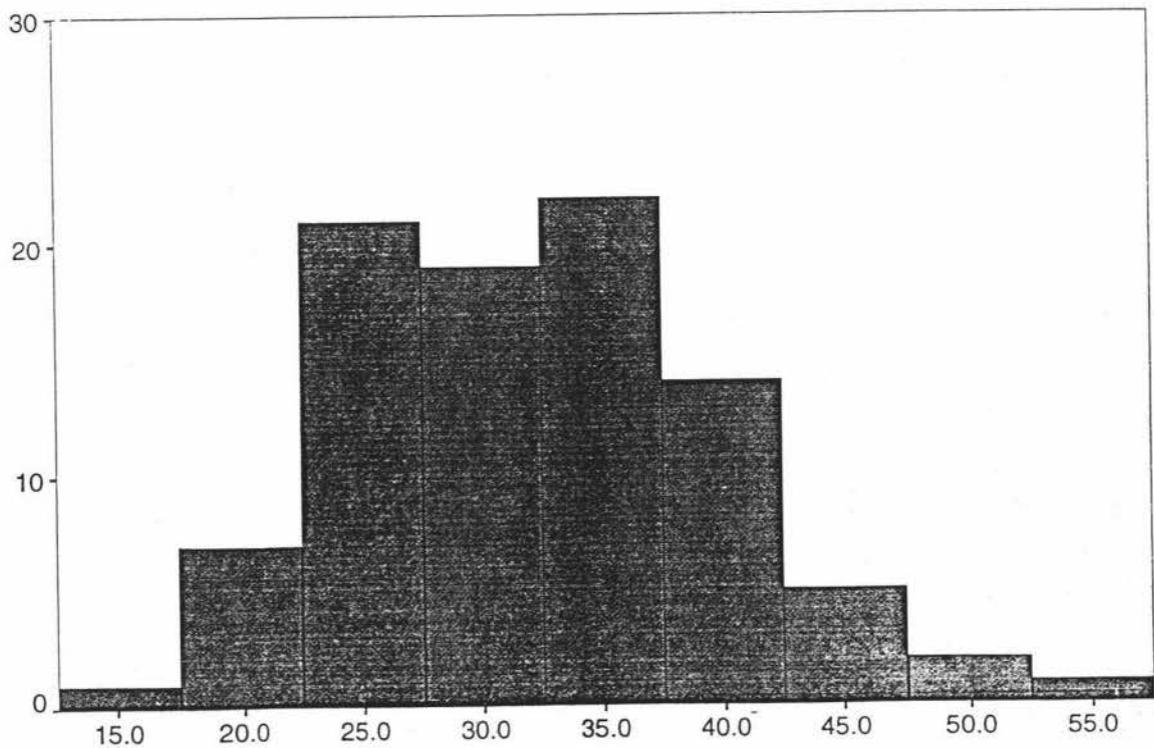
Coping Style. (Std. Dev. = 5.30, Mean = 25.6, N = 92).



Social Support Quantity (Std. Dev. = 2.46, Mean = 4.28, N = 87).

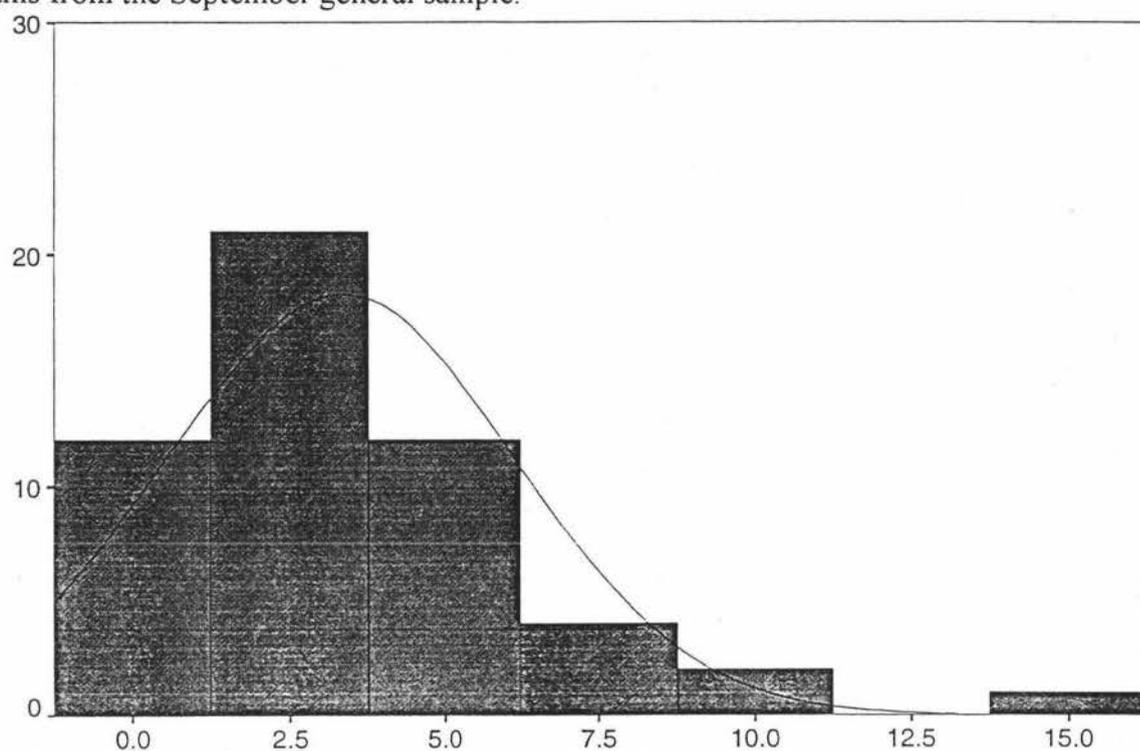


Social Support Quality (Std. Dev. = 0.61, Mean = 1.44, N = 87).

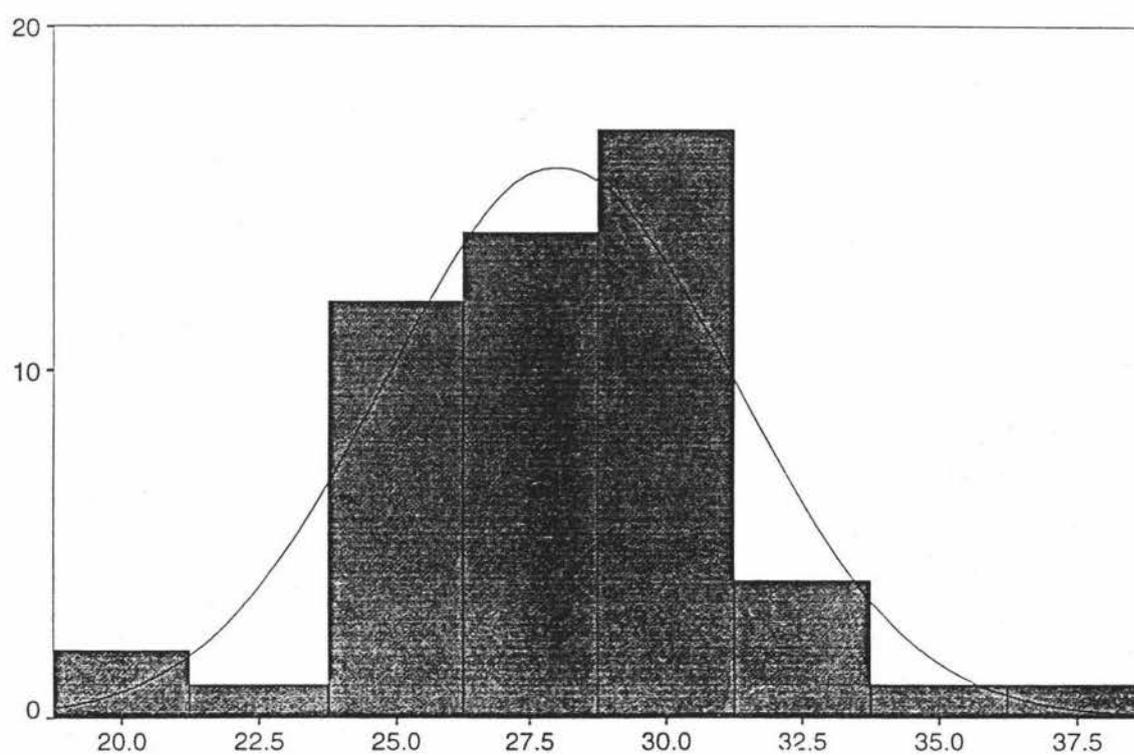


HSCL-21, Symptomatology. (Std. Dev. = 7.38, Mean = 32, N = 92).

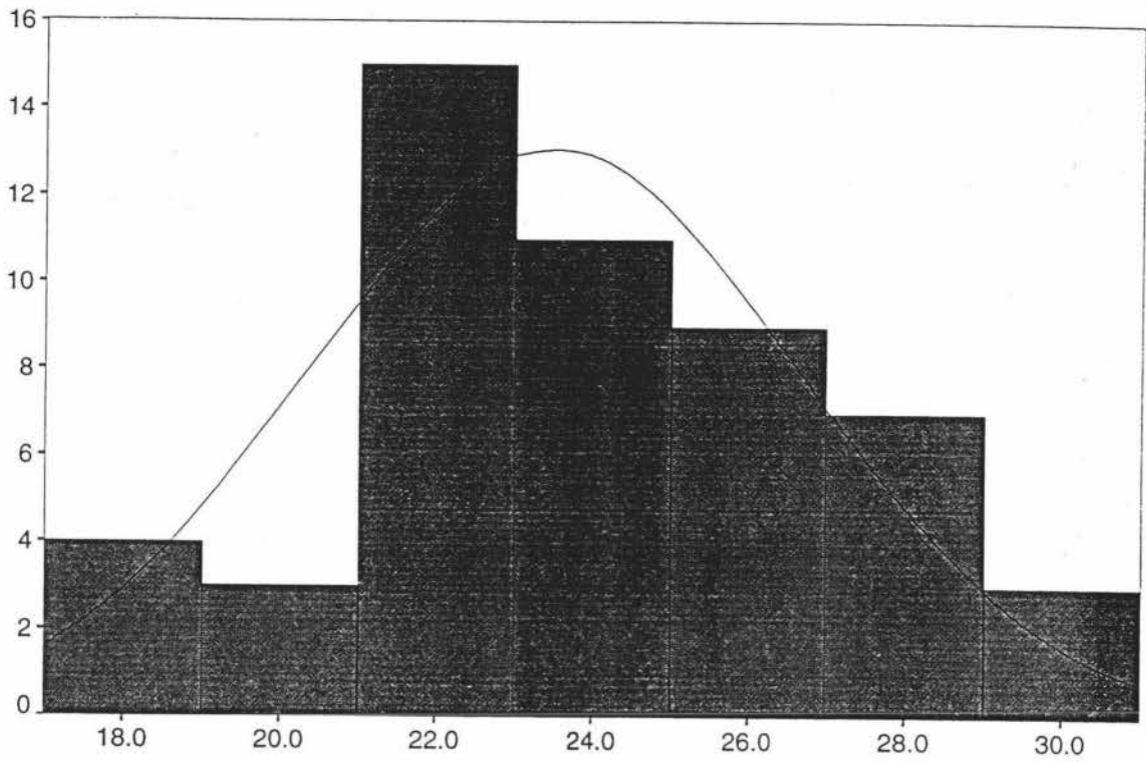
Histograms from the September general sample.



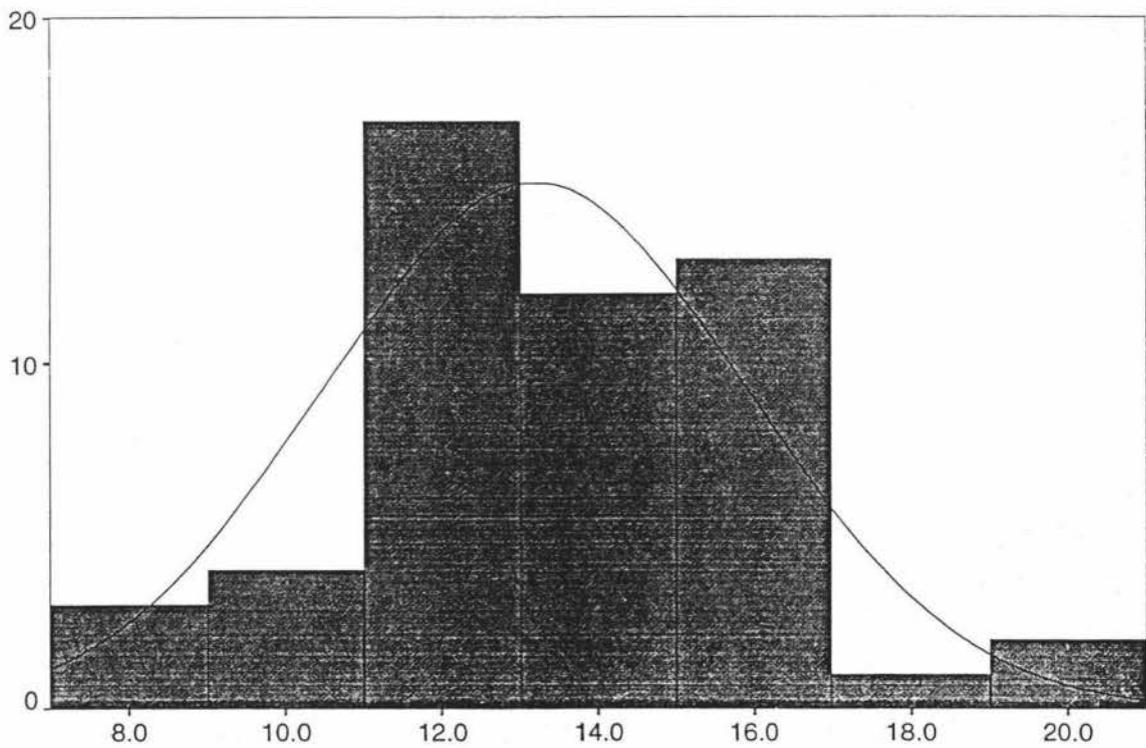
Membership to Community Groups. (Std. Dev. = 2.79, Mean = 3.6, N = 92).



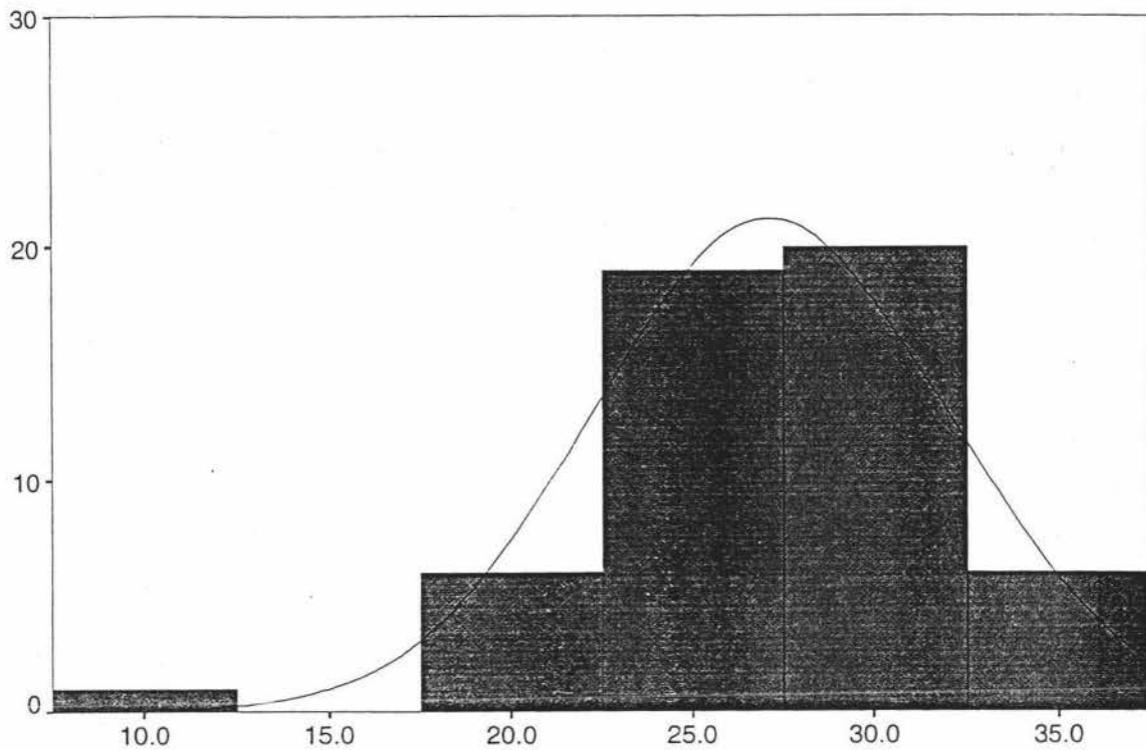
Sense of Community. (Std. Dev. = 4.13, Mean = 27.9, N = 92).



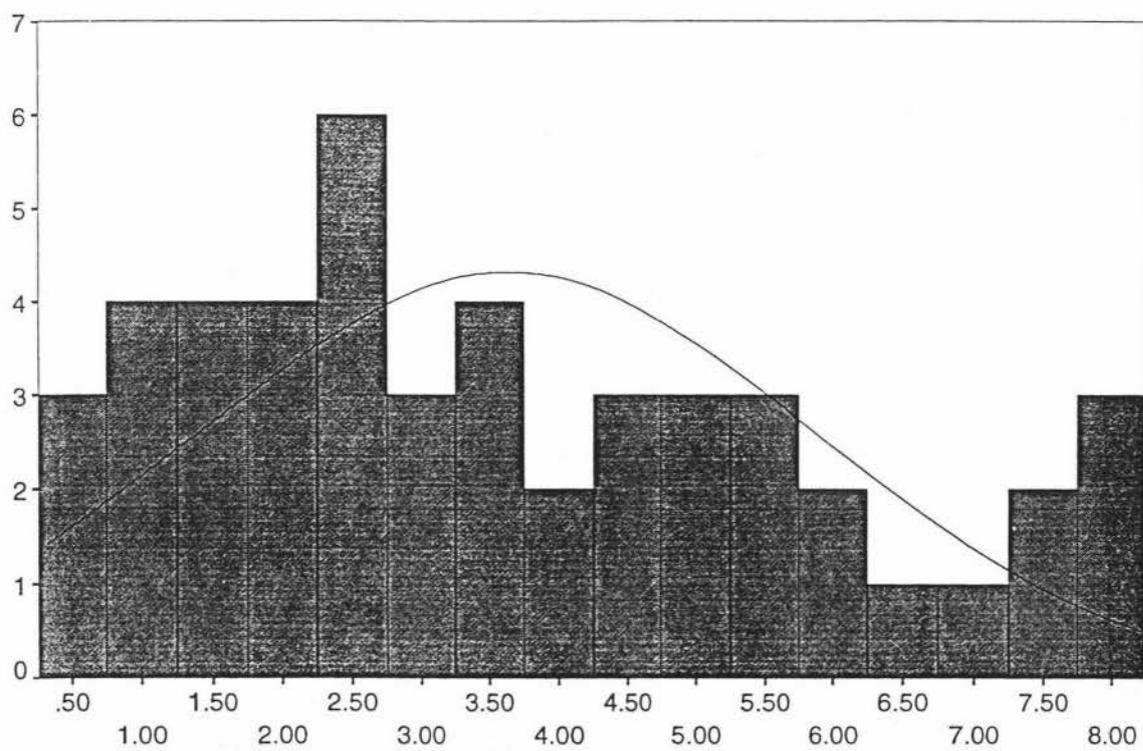
Self-Efficacy. (Std. Dev. = 3.89, Mean = 23.9, N = 92).



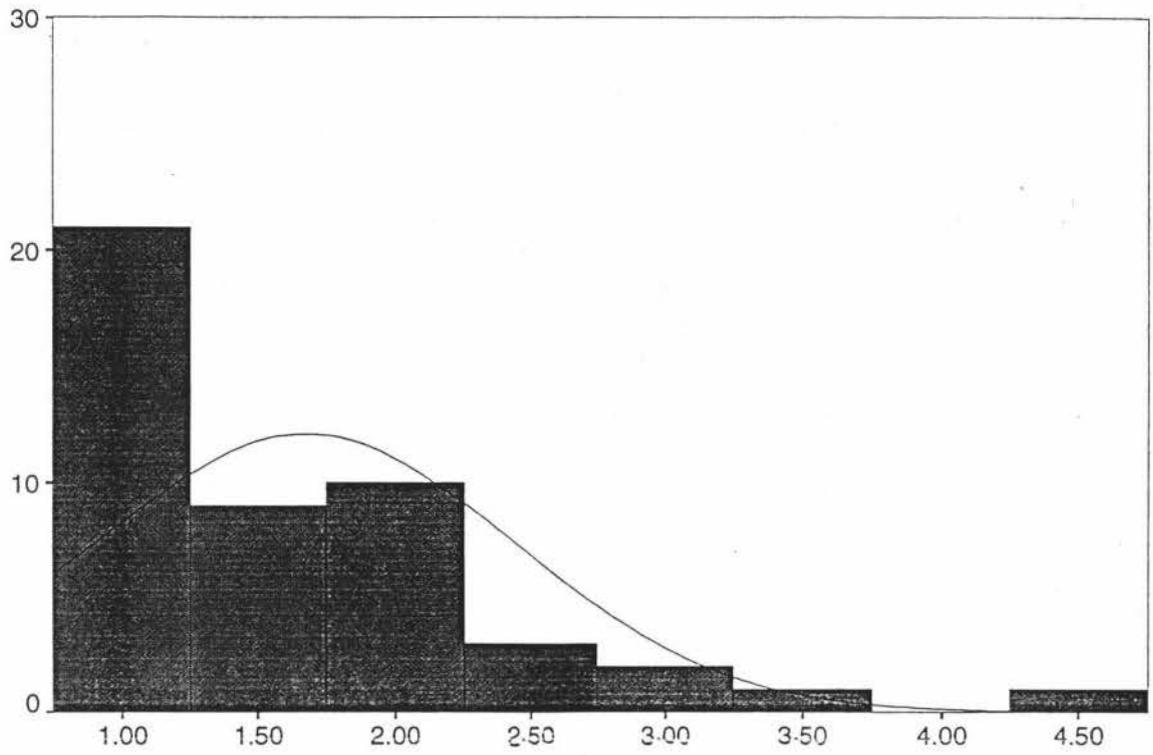
Self-Efficacy 2. (Std. Dev. = 2.70, Mean = 13.3, N = 92).



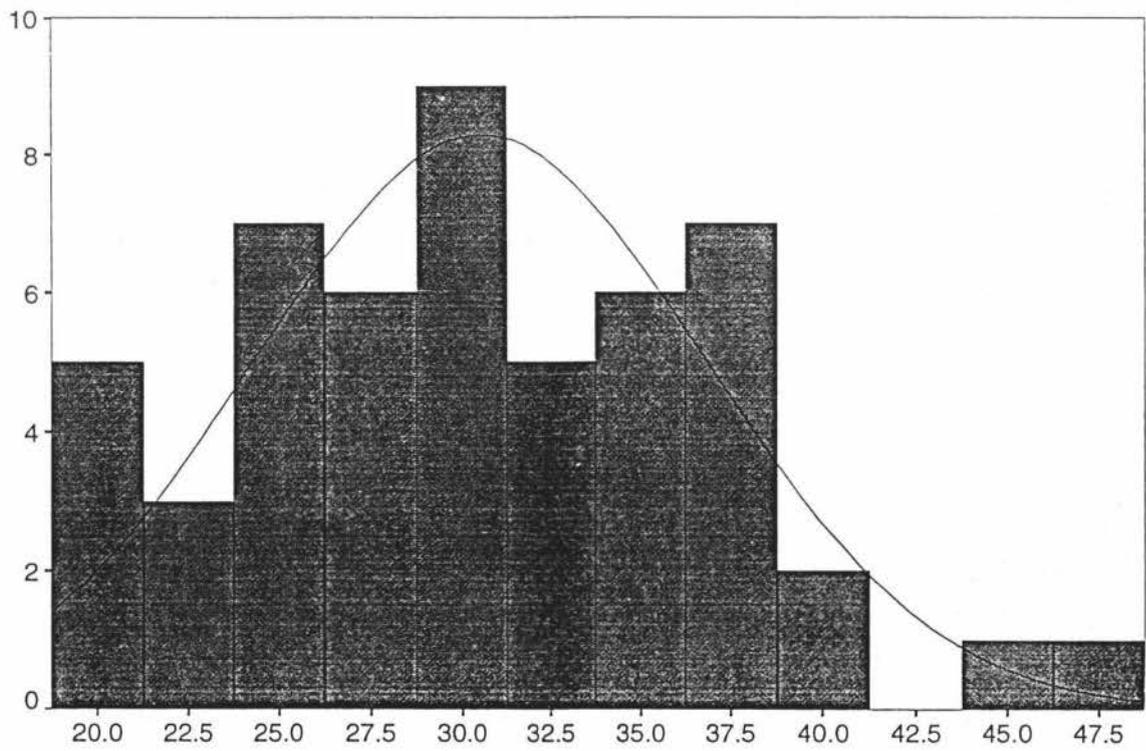
Coping Style. (Std. Dev. = 5.30, Mean = 25.6, N = 92).



Social Support Quantity (Std. Dev. = 2.46, Mean = 4.28, N = 87).

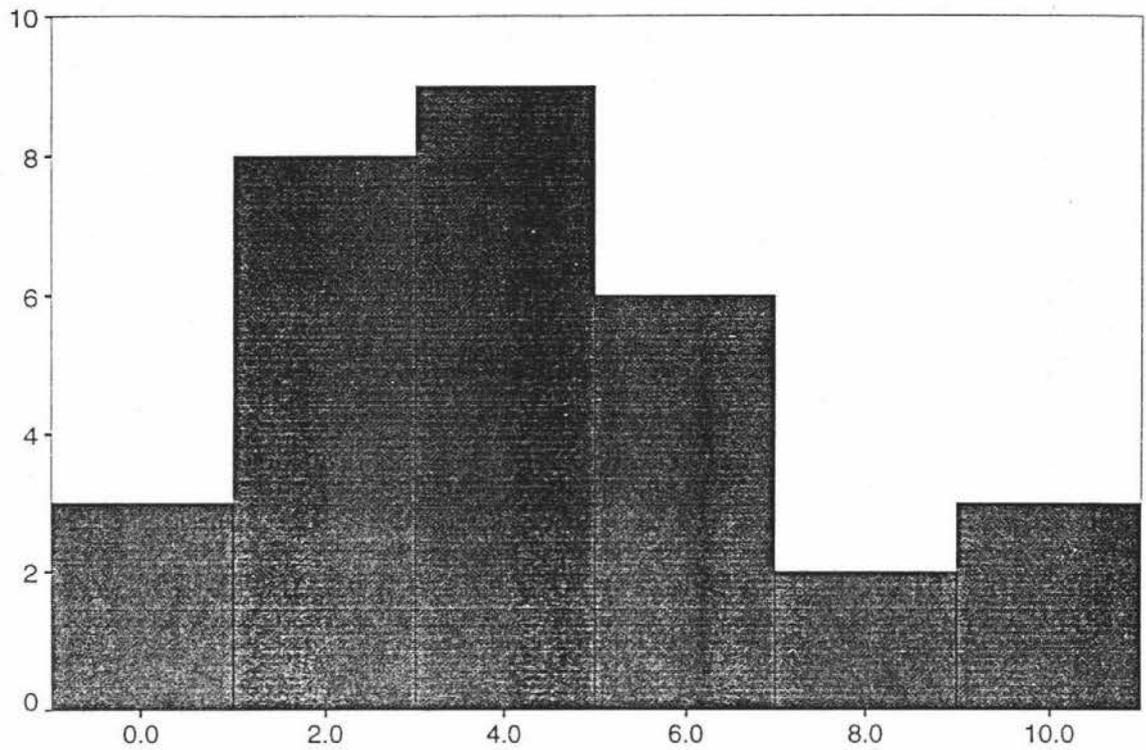


Social Support Quality (Std. Dev. = 0.61, Mean = 1.44, N = 87).

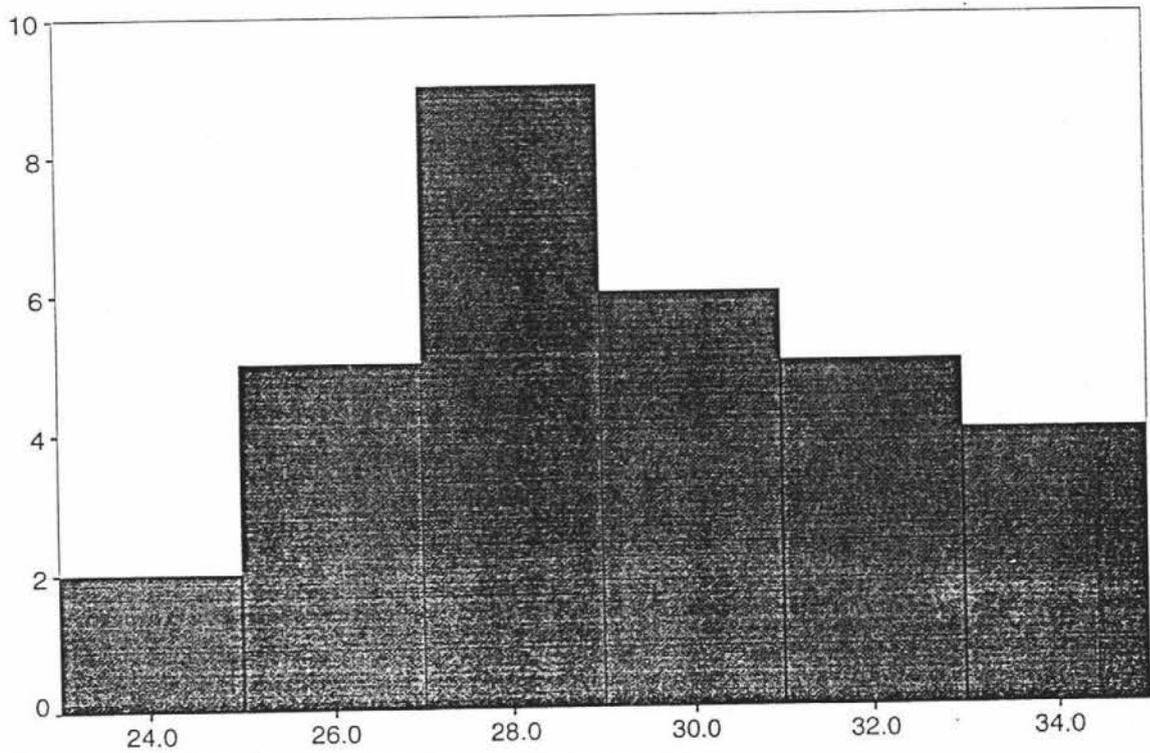


HSCL-21, Symptomatology. (Std. Dev. = 7.38, Mean = 32, N = 92).

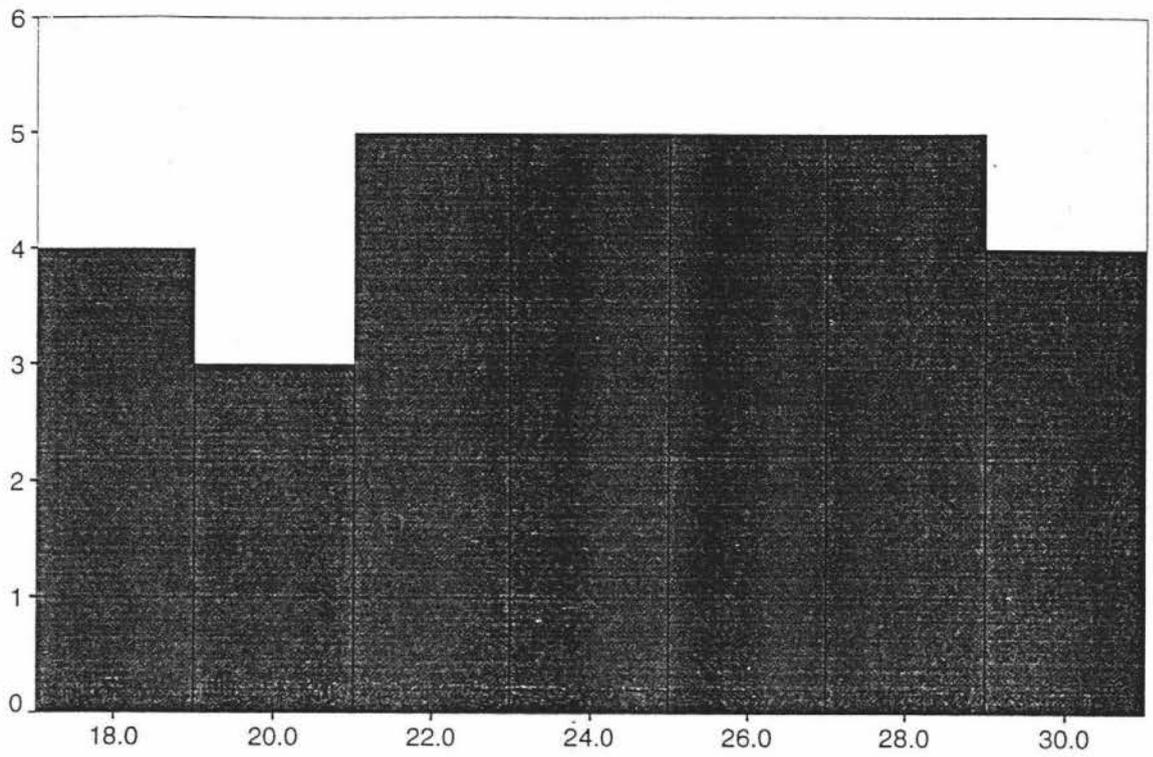
Histograms from the July matched cases.



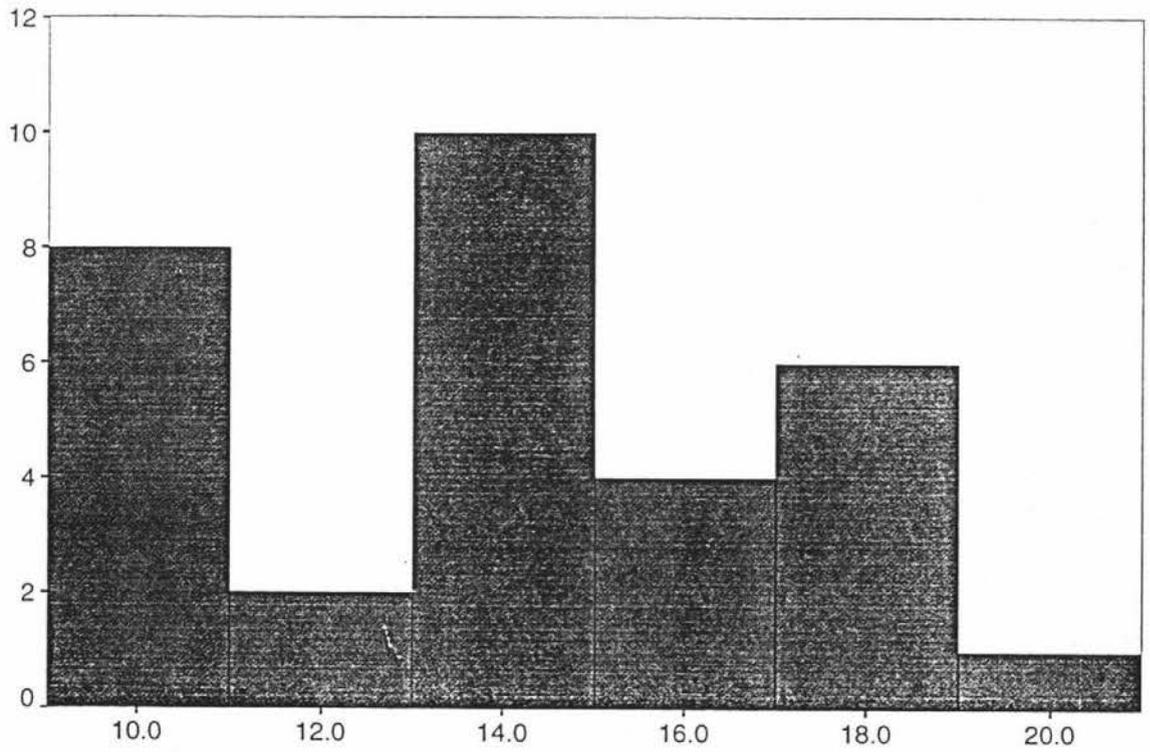
Membership to Community Groups. (Std. Dev. = 2.79, Mean = 3.6, N = 92).



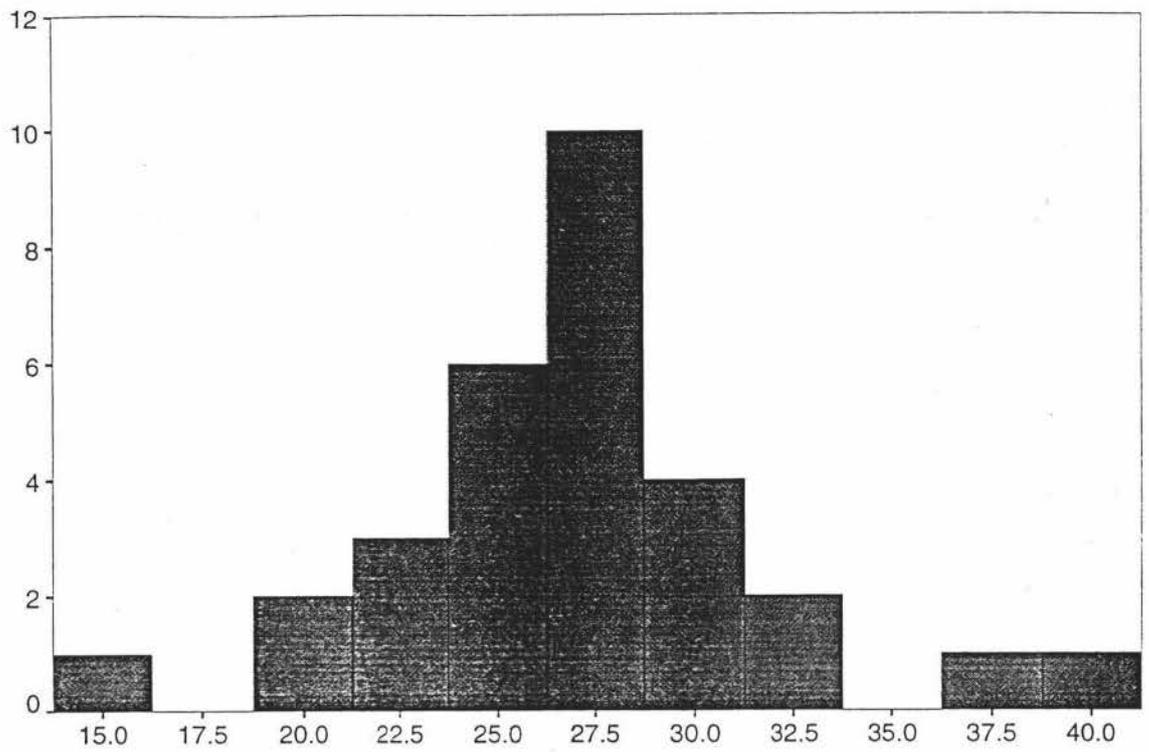
Sense of Community. (Std. Dev. = 4.13, Mean = 27.9, N = 92).



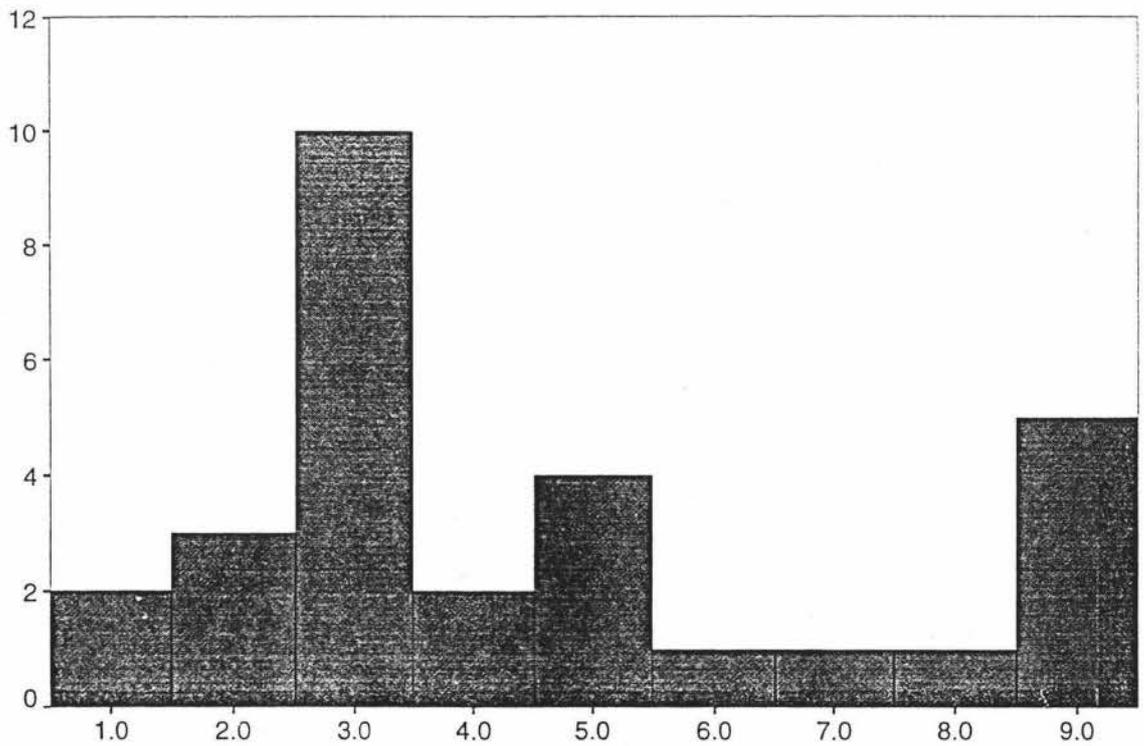
Self-Efficacy. (Std. Dev. = 3.89, Mean = 23.9, N = 92).



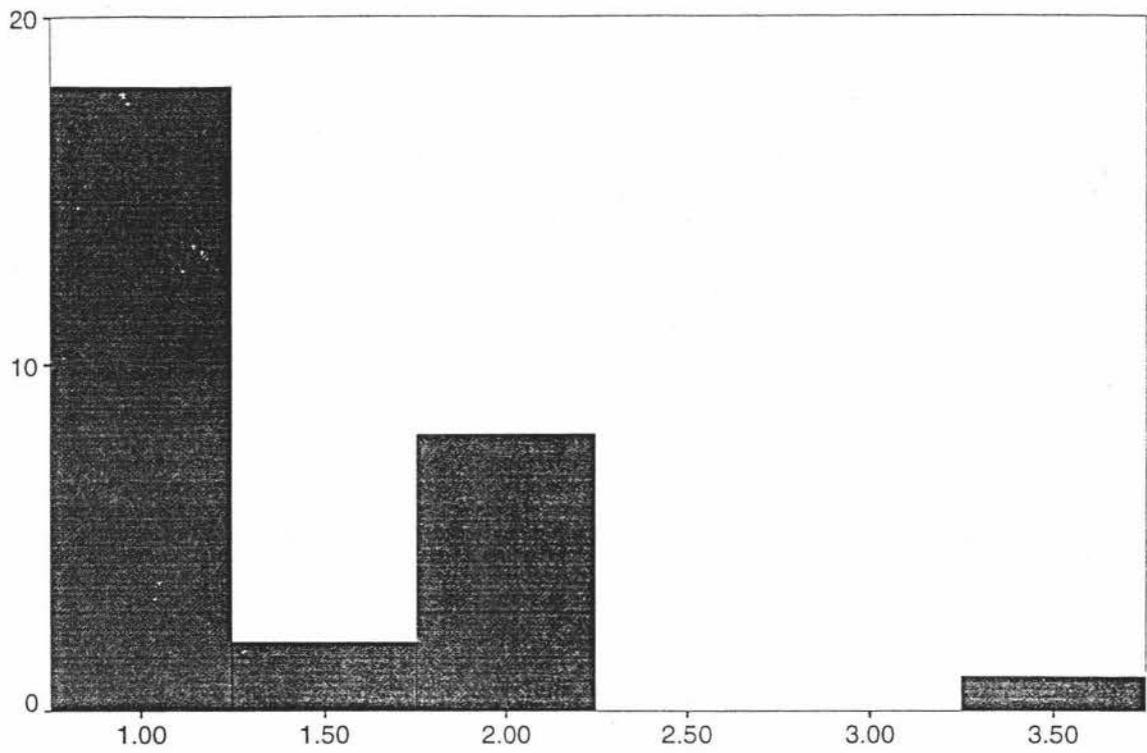
Self-Efficacy 2. (Std. Dev. = 2.70, Mean = 13.3, N = 92).



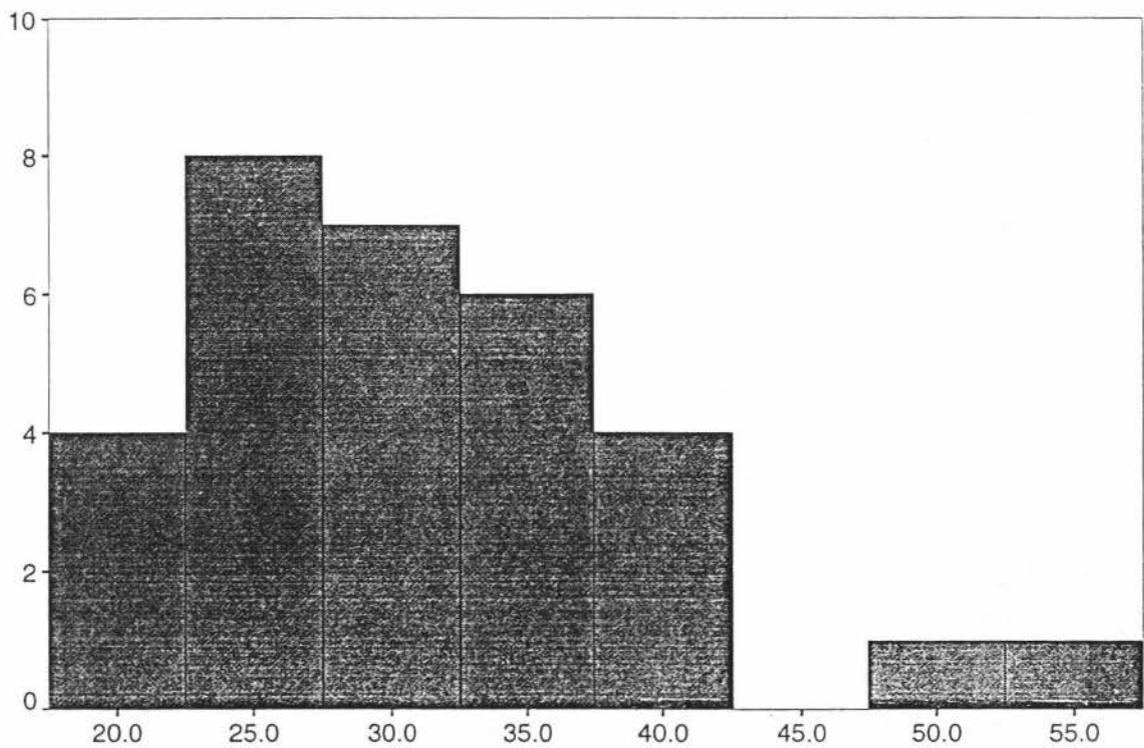
Coping Style. (Std. Dev. = 5.30, Mean = 25.6, N = 92).



Social Support Quantity (Std. Dev. = 2.46, Mean = 4.28, N = 87).

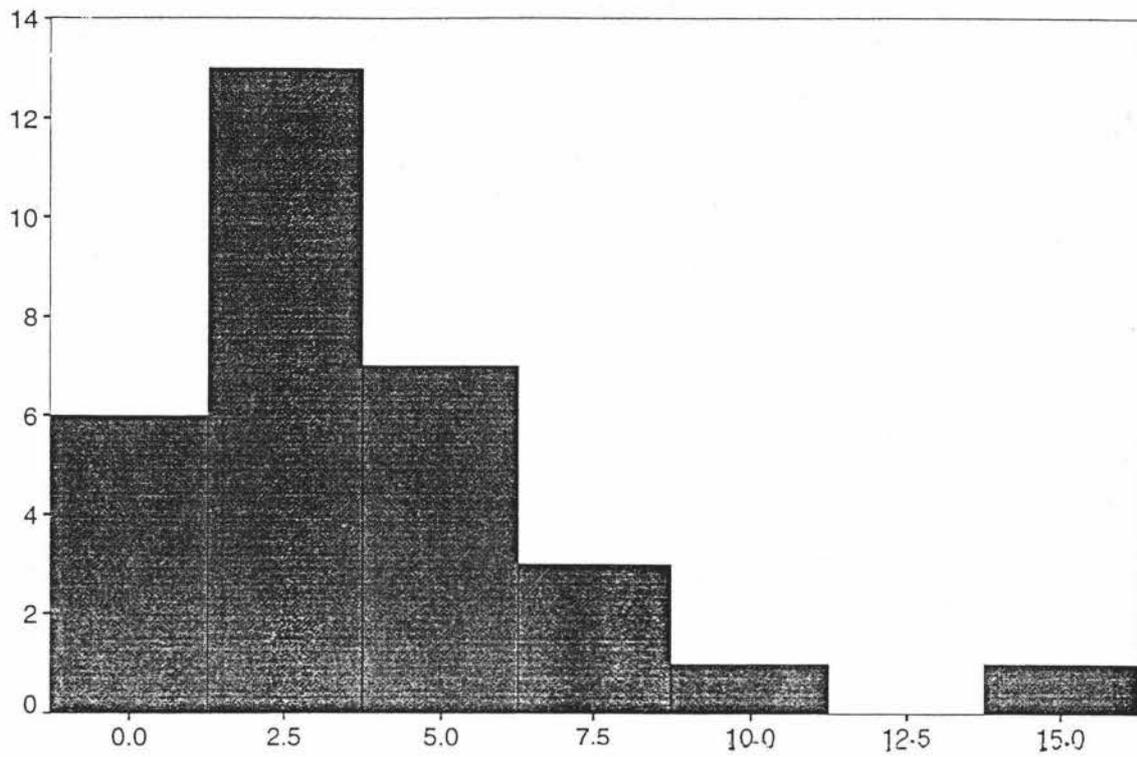


Social Support Quality (Std. Dev. = 0.61, Mean = 1.44, N = 87).

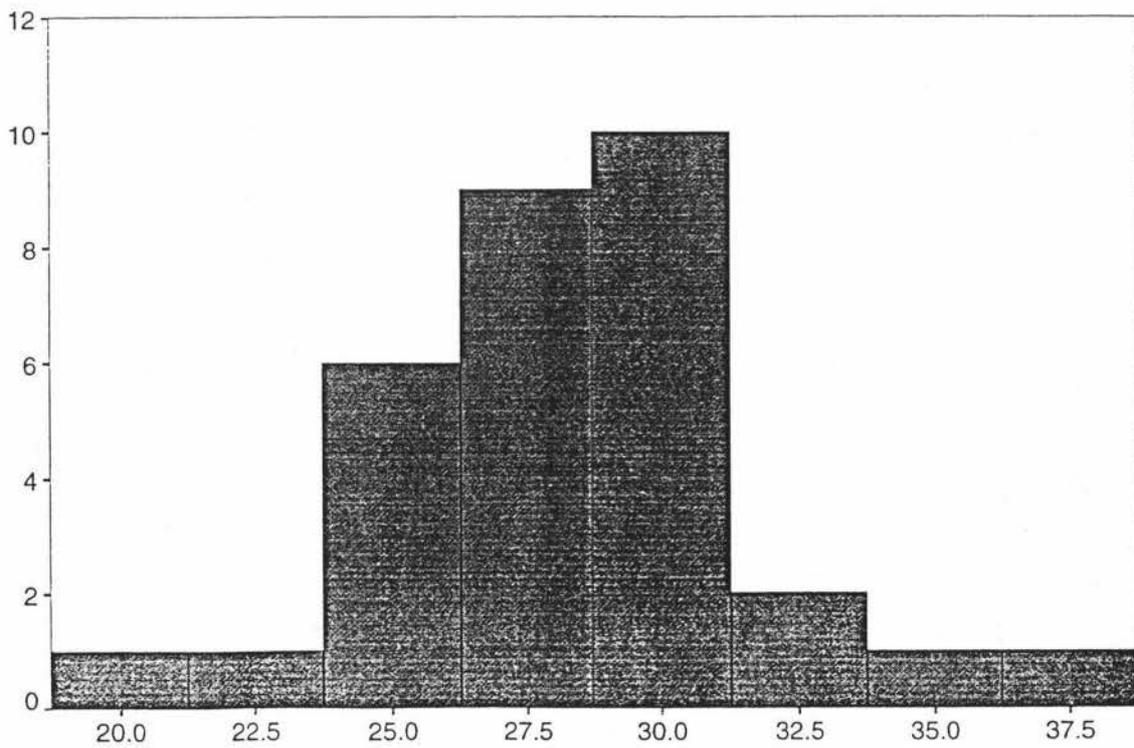


HSCL-21, Symptomatology. (Std. Dev. = 7.38, Mean = 32, N = 92).

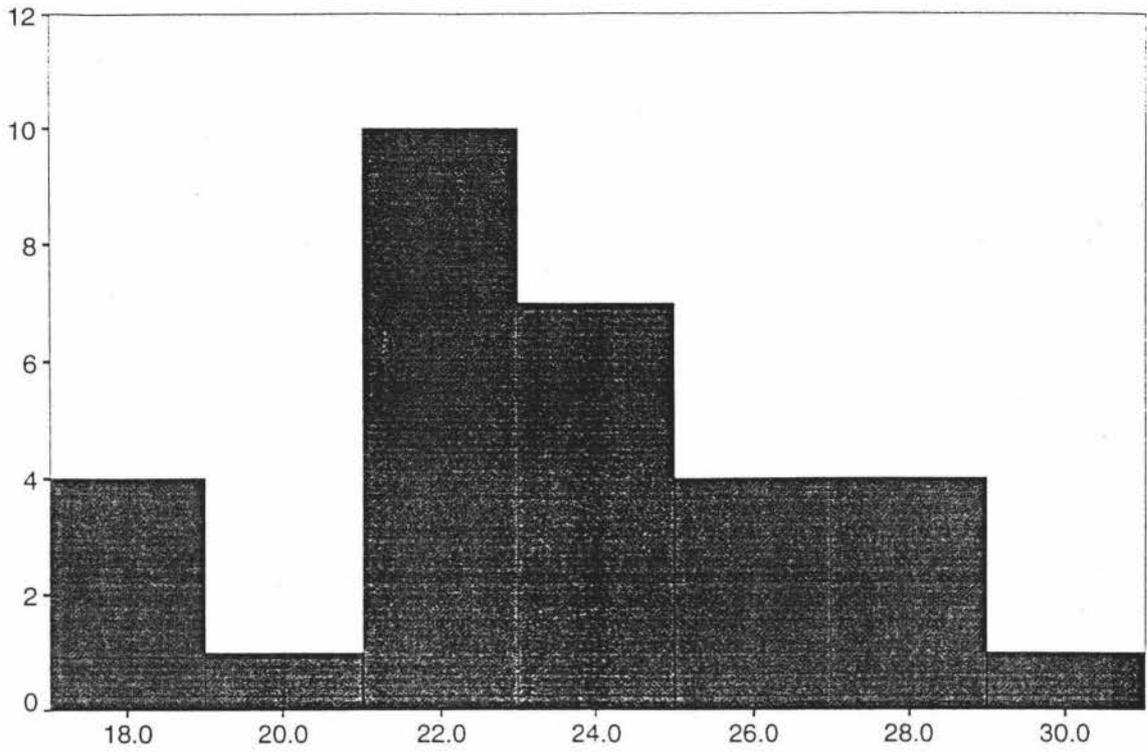
stograms from the September matched cases.



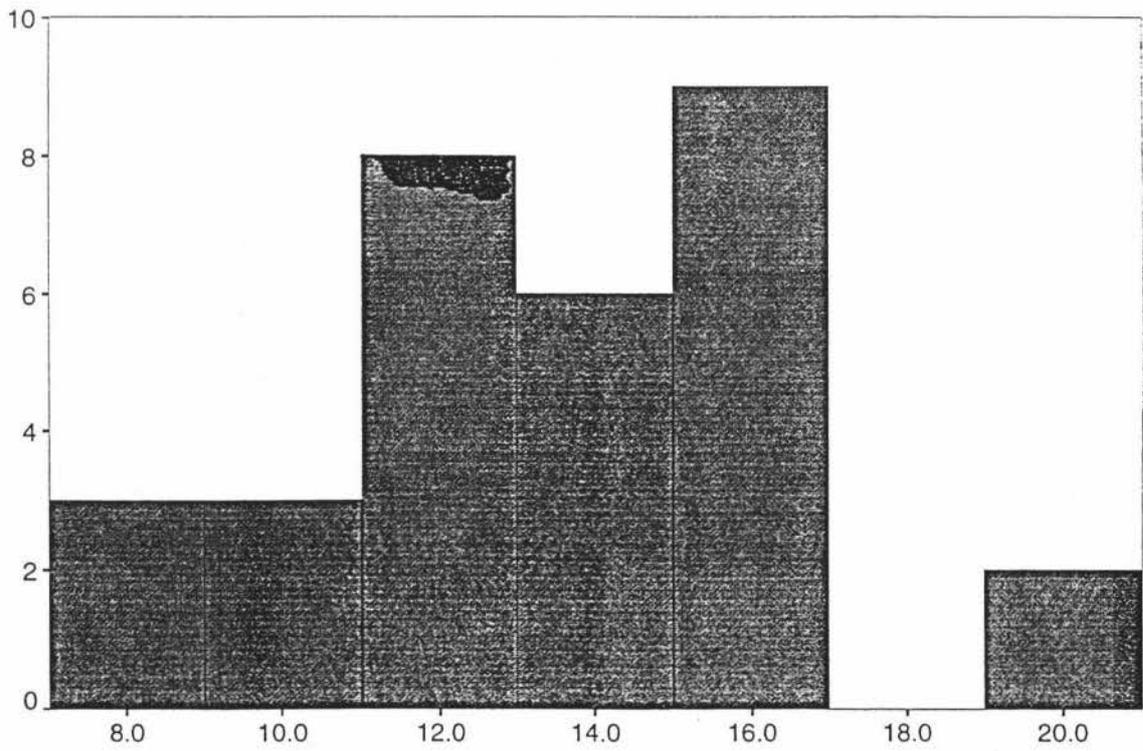
Membership to Community Groups. (Std. Dev. = 2.79, Mean = 3.6, N = 92).



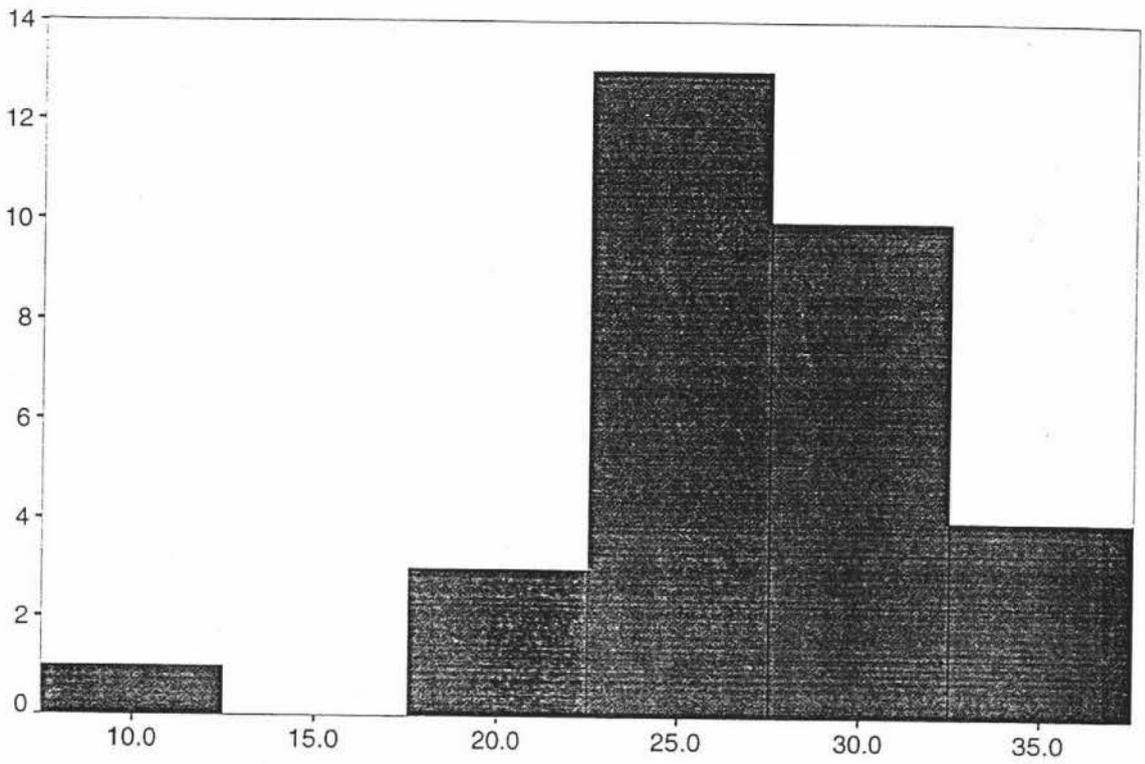
Sense of Community. (Std. Dev. = 4.13, Mean = 27.9, N = 92).



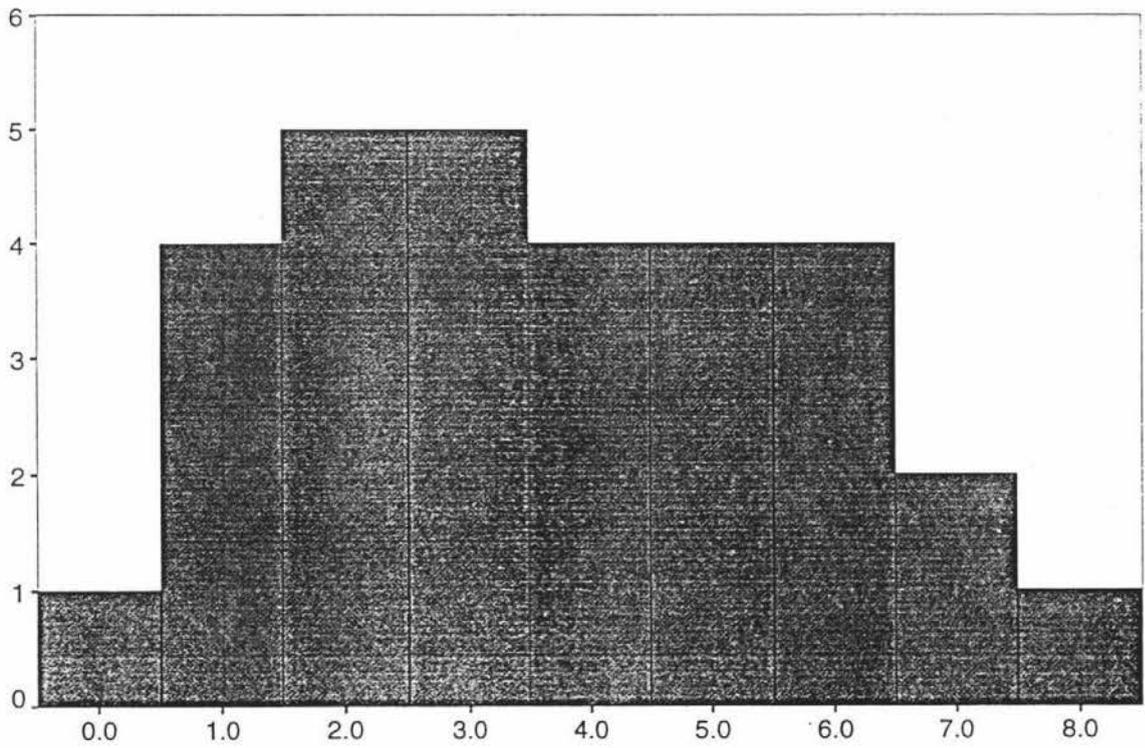
Self-Efficacy. (Std. Dev. = 3.89, Mean = 23.9, N = 92).



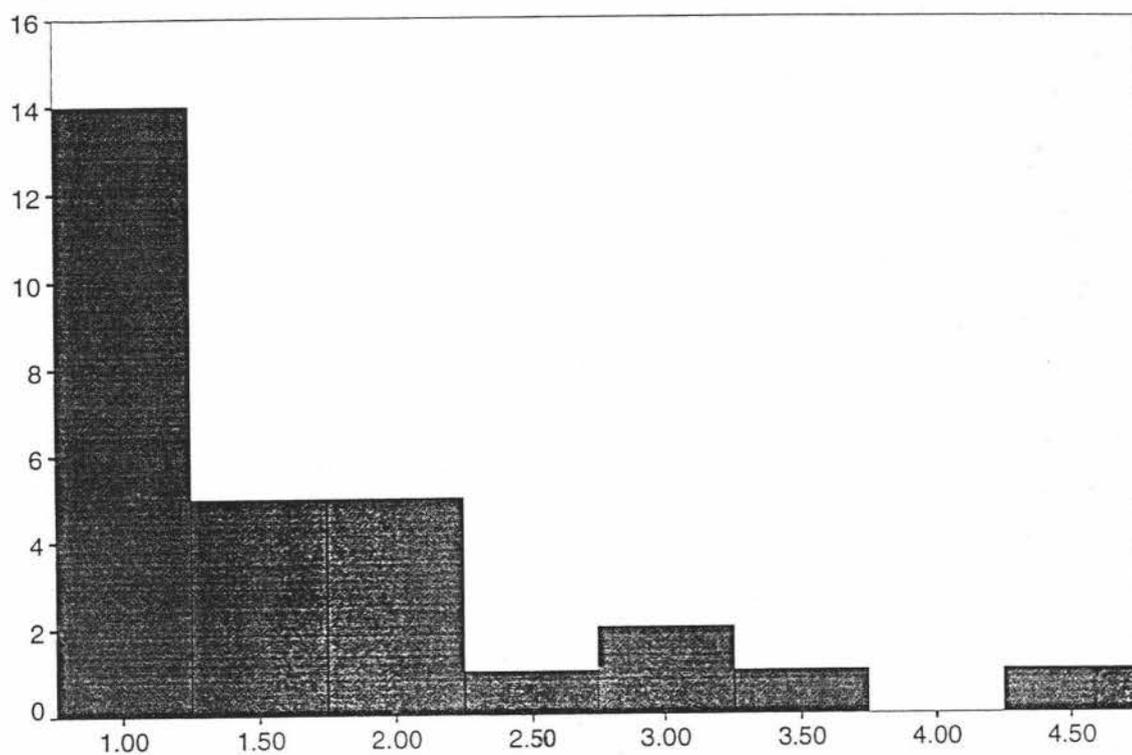
Self-Efficacy 2. (Std. Dev. = 2.70, Mean = 13.3, N = 92).



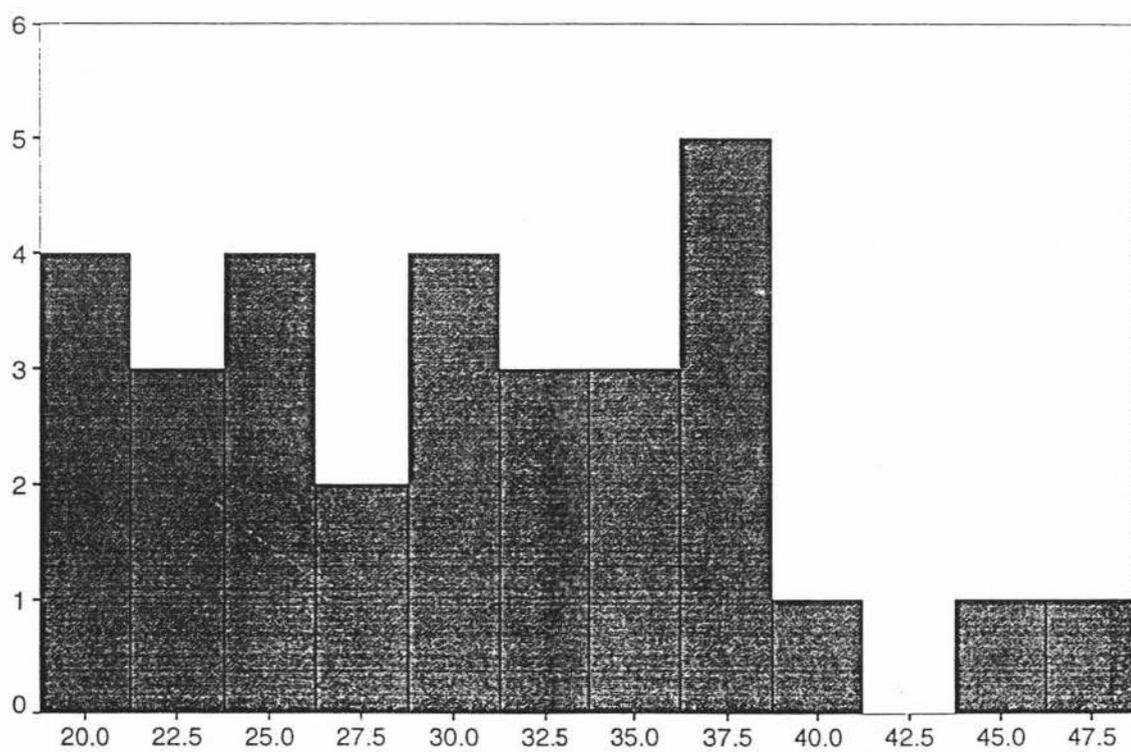
Coping Style. (Std. Dev. = 5.30, Mean = 25.6, N = 92).



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