The Construction of Operator Stress and Wellbeing in Aotearoa New Zealand's Logging Industry

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Trevor Best

University of Canterbury

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ABSTRACT

The forest industry in Aotearoa New Zealand is pursuing a strategy of increasing the use of mechanised harvesting systems as a way of both increasing crew productivity and reducing the number of serious injury and fatal accidents amongst those working on the felling face. While this will reduce exposure to physical hazards, hazards in the psychosocial environment (such as low job control and conflict between work, home and community life) also impact worker behaviour and wellbeing. Yet little is known about the psychosocial risks and coping adaptations in operation within the industry. Given the relationship between stress and risky and dangerous behaviour, it is imperative the industry develops an understanding of how stress operates within the lives of this group of workers to ensure the desired safety outcomes are achieved.

The first objective of this research, therefore, was to explore how machine operators working in the forest industry construct their wellbeing within their work life. Stress is a subjective process where the meanings an individual attribute to an event and their ability to cope with that event influences the stress experience. Understanding stress, therefore, means being able to encapsulate the impacts of social and institutional issues such as power, control and ethics and their impact on the perceptions individuals have of their stress experience. As little is known about these phenomena within this context, constructivist grounded theory methods were used to provide a substantive explanation of the processes in operation. Developing this substantive explanation was the second objective of the research.

Twenty-seven operators were recruited from three regions to participate in a semi-structured interview to explore their experiences of stress and wellbeing. Analysis consisted of three steps – initial coding, intermediate coding and theoretical coding. Within this process, interview text was first dissected into incidents and then organised into concepts with increasing levels of abstraction. That continued iteratively until a core category was identified. This was a category that encapsulated the process that was evident in the concepts and connections that emerged from the analysis. A

grounded theory was explicated by conceptualising the narrative inherent in the core category and explained using extant theory.

The data revealed that wellbeing could be explained by the concepts and connections encapsulated in the core category *securing a place in a hierarchical world.* Within this core category, operator wellbeing was an outcome of the adaptations operators used to secure a sense of place within the various contextual and socio-cultural hierarchies in which their lives unfold. The level of wellbeing the operators experienced was a function of the resources they were able to access from their position of disadvantage within that context. Most of the workplace resources were controlled by the other parties active within the setting, namely the forest owner / manager and contractor. Those resources were deployed in the interests of the controlling actor. While each of the actors were dependent on the others for their social position, the implication was that achieving improvement in wellbeing outcomes would be based on greater recognition of that mutual dependence and a subsequent re-alignment of each actors' interests.

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ACKNOWLEDGEMENTS

At its core, this PhD project is largely about the power of the collective to shape the individual. As with any rite of passage, the focus may be on the prospect and their journey, but it could not happen without supporters who have lit the way and provided the means and encouragement to take each step. I am indebted to several people and organisations who have helped me along the way.

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1 INTRODUCTION

1.1 BACKGROUND

Legislation has increased responsibilities on forest managers to take all practicable steps to ensure all who work in forests do not suffer physical or mental harm through their work. The Health and Safety in the Workplace Act 2015 changes the focus of management to risks rather than hazards, broadens the definition of risk, clarifies the duties of various roles within the contracting structure and increases the penalties for failing to meet the expectations set out within the Act. The purpose of the Act is to provide a framework to ensure the health, safety and welfare of workers and workplaces by eliminating or minimising risks to health, safety and welfare arising from work (WorkSafe New Zealand, 2016). It seeks to achieve this by placing certain obligations on the people who create risk and are best placed to manage it. The Act focuses on both potential work-related health conditions (physical and mental) and injuries which may happen from exposures to hazards. The definition of a hazard has been changed to include:

> a person's behaviour where that behaviour has the potential to cause death, injury, or illness to a person (whether or not that behaviour results from physical or mental fatigue, drugs, alcohol, traumatic shock, or another temporary condition that affects a person's behaviour (WorkSafe New Zealand, 2016, p. 79)

Furthermore, the Act aims to clarify who is responsible for what by placing responsibility for the primary duty of care onto "a Person Conducting a Business or Undertaking (PCBU)" (WorkSafe New Zealand, 2016, p. 19). The primary duty of care means ensuring, so far as is reasonably practicable, the health and safety of workers who work for the PCBU while they are at work regardless of the employment relationship with the PCBU (WorkSafe New Zealand, 2016). All of which means that whoever creates the risk of a negative health outcome arising from mental distress is obligated, under the Act, to manage that risk regardless of where in the employment structure that risk impacts. Failing to comply with a duty now carries penalties of $500,000 for an organisation

designated as a PCBU and $1.5 million for an organisation that fails to comply with a duty that exposes an individual to risk of serious injury, serious illness or death (WorkSafe New Zealand, 2016).

Industry's response to the increasing pressure to reduce the workplace fatality rate has been to focus on eliminating the activities which generate many of the fatal accidents – motor manual felling[1] and setting chokers, known in Aotearoa New Zealand as breaking out. A high level of physical hazard combined with judgement and decision-making errors (Bentley, Parker, & Ashby, 2005) has contributed to motor manual felling being at the centre of 78% of fatal accidents since 2011 (WorkSafe New Zealand, 2019). The response promoted by industry has been to increase the volume of wood harvested through mechanised systems (Forest Growers Research, 2018) that reduce exposure to the physical hazards and demands of the job (Albizu-Urionabarrenetxea, Tolosana-Esteban, & Roman-Jordan, 2013). In 2018, Forest Growers Research (2018) reported 35% of cable harvesting operations now use mechanised felling compared with 1% in 2010 and a 53% reduction in the number of notifiable injury and serious harm incidents in 2017 as compared to 2012.

However, moving to mechanised felling and harvesting is not without risks (Hunt, 2017; Paul, 2017). The international experience of shifting to mechanised felling from motor manual felling and breaking out is indeed a reduction in fatalities, but it is also an increase in non-fatal injuries associated with the operation of machinery and higher levels of stress-related incidents (Albizu-Urionabarrenetxea et al., 2013). Stress, therefore, is a psychological strain or a set of negative psychophysiological responses and reactions (Chirico, Heponiemi, Pavlova, Zaffina, & Magnavita, 2019) that can negatively impact the safety and effectiveness of the operator. Lovelock and Houghton (2017) noted that in Aotearoa New Zealand, machine operators were the group of forest industry workers in the poorest physical health condition. This study also highlighted the industry's exposure to known psychosocial stressors, such as low job control (particularly with respect to health and safety) and conflict between work, home and community life, something that will

[1] Specific logging terms used are described in "Glossary of Forest Operations Terms"

continue to impact on machine operators as it does on their motor manual colleagues. While there is no doubt mechanisation will reduce exposure to the physical hazards in the workplace and reduce the physical demands of the work itself, there is a need to understand the stress implications of mechanisation to ensure worker health and wellbeing and industry profits are not negatively impacted.

What makes this challenging for forest owners and managers is that the feedback loops that could bring the impacts of mental distress to their attention are poorly developed. While noting signs of stress in the workforce, Lovelock and Houghton (2017) and Nielsen (2015b) both concluded that more work was needed to increase awareness of the full range of risks faced by forestry workers and the health impacts of those risks. Furthermore, the arm's length nature of their service agreements means that forest owners and managers do not have the direct relationship with worker health and safety that would enable awareness of stress and its impacts. Despite widespread annual physical health checks of workers by contractors, there is no consistent and centralised assessment process in operation within the industry (Forest Industry Safety Council, 2018). The generally available investigation methods used to generate a learning feedback loop after an accident are unable to take psychosocial factors and any associated stress into account (Van Wassenhove & Garbolino, 2008, as cited in Leka, Van Wassenhove, & Jain, 2015). Those charged with managing health and safety within the Aotearoa New Zealand forest industry could well be working somewhat unaware of the potential impacts of stress on workers' wellbeing.

1.2 PURPOSE AND OBJECTIVES

The purpose of this study is to explore how machine operators working in the forest industry construct their experiences of stress within their work life and provide an explanation that could be used to design interventions that improve the wellbeing of this community. Kobau, Sniezek, Zack, Lucas, and Burns (2010, p. 274) define wellbeing as:

> … a dynamic and relative state where one maximises his or her physical, mental and social functioning in the context of supportive environments to live a full, satisfying and productive life.

Achieving wellbeing does not mean eliminating stress. Rather, it is about having the battery of coping skills and resources required to balance or moderate life's stressors to the extent that they become beneficial challenges (W. Martin, Jamel Dixon, & Thomas, 2017).

The research objectives, therefore, are to:

1. Explore the way the social process of stress and coping is constructed by machine operators within the forest industry; and
2. Use that exploration to develop an explanatory theory of the process of stress and coping as it is experienced by machine operators.

Having introduced the area of research and the key research objectives, the next chapter will consider the need for this research by reviewing a range of relevant literature. Chapter three builds on that literature review by critically examining the concept of stress and how it has been studied and presenting an argument in support of the methodological framework used in this study. Chapter four sets out the research methods used to generate the findings and Chapters five and six explore those findings. Each of these chapters also contain a theoretical explanation of the findings covered in the chapter. Chapter seven then draws the findings together into an explanatory theory of the process of stress and coping as it is experienced by machine operators in Aotearoa New Zealand's logging industry. Finally, Chapter eight provides a summary of the research and a consideration of its relevance and contribution, its limitations and the potential areas of future study.

2 LITERATURE REVIEW

Recent research in Aotearoa New Zealand has highlighted both the apparent role of stress in the forest industry's safety and wellbeing outcomes and the relative lack of research into the prevalence of stress, its drivers and its impact (Lovelock & Houghton, 2017; Nielsen, 2015b). That means the extant knowledge that serves as the foundation for the proposed research comes from studies of stress, its consequences and psychosocial drivers completed in the forest industry workforces of other countries and the study of stress in general. The purpose of this literature review is, therefore, to examine what is known about the operation of stress in forest industry workplaces outside of Aotearoa New Zealand to reach a conclusion about the need for the proposed research.

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The article has been included in its original form because no further articles on stress and wellbeing in the forest industry were published between the publication date of the article and the thesis submission date.

2.1 ABSTRACT

There is clear evidence that stress is having an impact on the health and wellbeing of the forest industry workforce in Aotearoa New Zealand. While this has legal ramifications under the national health and safety legislation, international research also shows that harm to mental health invariably leads to reductions in work force productivity and business profitability. The reverse is also true: improved mental wellbeing can lead to greater worker engagement and commitment, which in turn increases productivity and profitability. Although these relationships are well substantiated, managers and leaders in the forest industry may not be aware of either the existence of a workplace stress problem or of its impact.

A critical review is undertaken of stress and psychosocial hazards research within the international forest industry or similar industries (e.g., construction), with particular attention given to the explanation of psychosocial hazards.

International research on the forest industry largely confirms what we know about harmful aspects of job content and workplace conditions. However, it is argued that the focus within this research on job content and immediate workplace conditions obscures the impact of the wider social context. This limits the potential of management to move beyond seeing psychosocial factors simply as risks to be minimised at the workplace level. Bringing an ecological perspective to the analysis of forestry workplaces makes it easier to identify the elements of forest management practice that may contribute to stress within the workforce. It also becomes easier to identify the interactions between family / whānau, community and workplaces that may either exacerbate or reduce workforce stress.

This paper highlights particular opportunities for reducing stress and enhancing wellbeing within the Aotearoa New Zealand forest industry workforce. It suggests that the psychosocial conditions that contribute to mental ill-health can be reconfigured to promote mental health, with wellbeing benefits that extend beyond the workplace. Psychosocial demands on a person can be motivating as long as the person has the resources to meet the challenge. Successful stewardship of the psychosocial environment at the forest management level is thus an opportunity to increase value to both investors and other stakeholders.

Keywords: work-related stress, psychosocial hazards, forest industry workforce, ecological perspective

2.2 INTRODUCTION

At the core of the constitution of the World Health Organisation is the notion that health is a human right that goes beyond the absence of harm to include physical, mental and social wellbeing (World Health Organisation, 2019). In the psychosocial domain, health can be understood as emerging from

the relations between our physical and mental capabilities and the social environments in which our lives unfold (Woodward, 2015). Work therefore has the potential to enhance a person's sense of wellbeing (Modini et al., 2016). Unlike physical hazards, where wellbeing can be enhanced by the elimination of the hazard, psychosocial factors relating to the nature of work and the demands it places on the worker exist along a continuum from causing harm to promoting wellbeing (Bentley et al., 2019; Leka et al., 2015). Yet rather than managing those psychosocial factors to promote worker wellbeing (Leka et al., 2015), the occupational health and safety frameworks in most developed countries seek to prevent harm by eliminating or minimising the risks to worker health represented by hazardous psychosocial conditions (Chirico et al., 2019)

Recent changes in New Zealand's health and safety legislation are a good example of the limitations of this approach. The Health and Safety in the Workplace Act 2015 contains a clear expectation that the work-related risks to a person's mental health should be managed by the people in charge of that work or workplace (Health and Safety in the Workplace Act 2015). In the interpretations (section 16) of the Act, the definition of a hazard includes behaviour that has the potential to harm, "whether or not that behaviour results from physical or mental fatigue, drugs, alcohol, traumatic shock, or another temporary condition that affects a person's behaviour". The understanding of "health" in the Act includes both mental and physical health. However, managing workplace factors that impact psychosocial health through a framework of psychosocial hazards may obscure the opportunity to enhance both individual and organisational health represented by those factors. Health should be addressed as something more than harm elimination or reduction (Leka et al., 2015).

Designing workplaces and work processes in ways that go beyond harm elimination and reduction improve a worker's quality of life and enhance productivity and sustainability. Making such interventions can be a challenge when the workforce is largely employed through service contracts, however, as is the case with the Aotearoa New Zealand forest industry. While the direct terms and

conditions of the employment relationship are set by the contractor/employer, the scope of those conditions is largely controlled by the agreement between the contractor and the forest owner. The organisation of the work and the workplace is, therefore, not totally within the control of the employer. However, the Health and Safety in the Workplace Act 2015 places the responsibility for the primary duty of care onto a 'Person conducting a business undertaking' (PCBU). This means that the obligation for managing the risk of a negative health outcome arising from mental distress sits with whoever creates that risk, regardless of where in the process of work that risk arises (and irrespective of the nature of the employment relationship between the PCBU and the worker who suffers harm).

This obligation to manage risk is more than just a legal and economic matter. The principles behind the International Labour Organisation's health and safety standards are not just that work should take place in a safe and healthy working environment, but also that conditions of work should be consistent with workers' wellbeing and human dignity. Work should offer real possibilities for personal achievement, self-fulfilment and service to society (Forastieri, 2016). Although the legal challenge for the forest industry is to design workplaces and processes that reduce mental harm across business boundaries, this expectation also presents a moral and economic opportunity. By focusing on wellbeing rather than harm reduction, the industry could positively impact both worker's quality of life and reap the potentially significant financial benefits of a more loyal, engaged, and productive workforce.

What makes this challenging for forest owners and managers is that the feedback loops that could bring the impacts of mental distress to their attention are poorly developed. While noting signs of stress in the workforce, Lovelock and Houghton (2017) and Nielsen (2015b) both concluded that more work was needed to increase awareness of the full range of risks faced by forestry workers and the health impacts of those risks. Furthermore, the arm's length nature of their service agreements means that forest owners and managers do not have the direct relationship with worker health and

safety that would enable awareness of stress and its impacts. Despite widespread annual physical health checks of workers by contractors, there is no consistent and centralised assessment process in operation within the industry (Forest Industry Safety Council, 2018). The generally available investigation methods used to generate a learning feedback loop after an accident are unable to take psychosocial factors and any associated stress into account (Van Wassenhove & Garbolino, 2008, as cited in Leka et al., 2015). Those charged with managing health and safety within the Aotearoa New Zealand forest industry could well be working somewhat unaware of the potential impacts of stress on workers' wellbeing.

Against this backdrop, this paper examines the research on stress within the international forest industry workforce to identify opportunities for enhancing wellbeing amongst forest industry workers in Aotearoa New Zealand. It begins by reviewing how work-related stress and its risk factors are generally explained. It then considers what the extant research on work-related stress from the world's forest industries suggests about health impacts and psychosocial hazards within forestry. It finishes by questioning whether a focus on workplace psychosocial hazards is the most appropriate framework to address stress and wellbeing within the forest industry workforce in New Zealand. An alternative approach is presented, based on ecological systems theory, and some of the implications for potential interventions are noted.

2.3 EXPLAINING WORK-RELATED STRESS

Work-related stress has generated a large body of academic research that focuses primarily on how a person fits or does not fit into his or her work environment (Väänänen, Murray, & Kuokkanen, 2014). In this framework, work-related stress is seen as psychological strain or a set of negative psychophysiological responses and reactions (Chirico et al., 2019). It occurs when either the demands of the work environment exceed the capabilities and resources of the worker or when the needs of the worker cannot be supplied by the work environment (Dewe & Cooper, 2017; Forastieri, 2016). Stress is thought to occur when that mismatch becomes chronic or unmanageable (Leka et

al., 2015). Much research has sought to clarify the relationship between the work environment and the individual's body and mind through investigations of the impact of workplace characteristics on particular unhelpful behaviours and psychological and somatic symptoms (Väänänen et al., 2014). Measuring both the psychosocial hazards and the symptoms has required the development of self-rating scales (Väänänen et al., 2014) . This work has shown that chronic and unresolvable exposure to a number of workplace characteristics can increase the likelihood that a proportion of the workforce will suffer a negative psychophysiological response as a result (Leka & Jain, 2010; Maslach & Leiter, 2016).

Both the New Zealand Workplace Barometer (Bentley et al., 2019) and the World Health Organisation review of psychosocial hazards at work (Leka & Jain, 2010) use the following definition of psychosocial hazards:

> those aspects of work design and the organisation and management of work, and their social and environmental contexts, which have the potential for causing psychosocial or physical harm. (Cox, Griffiths, & Randall, 2003, pg 195)

The World Health Organisation (2008) developed a summary of work-related psychosocial hazards (see Table 2.1) for the European Framework for Psychosocial Risk Management. The framework identifies ten psychosocial domains, each of which can be thought of as a potential source of work-related stress (Forastieri, 2016). The domains are divided into two groups: work content (which includes psychosocial hazards related to the conditions, organisation and component tasks of the job), and work context (which includes psychosocial hazards related to workplace organisation) (Leka & Cox, 2008, as cited in Bentley et al., 2019) . The New Zealand Workplace Barometer is closely based on this EU framework, in that it incorporates all ten domains and adds workplace bullying to the domain of interpersonal relationships at work (Bentley et al., 2019). Given that the New Zealand Workplace Barometer lists forestry as one of the industries with the highest reported levels of bullying – with greater than 10% of respondents reported having been bullied – the addition of

bullying is highly relevant to the industry. This is particularly the case as the definition of bullying used by the survey required the harassment to occur over a period of time and to involve one or more perpetrators (Bentley et al., 2019). The World Health Organisation (2008) point out that while bullying can be considered a psychosocial risk, it should also be regarded as a consequence of a poor psychosocial work environment. The implication of this perspective is that if an organisation mitigates the risks listed in Table 2.1, then the risk of bullying will also reduce.

TABLE 2.1 WORK-RELATED PSYCHOSOCIAL HAZARDS
Source: adapted from Leka & Cox, 2008, as cited in Bentley et al. (2019, p. 6)

Psychosocial Hazard	**Explanation**
Job Content	Lack of variety or short work cycles, fragmented or meaningless work, under use of skills, high uncertainty, continuous exposure to people through work.
Workload and work pace	Work overload or under load, machine pacing, high levels of time pressure, continually subject to deadlines
Work schedule	Shift working, night shifts, inflexible work schedules, unpredictable hours, long or unsociable hours
Environment and Equipment	Inadequate equipment availability, suitability or maintenance, poor environmental conditions such as lack of space, poor lighting, excessive noise
Control	Low participation in decision making, lack of control over workload, pacing, shift working
Organisational culture and function	Poor communication, low levels of support for problem solving and personal development, lack of definition of, or agreement on, organisational objectives
Interpersonal relationships at work	Social or physical isolation, poor relationships with superiors or co-workers, interpersonal conflict, lack of social support
Role in Organisation	Role ambiguity, role conflict, and responsibility for people
Career Development	Career stagnation and uncertainty, under promotion or over promotion, poor pay, job insecurity, low social value to work
Home-work interface	Conflicting demands of work and home, low support at home, dual career problems.

The findings of other research overlap considerably with this framework, albeit with different emphases. In their review of two decades of research on burnout and its causes and outcomes, Maslach and Leiter (2016) pointed to six key domains of psychosocial hazards: workload, control, reward, community, fairness and values. Of these domains, the conceptualisation and explanatory significance of workload, control and community are similar to the European Framework. In contrast, however, Maslach and Leiter (2016) place much greater emphasis on the role of rewards (financial, institutional or social), fairness (the extent to which decisions are perceived as being fair and equitable) and values (the alignment between the individual's values and those of the organisation they work for) in the development of burnout. Nevertheless, these differences may be quite important to the health and wellbeing of the various actors within the Aotearoa New Zealand Forest Industry. Issues such as whose interests are represented in the service contracts that form the basis for employment of the workforce and how those contracts distribute risk and reward will shape the perception of whether those agreements are seen as fair and equitable. Furthermore, with a workforce that is approximately 37% Māori (Ministry of Primary Industries, 2020) there is a significant potential for differences in world views between a significant part of the workforce and the forest industry, creating mis-alignment in values (B. Hooper, personal communication, 13 August 2020).

Similarly, in a review of the epidemiological literature of work-related stress, Pfeffer (2018) points to ten workplace exposures that affect human health through stress. As with the psychosocial hazards associated with burnout, this framework is largely the same as that used in the European Framework. However, there are key differences that are important in the context of the Aotearoa New Zealand Forest Industry. Job insecurity, whether for one's own job or those of colleagues, is much more prominent in Pfeffer's framework. This is something that could be considered important in an industry which employs most of its workforce on a contractual basis. Workers paid by piece rates or hourly rates are exposed to the risk of

reduced hours or job loss resulting from contractual transgressions or down turns in the log market. Job insecurity is also highlighted as a key work-related psychosocial stressor by other authors (e.g., Dewe & Cooper, 2017). Furthermore, Pfeffer included access to health care as a significant stressor reflecting the "US-centric" nature of the epidemiological literature. However, any industry reliant on a rurally located workforce in Aotearoa New Zealand should be cognisant of reduced access to health care for those who live outside the urban centres, a pattern which reflects health service re-structuring between 1980 – 2001 and the consequential differences in all-cause mortality rates between urban and rural regions (Pearce, Tisch, & Barnett, 2008).

The differences between these frameworks highlight the contextual nature of psychosocial hazards and the need for psychosocial risks within the Aotearoa New Zealand Forest Industry to be researched more thoroughly than is currently the case. However, there has been research undertaken within the forest industries of other countries that is relevant in the Aotearoa New Zealand context. This research, which highlights potential psychosocial hazards in the Aotearoa New Zealand Forest Industry and their impacts on health and wellbeing, is discussed in the next section.

2.4 EVIDENCE OF HEALTH IMPACTS OF WORK-RELATED STRESS IN THE FOREST INDUSTRY

Within the international forest industry, the study of known mental health conditions and their association with wellbeing and safety is centred on an 18 year prospective cohort study of workers at a Finnish based multinational forest industry company (Väänänen et al., 2008). This study assessed health and potential risk factors within the workforce, which included manual labourers and machine operators. Research based on data from this study has highlighted the association of burnout with negative health and safety outcomes. Burnout was assessed using the Maslach Burnout Inventory (MBI, Maslach, Jackson & Leiter, 1996, as cited in Maslach & Leiter, 2016). This consists of three dimensions: overwhelming physical and emotional exhaustion arising from depleted emotional and physical resources with insufficient recovery (Maslach & Leiter, 2017);

feelings of cynicism that reflect a detached attitude towards work and increasing disregard towards one's co-workers and clients (Toppinen-Tanner, Kalimo, & Mutanen, 2002) ; and a reduced sense of accomplishment and effectiveness (Seidler et al., 2014). Assessments occurred at various times throughout the study period and could be correlated with a number of different health outcomes recorded in various registry's kept by Finland's National Population Register Centre and the company itself (Väänänen et al., 2008).

The health outcomes explored over the life of this research program are significant to the Aotearoa New Zealand forest industry for a number of reasons: firstly, they involve a large number of participants (ranging from 3895 to 10062 employees) that are mostly men (greater than 76%) involved in manual work or machine operation (greater than 62%); and, secondly, burnout is correlated with clinically derived indicators of health (Väänänen et al., 2008). These are considered more reliable than self-report measures (Väänänen et al., 2014) . The research facilitated by this program all points to burnout being associated with negative health outcomes. An increase in the MBI summary score of one unit was associated with a 35% increase in the risk of mortality among workers less than 45 years old (Ahola, Väänänen, Koskinen, Kouvonen, & Shirom, 2010). Of the subscales, only exhaustion produced a statistically significant hazard ratio when adjusted for sociodemographic and baseline health factors. A similar study of the relationship between burnout and severe injuries by the same research group found a one unit increase in the burnout summary score to be related to a 10% increase in the risk of injury requiring hospitalisation or causing death (Ahola, Salminen, Toppinen-Tanner, Koskinen, & Väänänen, 2013). Of the MBI subscales, emotional exhaustion was associated with a 9% increase in the risk of injury, while cynicism was related to a 10% increase. This suggests having both energy and motivation to act safely is important to prevent workplace injury or death. Toppinen-Tanner, Ojajärvi, Väänänen, Kalimo, and Jäppinen (2005) reported on burnout as an event prior to sickness absence for different medically certified causes of absence. They found that the MBI summary score was positively correlated with the risk of future medically certified absence (after adjustment for age, gender, occupation, and baseline absence).

The increased risk of future illness was shown to include mental and behavioural disorders and diseases of the cardiovascular and musculoskeletal systems. Burnout predicted future hospital admissions for mental health and cardiovascular disorders among participants who had not suffered the disorder prior to the start of the study (Toppinen-Tanner, Ahola, Koskinen, & Väänänen, 2009). Although none of these studies defined a causal pathway between burnout and negative health outcomes, they do suggest that work-related stress conditions are associated with increased risk of injury, illness and early mortality within a male dominated, manual and machine operator workforce. Such research is very relevant to the Aotearoa New Zealand forest industry.

Of concern, therefore, is that there are already indications that mental distress is having an impact on Aotearoa New Zealand forest industry workers. The industry is part of an occupational group (Forestry and Farming) that contributes 6.8% of male suicide victims in Aotearoa New Zealand (Suicide Mortality Review Committee, 2016). If that percentage still holds, increases in male suicide levels in Aotearoa New Zealand (Coronial Services, 2020) suggest that deaths by suicide are likely to exceed accidental workplace deaths for the farming and forestry occupational group. Work Safe New Zealand's National Health and Safety Attitudes and Behaviours Survey (NHABS) also noted that "stress-related or mental illness was more likely to be identified as a long-term health problem by workers who had personally experienced a serious harm incident (22% compared with 12% of those who had not experienced an incident) or a near miss incident (19% compared with 11%)" (Nielsen, 2015a, p. 68). The same survey found that 27% of employees and 36% of employers experienced a serious harm near miss or actual incident in the preceding 12 months (Nielsen, 2015a). This is in line with international evidence that highlights the interaction between exposure to actual and potential trauma and mental health disorders (Tehrani, 2004) and, more specifically, the relationship between exposure to risks and hazards and mental distress (Nahrgang, Morgeson, & Hofmann, 2011). Furthermore, the Lovelock and Houghton (2017) review of the industry highlighted the prevalence of health conditions among workers such as hypertension and diabetes, poor lung function due to high levels of smoking, and high levels of substance abuse. All of these conditions have some

association with stress as lifestyle responses to mental distress (Forastieri, 2016; Leka & Jain, 2010; Solar & Irwin, 2010). The 2014 NHABS (Nielsen, 2015a) also lists fatigue, ill health, stress and addictions as barriers to improvement in health and safety outcomes and notes that emotional and physical stress is of high concern to those working in the industry.

Mental distress and strain are also known to have significant negative impacts on business profitability and sustainability (Leka et al., 2015; Pfeffer, 2018; World Economic Forum, 2008) . Presenteeism (presenting for work while sick or injured) has been shown to reduce worker productivity, with a cost impact four times greater than that of directly treating the condition (Edington & Burton, 2003). The latest NHABS reported that 53% of forest workers surveyed had worked while sick or injured and 46% had worked while overtired (Nielsen, 2018). Similarly, a reduction in psychological health has also been associated with the sort of risky and dangerous behaviour that can lead to both accidents and quality loss arising from adverse events (Du Plessis, Cronin, Corney, & Green, 2013; Forastieri, 2016; Leka et al., 2015). The same study that identified exposure to risks and hazards as a risk factor for mental distress also found an association between mental distress and risky and dangerous behaviour (Nahrgang et al., 2011). Finally, workers exposed to hazardous psychosocial environments are less likely to engage in re-training or further learning (Leka et al., 2015). This should be of concern to an industry looking to adapt to the physical safety risks through the introduction of mechanised harvesting systems (Forest Growers Research, 2018) and increase its workforce to take advantage of growth opportunities (Harris, 2017; Moore, 2017).

2.5 HEALTH IMPACTS OF PSYCHOSOCIAL WORKPLACE CONDITIONS

Within the international forest industry there are several studies that examine the relationship between psychosocial workplace conditions and workers' health in forest and logging operations. Although none employ the psychosocial hazard framework outlined in Table 2.1, all consider factors that fit within that framework. Elements such as psychological demand, intellectual discretion and exposure to risks and hazards have been associated with

disorders of the neck / shoulders and lower back (Hagen, Magnus, & Vetlesen, 1998), mental strain (Inoue, 1996), and reduced job or life satisfaction (Mylek & Schirmer, 2015). The international findings fit with the work by Lilley, Feyer, Kirk, and Gander (2002) on fatigue, work / rest patterns and recent injury and near injury experience. This found that 78% of participants reported experiencing fatigue sometimes, often, or always, with 19% experiencing fatigue often or always. There was also a significant association between self-reported near misses in the previous 12 months and the reported level of fatigue experienced at work. Getting eight hours sleep and taking breaks was associated with reduced fatigue, but the majority of participants reported having seven hours or less sleep per night (and almost 25% reported six hours or less). These are all psychosocial conditions associated with reduced mental wellbeing. Despite the paucity of research, there is enough evidence to suggest forestry workplaces contain psychosocial hazards that are harmful to mental health and that these hazards fit within the European Framework (see table 2.1). Research in the Aotearoa New Zealand forest industry (Lilley et al., 2002; Lovelock & Houghton, 2017; Nielsen, 2015b) suggests these conditions also apply to local forestry workplaces.

However, some research within the forest industry highlights a key difference between physical hazards and the psychosocial domains listed as hazards in Table 2.1. As noted above, the risk management objective for a physical hazard is to reduce the potential of that hazard negatively impacting the health condition of the worker (Health and Safety in the Workplace Act 2015). The goal is for the worker to go home at the end of the day in the same health state as when they arrived. On the other hand, effective management of psychosocial risks creates the potential for the worker to go home with enhanced wellbeing (Bentley et al., 2019; Leka et al., 2015). In their study of the impact of job content (see table 2.1) on logging machine operator wellbeing, Hanse and Winkel (2008) found that daily task variety, job rotation and access to breaks when required, were all positively associated with job satisfaction to a statistically significant degree. They also found a statistically significant positive association between job control and job rotation with reduced

musculoskeletal symptoms, and between job rotation and access to breaks with reduced headaches and sleeping problems. Overall, job rotation – defined as operating a shift system that broke up machine operating hours, altering tasks to reduce machine operating tasks and restricting or controlling the number of machine operating hours – had a positive impact across all three measures of wellbeing in the study.

Similarly, in their survey of Australian forestry managers and workers, Mylek and Schirmer (2015) found a number of work context elements (see table 2.1) were associated with improved wellbeing. Participants who felt they had more control over their work, reported a better work-life balance and were more satisfied with their income also reported higher life satisfaction and general health. Other psychosocial conditions that were significantly associated with higher life satisfaction included job security, a positive workplace culture (defined as confidence in being able to express views), a felt level of social support, higher work efficacy and a positive work-related social identity. Interestingly, only job control, work-life balance, income, a positive culture, and work-related efficacy were positively associated with general health. What these results reflect is that psychosocial factors can be managed, not just to reduce work-related stress but to promote worker engagement, "a persistent, positive affective-motivational state of fulfilment that is characterised by the three components of vigour, dedication and absorption" (Maslach & Leiter, 2016, p. 104) as a state of wellbeing. Furthermore, Nahrgang et al. (2011) found engagement was positively associated with reductions in risky and unsafe behaviour, adverse events and accidents and injuries. If psychosocial risk management is approached with engagement as the goal, psychosocial factors can switch from hazards to be eliminated to protective factors that can be pursued, not only to protect workers from harm but also to promote wellbeing.

2.6 CHANGING PSYCHOSOCIAL CONDITIONS – FROM HARMFUL TO "WELL-FUL"

While the Health and Safety in the Workplace Act 2015 might make it clear that any forest owner or manager must ensure, to a reasonably practicable extent, the mental and physical health of those

working in the forest, the nature of their relationship with the workforce does not easily fit with the 'employee' focus of the psychosocial risk framework. A forest owner or manager could easily be forgiven for thinking that psychosocial risks exist only within the organisations and workplaces in which the workers are directly employed. That highlights a specific weakness of this approach to thinking about work-related stress. The weakness is that the model assumes that all of the stress experience captured in the research originates within the worker's immediate work context (Theorell et al., 2015). This is of concern for the forest industry, as it ignores the broader social structures and systems (e.g., piece rate contracts) that may drive those risk factors in the immediate work context. It also overlooks the ways people exist within adjacent systems that may have highly permeable boundaries. With such a narrow view of context, the focus goes onto the individual and what can be done to enable individual coping (Harkness, Long, Bermbach, & Patterson, 2005). As a result, workplace wellbeing interventions typically seek either to modify micro-organisational factors (e.g., decision latitude and social support) that surround the individual (Väänänen et al., 2014) or to enhance the individual's ability to cope through counselling or stress management techniques (Harkness et al., 2005). Macro-organisation and wider social system issues are often not addressed and the opportunity to eliminate stress through removal of the stressors in the wider context is not considered (Dewe, O'Driscoll, & Cooper, 2010).

In considering how psychosocial factors could be managed to the benefit of both individuals and the organisations in which they work, it is important to recognise that workplaces sit within an ecological system where they exist in relationship with all other parts of that ecological system. Ecological systems theories, such as that proposed by Bronfenbrenner (1977), explain human behaviour by recognising that individuals always act within these larger social and ecological systems (see figure 2.1). To understand behaviour it is also important to understand the nature of the institutions and social structures within each level of the system and the ways in which those levels interact and may reinforce each other (Golden & Earp, 2012). Stokols (1992) argues that the social, physical, and cultural aspects of this multi-layered environment each have a cumulative effect on health. There

are, consequently, multiple influences on specific health behaviours and outcomes, and multiple opportunities to intervene. Achieving change will require interventions at a number of different points within the system (Sallis, Owen, & Fisher, 2008). Unfortunately, interventions for worker wellbeing within the Aotearoa New Zealand forest industry, as guided by the legislation and the traditional conception of workplace mental health, are focused almost entirely on the specific settings in which people work. Yet what the ecological perspective shows is that health is determined as much by what goes on in the mesosystem (where those settings interact, see figure 2.1) and by the social, political and cultural settings of the exo- and macrosystems (see figure 2.1), as by what goes on within the specific work setting.

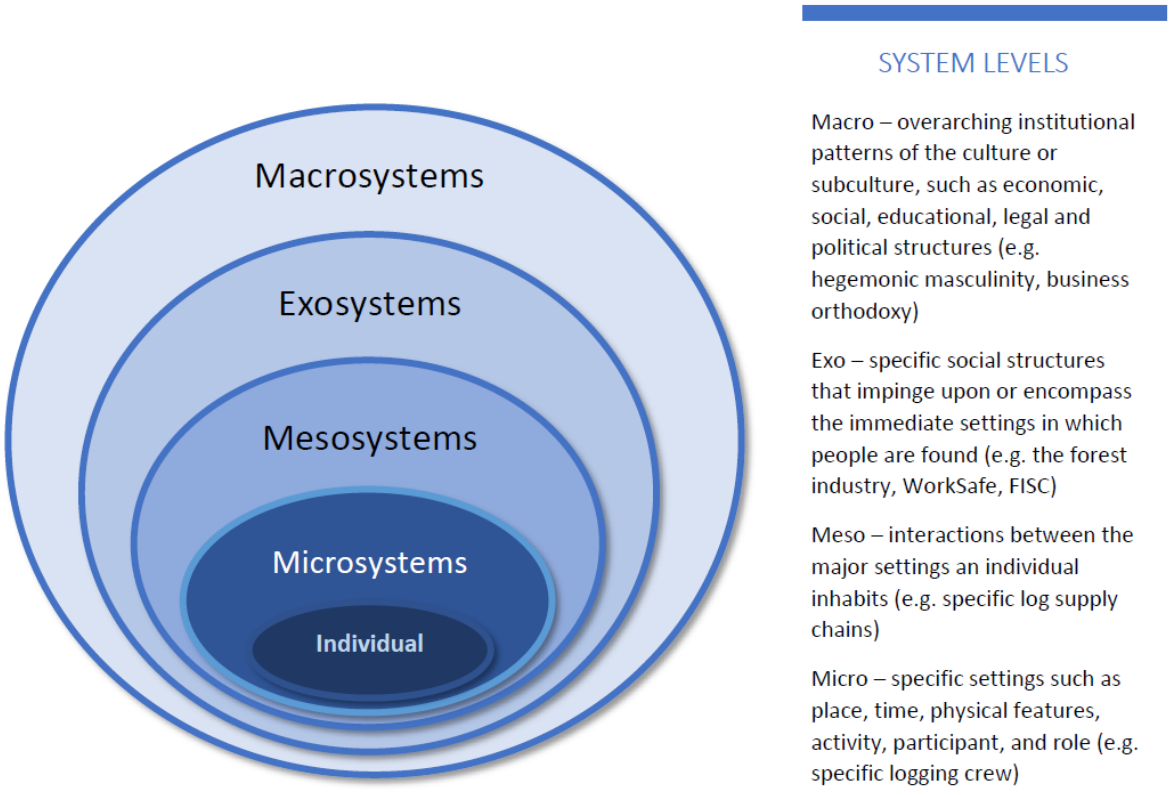


FIGURE 2.1: BRONFENBRENNER'S ECOLOGICAL SYSTEMS THEORY
Source: adapted from Bronfenbrenner (1977)

The significance of this point for designing wellbeing interventions can be illustrated by considering the interactions between the various industry players. Lilley et al. (2002) confirmed that the total workday length for forestry workers in New Zealand was increasing and that there were substantial

groups of workers whose break times were compromised. There had also been a reduction in the number of workers getting two consecutive days off in every seven days in the preceding 10 years. The Hide, Tappin, and Parker (2010) study of cable logging places noted the inconsistent break times, and that work pace, and workload were often driven by the pace of the adjacent workstations. These are all factors directly controllable within the workplace (the microsystem, in Bronfenbrenner's framework, see figure 2.1). However, they also pointed to the impact of elements beyond the direct control of the contractor. The challenge of achieving daily piece rate targets, working on sites with limited operating and storage space, and bottlenecks in the downstream supply chain all directly impacted the working day length. These conditions arise from the mesosystem (interactions within the supply chain) and the exosystem (outsourcing operations using piece rate contracts). Furthermore, long commutes were found to increase the length of the workday, suggesting that urbanisation, a macrosystem change, was adding to the problem.

Ecological systems theory also helps explain the impact of interactions between work, family / whānau, the community, and wider societal issues such as gender and socio-economic status. Lovelock and Houghton (2017) identified that the poor health and safety outcomes in the Aotearoa New Zealand forest industry may originate with psychosocial stressors outside of the workplace. These included high drug use in worker families and communities, insecure and overcrowded accommodation, and conflict with unemployed family members. Studies from outside the industry have also highlighted the potential of family / whānau conflict to reduce the cognitive resources available to an employee at work (Du, Derks, & Bakker, 2017). While confirming partner conflict as a predictor of wellbeing (in this case, using burnout as the measure of wellbeing), Rössler, Hengartner, Ajdacic-Gross, and Angst (2015) also found an association with never having been married. This suggests that it is not only what goes on in families that impacts worker performance and wellbeing (Kinnunen, Feldt, Geurts, & Pulkkinen, 2006) but also the structure of the family / whānau itself.

As ecological systems theory indicates, work can also impact wellbeing within settings outside work. What appear to be unhealthy lifestyle choices (e.g., smoking, drug and alcohol use, a carbohydrate dense diet associated with obesity, diabetes and hypertension) could be, in part, a coping response to stress arising from work or from the situations workers find themselves in as a result of the way their work is organised (Forastieri, 2016; Leka & Jain, 2010). Construction workers in Australia have linked several personal health issues, including an increased use of alcohol, to the pressures of long working hours (McKenzie, 2008, as cited in Du Plessis et al., 2013). Evaluations of health promotion programs within male dominated industries in Canada and Australia have also found that while workers recognise the importance of healthy lifestyle choices on their physical and mental health, they also face a number of obstacles in making those choices (Lingard & Turner, 2015; Seaton, Bottorff, Oliffe, Medhurst, & DeLeenheer, 2019). Low socio-economic status, long work hours that interfere with family / whānau commitments, and cultural constructions of masculinity that emphasise material success can contribute to a culture that inadvertently promotes unhealthy diets, alcohol misuse, and risk taking and stoicism in the face of difficulties (Du Plessis et al., 2013; Iacuone, 2005; Kolmet, Mariño, & Plummer, 2006; Lingard & Turner, 2015; Seaton et al., 2019). Lovelock and Houghton (2017) pointed to a similar conflict between the imposition of safety rules on New Zealand logging crews and the socio-cultural constructs operating within those crews (e.g., the role of experience in establishing crew hierarchy). Lingard and Turner (2015) concluded that the underlying environmental causes of construction workers' unhealthy behaviours may be structural and that health promotion initiatives designed to change workers' health behaviour will consequently be of limited effectiveness. This could well apply to the Aotearoa New Zealand forest industry.

As stated above, an ecological approach suggests that improving workers' health outcomes will require intervening in multiple places within the system (Sallis et al., 2008). Poor mental health at work will most likely reflect multiple psychosocial factors, some of which will be located outside of the direct relationship with the employee or outside of the workplace entirely, within families, the community and society (Forastieri, 2016; Lingard & Turner, 2015; Sallis et al., 2008). However, it is

also important to recognise that benefits from successful interventions are also likely to accrue in multiple places within the system. Leka et al. (2015) argue that successful psychosocial risk management can result in benefits to organisational productivity and quality. A study of 7000 Polish machine operators using the European Framework for Psychosocial Risks set out in Table 2.1 highlighted the inverse relationship between the level of the psychosocial risk reported by the participants and their reported levels of commitment to and enjoyment of the work and their workplace (Mościcka-Teske, Sadłowska-Wrzesińska, Butlewski, Misztal, & Jacukowicz, 2017). While the target setting for intervention may be in the forest, benefits such as improvements to productivity, quality and worker commitment will flow beyond the immediate employer to the forest owner and industry level. Similarly, psychosocial protective factors experienced at work also have the potential to spill over into the family / whānau environment through enhanced mood and skills such as time management (Kinnunen et al., 2006) or self-esteem and social support (Ten Brummelhuis & Bakker, 2012). Given this complexity, improving the psychosocial factors within forestry workplaces will mean looking beyond the day-to-day work settings and workplaces in which forest workers are engaged and considering the forest management practices and operations that impact the way work is organised and completed.

Figure 2.2 sets out some aspects of forest management practices that have the potential to influence the psychosocial risk factors for stress. They represent risk factors because of their potential impact on the relationship with the contractor, particularly with respect to the contractor's profitability, the balance of power within the contract and its impact on business risk. Examples of the way in which risk is transferred to the contractor, through the contract, include the setting of a production target as the basis for payment, and the forest owner / manager's engineering of the work site, particularly the quality of the access and for harvesting, the setting layout, the maximum and average haul distances, and the skid size. Some of these elements of risk involve decisions made with information gathered for the forest owner's uses but which may not be fit for purpose for managing the contractor's risk (e.g., inventory data). Some of the key decisions may be made in the

absence of data or evidence (e.g., estimating production targets without prior productivity measurement evidence). The forest owner / manager may still have control of the sources of risk despite the consequences of the risk having been handed over to the contractor (e.g., establishing piece rates using production when the payment is actually based on uplift and the trucking and delivery is directly contracted and managed by the forest owner). Some of the forest owner's / manager's risk can be mitigated by passing some of that risk to the contractor (e.g., the need for layoffs during a market downturn). Risk is also imposed on the contractor though the terms of the contract, including the crew day rate used as the basis for the piece rate and the way in which perceived transgressions against the contract conditions are dealt with (e.g., stand downs).

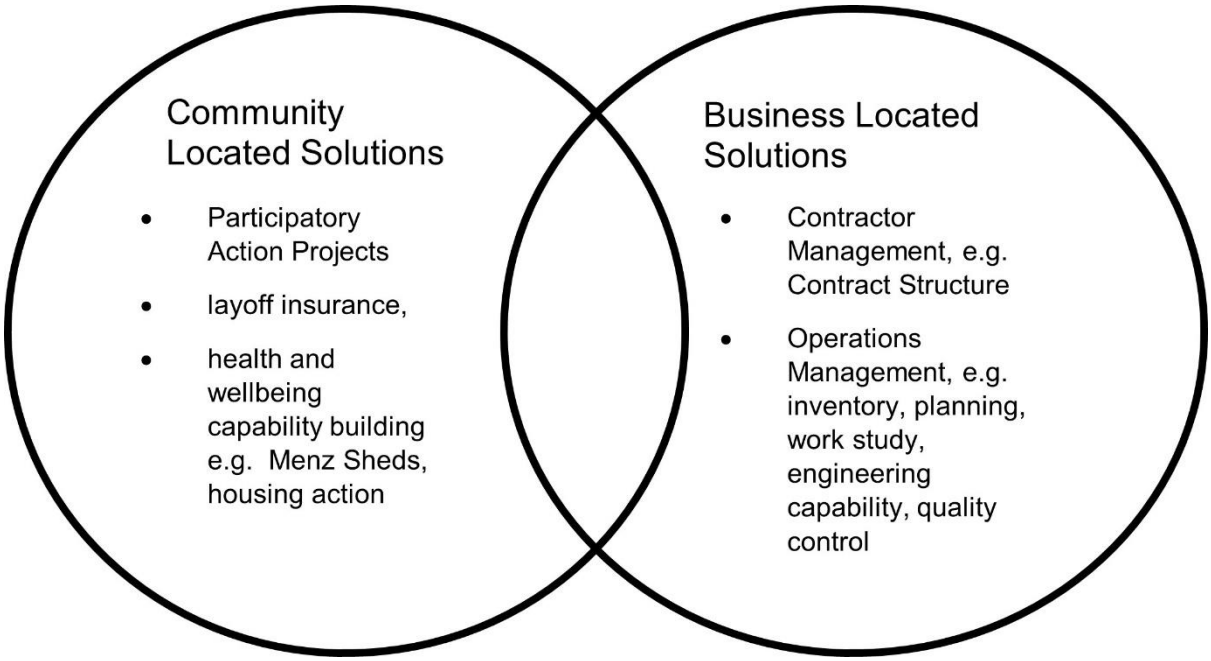


FIGURE 2.2: SOLUTION MAP

The allocation of risk between the forest owner / manager and their contractors can be thought of as an expression of the forest owner / manager's psychosocial safety climate. The psychosocial safety climate refers to the "shared perceptions of organisational policies, practices and procedures for the protection of worker psychological health and safety that are largely driven from senior management" (Idris, Dollard, Coward, & Dormann, 2012, p. 19). The terms and conditions of the contract have a material impact on the demands made on the contractors and their workers (e.g.,

work pressure resulting from target or throughput) and the resources they have available to them (e.g., profitability, cashflow, skills, machinery, work study data, control over site lay out). The Job Demand – Resources Model (Bakker & Demerouti, 2007) describes how work-related stress is constructed in the balancing of demands and resources. When demands outweigh resources, stress results. Being inherently motivational, resources can overcome the costs associated with demands and generate engagement. The potential for the work contained in that contract to have a positive impact on wellbeing is established, essentially, through the process of generating the relationship between the forest owner / manager and the contractor, and then capturing that relationship within the contracting processes.

Figure 2.2 also suggests that working directly with communities may be required to ensure interventions in the workplace are successful (Sallis et al., 2008). There is a need to engage with the workforce and their communities in a socially and culturally aligned manner (Wold & Mittelmark, 2018). The Aotearoa New Zealand forest industry is dominated by men who often conform to the dominant constructs of working class masculinity in Aotearoa New Zealand, irrespective of whether that helps or hinders the industry's efforts to mitigate the health risks of stress. Working with that dominant construct means involving those men in the design, decision making and implementation of any efforts to mitigate mental health risks. Fortunately, there are some good examples of successful mental health initiatives (mostly focused on suicide prevention) centred on male participant empowerment, such as the Community Response to Eliminating Suicide (CORES) programme developed in rural Tasmania (Jones, Walker, Miles, De Silva, & Zimitat, 2015) and the Mates in Construction initiative developed in the Queensland construction industry (G. Martin, Swannell, Milner, & Gullestrup, 2016). Technology is also being used in mental health prevention and care to overcome obstacles to accessing help services (Luxton, June, & Kinn, 2011). It also means recognising that the community's contribution to health and wellbeing involves infrastructure and services such as housing, schools and health centres (Solar & Irwin, 2010) and that business is

increasingly playing a role in the development of community capability as a community partner (L. Lee, 2011).

2.7 IMPLICATIONS

If the Aotearoa New Zealand forest industry accepts that its workers operate in conditions that pose a mental health risk, then ecological systems theory can be used as a basis for turning that risk into an opportunity to enhance the industry's value and social licence. However, it has not been the intention of this paper to be specific about recommended interventions. While the little research that does exist about the psychosocial conditions within Aotearoa New Zealand's forestry workplaces suggest they can be understood through the internationally recognised frameworks, Lovelock and Houghton (2017) show that even well-intentioned initiatives such as the imposition of greater controls around safe practice can be met with resistance if they do not fit with the socio-cultural constructs in operation for this particular workforce. Socio-cultural constructs of gender have also been implicated in the resistance to making healthier eating choices by Australian construction workers (Lingard & Turner, 2015). As the research reviewed here indicates, proceeding with worker wellbeing interventions in the absence of an ecological perspective carries some risk. Further research that aims to understand what those who work in the bush perceive as their biggest threats and challenges, and what they regard as their coping resources and obstacles, is required before interventions can be prescribed with confidence.

2.8 CONCLUSIONS

This paper has summarised what the extant research can tell forest managers in New Zealand about stress and its various expressions in the workplace (where it is both a potential risk and a potential opportunity). It has assessed that risk by looking at the health and safety consequences of mental distress and by examining what is known about psychosocial hazards within forestry workplaces. It then suggested that mitigating those risks will require going beyond harm reduction as a strategy to thinking about psychosocial hazards as possible drivers of a more engaged and committed workforce. Interventions aimed at taking advantage of those opportunities within forest

management practice and the environments outside the workplace will require thinking beyond the contracts engaging the workforce and instead, focusing on the risk factors inherent in forest management practice and the communities in which workers reside. The rewards for doing so go beyond compliance with health and safety legislation.

At its heart, the provision of safe and healthy work environments is a moral and ethical issue. As noted earlier, the International Labour Organisation's principles are that work should take place not only in a safe and healthy working environment, but also in an environment that offers real possibilities for personal achievement, self-fulfilment and service to society (Forastieri, 2016). In other words, the imperative with health and safety management is to go beyond ensuring workers survive to enabling workers to thrive. The Aotearoa New Zealand forest industry has an opportunity to go beyond the harm reduction focus of the current legislation through promoting worker health and wellbeing, and this should enhance both the industry's economic performance and its environmental sustainability.

Authors' Contributions

The lead author, Trevor Best, undertook most of the work for this manuscript, including establishing the project concept, reviewing the literature, and writing the text. The development of the project and revisions to the manuscript were extensively supported by Visser and Conradson.

3 ESTABLISHING THE METHODOLOGICAL FRAMEWORK

The methodological framework used for this study has shaped the information we obtained and how we interpreted that information (Dew, 2007). Establishing a methodological position requires the researcher to "think about the relationship between the nature of our subject matter and our approach to understanding that subject" (Schwalbe, 2020, p. 598). Methodology and its underlying principles guide and justify the ways data is collected and analysed (the 'methods') and what I 'learn' from that data (Carter & Little, 2007; Dew, 2007). Before considering how this study was completed and what it found, therefore, I must first explain why the methodology used was considered the most appropriate for this specific inquiry within this context (Avis, 2003; Patton, 2015). This chapter will do that by considering what is stress, how it has been studied to date and the implications that has for this study. It will conclude that a qualitative methodology would be the most appropriate approach for this specific inquiry and its context. It will then argue that constructivist grounded theory is the methodological framework that provides the best fit between the research problem, the context in which that research is happening and the researcher.

3.1 RESEARCHING STRESS, ITS CAUSES, AND IMPACTS

Stress has generated a large body of academic endeavour that focuses primarily on how a person fits or does not fit into his or her work environment (Väänänen et al., 2014). In this framework, work-related stress is seen as psychological strain or a set of negative psychophysiological responses and reactions (Chirico et al., 2019). These occur when either the demands of the work environment exceed the capabilities and resources of the worker or when the needs of the worker cannot be supplied by the work environment (Dewe & Cooper, 2017; Forastieri, 2016). The focus of research has been on finding independent variables that objectively capture the work and workplace characteristics to which a person passively responds with stress as a dependent outcome (Dewe & Cooper, 2017; Väänänen et al., 2014; Wainwright & Calnan, 2002). Specific causes of work stress (psychosocial hazards) such as work overload, performance pressure, abusive supervision, difficult working conditions, and lack of fairness or respect (Driver, 2014) have been studied through a

hypothetico-deductive framework based on the expression of stress as an objective, measurable construct (Väänänen et al., 2014). As with the forest industry studies outlined in Chapter 2, the fundamental premise has been that harmful and unpleasant workplace elements have been associated with a loss of equilibrium in the individual's homeostatic system. The research objective has been to clarify the relationship between the workplace environment and the individual's body and mind through a test of the impact workplace characteristics on unhelpful behaviours and psychological and somatic symptoms (Leka & Jain, 2010; Maslach & Leiter, 2016; Väänänen et al., 2014).

The literature highlights several weaknesses in this approach to examining stress. Firstly, in an analysis of the core scientific representations used in defining and categorising work stress in 132 international research publications for the period 1960 – 2011, Väänänen et al. (2014) found that in occupational and public health research, publications were often tests of the associations between conditions in the environment and certain health outcomes (particular psychological symptoms, health problems or the risk of some disease). As noted in Chapter 2, that approach does not identify a causal pathway. Exposure to stressors is assessed at one point in time when exposure over time is likely to be the most harmful (Schaafsma et al., 2021). Much of the research has been focused on understanding the variance between subjects in a cross-section of the population at that point in time when stress is an "unfolding process over time" (Cassar, Bezzina, Fabri, & Buttigieg, 2020, pg 54). Despite the literature noting the need for study designs that identify causal relationships (Väänänen et al., 2014), epidemiological studies aiming to understand the health impacts of cumulative exposure to work stressors are limited (Schaafsma et al., 2021). Furthermore, in a systematic meta-review of work-related risk factors for common mental health problems, Harvey et al. (2017) concluded that while longitudinal studies do exist, the impact of psychosocial risk factors on employee mental health beyond two years remains unknown.

Secondly, there appears to be little agreement over the way environmental conditions and the subsequent health impacts are described. Despite recognising the need for some form of objective evidence (biological or physiological markers such as hormone levels, disease onset or hospitalisation), most studies of work-related stress depend on self-rated psychological and psychosomatic scales or use clinically based conditions measured using self-rated scales (Harvey et al., 2017; Väänänen et al., 2014). Even when a clinical definition with associated interview and tested treatment regimens are available (e.g., major depressive disorder), the need for findings to be generalisable means a self-reporting instrument is more likely to be used and the lack of a clinical assessment listed as a limitation of the study (e.g., Bianchi, Schonfeld, & Laurent, 2015). Psychosocial risk factors are also measured through self-rated scales. Harvey et al. (2017) found that workplace risk factors were often examined using self-reporting questionnaires and noted that any such appraisal will incorporate a range of individual beliefs, perceptions and attitudes to work (Harvey & Henderson, 2009, as cited in Harvey et al., 2017). Harvey et al. (2017) also note that while there is evidence for a prospective relationship between psychosocial risk factors and various mental health conditions (depression, anxiety and stress), the heterogeneity of instruments used to assess risk factors and mental health disorders presented methodological difficulties for systematic reviews attempting to make causal inferences.

The proliferation of risk factor and mental health disorder instruments has led to questions about the robustness of hypothetico-deductive cross sectional research. A review of the instruments available for measuring work-related psychosocial risk factors listed 33 instruments (26 questionnaires and 7 observations) with 12 of those instruments incorporating some measure of mental health impact (Tabanelli et al., 2008). While Harvey et al. (2017) noted in their systematic meta-review that there were signs that concepts of psychosocial risk were starting to overlap, they concluded that higher quality studies (observational studies, randomised control trials) were required before there could be more certainty over causative relationships. This leads to confusion over exactly what is the experience of stress (Dewe et al., 2010). Lack of agreement on how to

describe the conditions in the environment and the person, places at risk the potential of interventions aimed at alleviating stress to be successful. A recent systematic review undertaken between 2013 and 2019 noted that "83 different instruments were used in the 29 articles to measure 22 variables and the impact of the interventions on work-related stress" (Restrepo & Lemos, 2021, p. 59). The authors concluded that while the interventions showed significant reductions in stress, there were methodological issues with the studies that made it difficult to draw conclusions regarding the success of the interventions. As the success of stress interventions in such circumstances has been questioned (Cooper, Dewe, & O'Driscoll, 2001; Wainwright & Calnan, 2002), the amount of research effort being applied to understanding work stress has fallen (Väänänen et al., 2014).

A third weakness of the hypothetico-deductive approach to researching stress is the risk that it assumes that all of the stress experience described within a workplace originate with the environmental factors described for that particular social context (Theorell et al., 2015). This approach ignores the broader social structures and systems that may create those factors, and overlooks the ways in which people exist within adjacent systems that may have permeable boundaries. Ahola et al. (2013) point to this weakness in their assessment of the limitations of their longitudinal study of the association between burnout and serious injury within the Finnish forest industry. They note that burnout can spill from or to other life domains, and that research based on the National Health Interview Survey in the United States showed that 62.5% of the injuries suffered by the employed working age (18-64 years) population happened outside the workplace (Smith et al., 2005). Lovelock and Houghton (2017) highlighted the potential for the poor health and safety outcomes of the NZ forest industry to originate with psychosocial stressors outside the workplace such as high drug use in worker families and communities, insecure and overcrowded accommodation, and conflict with unemployed family members. A study of 108 participants in China found that rumination about family hassles and conflicts was a risk to the personal cognitive resources available to employees at work on a daily basis (Du et al., 2017). Similarly, a study of 202

Finnish employees found that partner conflict was a source of negative family to work spill over (Kinnunen et al., 2006). With such a narrow view of context, the focus goes onto the individual and what can be done to enable coping (Harkness et al., 2005). As a result, the aim of interventions has been to either modify the micro-organisational elements (e.g., decision latitude and social support) that surround the individual (Väänänen et al., 2014) and / or enhance the individual's ability to cope through counselling or stress management techniques (Harkness et al., 2005). Consequently, macro-organisation and wider social system issues may not be addressed and the potential to eliminate stress through removal of the stressor not considered (Dewe et al., 2010).

Failure to work with a model of stress that identifies a causal pathway, lack of agreement over measurement of stress and psychosocial risk factors and an inability to adequately capture the impact of context beyond the workplace on stress raises questions about the relevance of continuing to study stress within the industry using a stimulus-response approach. Using this approach risks imposing a reality on the process of stress as it occurs for this population of participants (Dewe & Cooper, 2017) or overlooking important phenomena associated with the process of stress as it is experienced by this group of workers (Bergman & Jean, 2016). Dewe et al. (2010) point to the need to ask whether how we represent stress is a reflection of what individuals are experiencing. Dewe and Cooper (2017) suggest that representations of stress can only be robust if they are relevant and reflect the work experience of the participant population and that relevance ranks alongside reliability in the construction of robust representations. Furthermore, Dewe and Cooper (2017) warn that ensuring what is researched is relevant to those whose working lives are being studied is a moral and ethical responsibility of the researcher due to the potential for contextual factors (e.g., organisational policy and procedures) to have serious harmful effects on employees physical and psychological wellbeing (Pfeffer, 2018). Given the lack of research on stress and its impacts within the Aotearoa New Zealand forest industry, it is, therefore, an ethical imperative that producing findings relevant to the participant machine operators should be a key criterion in the choice of methodological framework for the study.

3.2 THE CHALLENGE OF UNDERSTANDING STRESS

Stress has its own discourse with many meanings coming from many sources. As it is now part of the vernacular of working people it is not always clear what is being discussed when stress is being talked about (Dewe & Cooper, 2012). That means it cannot be reliably studied without unpacking the experience of stress in operation for the group of people being studied (Bergman & Jean, 2016; Driver, 2014; Harkness et al., 2005). An analysis of the meanings Canadian female clerical workers applied to the word 'stress' highlighted the ambiguity of the term (Harkness et al., 2005). To this group of workers, being stressed at work was considered a normal part of the work experience and that showing the effects of stress was considered inadvisable. Talking about stress as an explanation for work experiences became a socially acceptable way of expressing negative emotions without risking any negative consequences in their relationships with others. It was also a way of constructing a greater sense of importance in the workplace as a counter to their general feeling of being undervalued (Harkness et al., 2005). Furthermore, Harkness et al. (2005) suggested its confusing nature was the reason for the inability of this discourse to provide sufficient understanding about the context of a psychological or physical reaction to enable development of effective solutions. With so much published about stress (Väänänen et al., 2014), individuals have their own preconceptions about what is meant by the word 'stress' and what it represents. Participants in a study that includes questions on their current level of stress (e.g., Nielsen, 2015b) or the nature of their stressors (e.g., Lovelock & Houghton, 2017; Mylek & Schirmer, 2015) will answer in alignment with an identity that may, at one extreme, be based on the notion of 'victim' (Harkness et al., 2005) or at the other extreme, on the notion of 'stress-fit' (Driver, 2014). Any approach to studying stress with a population will first have to identify the meaning of the word in operation if that research is to have any potential to identify interventions that could be effective in mitigating the negative effects of the experience (Dewe & Cooper, 2017).

Stress, therefore, is not simply a consequence of the objective fit between the needs and abilities of a person and the demands and supplies of their environment. It resides in the person's perceptions

of that fit and the way that changes over time (Edwards, Cabe, Williamson, Lambert, & Shipp, 2006). When questioned about that relationship, a person's appraisal of the psychosocial risks they face and their experience of mental harm as a result will include an assessment of such personal and individual factors as their health and vulnerability, their attitudes towards work, their level of educational attainment, and their personality (Harvey et al., 2017). Understanding those perceptions, therefore, is critical to understanding a person's stress experience (Edwards et al., 2006). Stress is a process that can be best expressed and understood as a transaction between the person and some challenging or threatening event happening within their environment (Lazarus, 2000, as cited in Dewe & Cooper, 2012). Stress arises as people appraise or evaluate the potential of environmental demands to tax their resources and threaten or challenge their health and wellbeing (Holroyd & Lazarus, 1982, as cited in Dewe & Cooper, 2012).

Lazarus (2001, as cited in Dewe & Cooper, 2012) describes this transactional model of stress a two-step appraisal process: a primary appraisal where the individual evaluates an event in terms of 'what is at stake'; and a secondary appraisal concerned with 'what can I do about it'. Furthermore, using Attribution Theory, Perrewé and Zellars (1999) argue that the meanings an individual attributes to an event and their perception of their ability to cope with that event determines the stress experience. Appraisal is a relational process that links the individual with the environment and provides a causal pathway for stress (Dewe & Cooper, 2017). When someone talks about stress, they are referring to their experience of a social process consisting of the stressor-appraisal-strain-coping sequence and the meanings they have made throughout that process (Dewe & Cooper, 2012). Understanding these meanings, therefore, are an essential part of explaining the stress process.

Meanings are also important to the choices made about which resources are applied within the element of coping. While the application of resources is an element of the social process of stress that can be researched from a neutral observer standpoint, understanding which resources are considered available and the relative rankings of those resources involves understanding meanings

the individuals are applying to those resources (Hobfoll, 2001). Valuation of resources is also built in the relationship between the person and the environment (Hobfoll, 2001). Understanding stress, therefore, means being open to the impact of social and institutional issues such as power, control and ethics and their impact on the perceptions individuals have of the stress experience (Dewe & O'Driscoll, 2002). Stress is shaped by its context and its dependence on the macro-systems in which that context sits (political, social, cultural and economic) (Newton, 1995, as cited in Harkness et al., 2005). Understanding the meanings and appraisals that exist for machine operators, the process by which they are constructed, and the impact of context and social structures, are all understandings in line with the aims of this research and determine the methodological requirements of the research process.

3.3 EXPLORING THE SOCIAL PROCESS OF STRESS IN MACHINE OPERATORS

Given the lack of research on the operation of stress in machine operators within the forest industry and the contextual and relational nature of the stress process, any approach to this research must be grounded in the everyday work experiences of the target population. It must also be able to capture the explanatory potential of the context and how it shapes behaviours (Dewe & Cooper, 2012). That means pursuing a style of analysis that is "contextual, person-centred, holistic and process-oriented, aimed at capturing the reality of the experience …, how that experience was constructed and the significance of what is actually happening" (Dewe et al., 2010, p. 147). The research methodology should approach the participant as "an embodied reflexive actor, constantly assessing and interpreting his or her circumstances, within a broader social and cultural context" (Wainwright & Calnan, 2002, p. 121).

Qualitative methodologies come from philosophical traditions that place the person and their meaning making at the centre of this analysis (Cooper et al., 2001). They explore the meanings of social phenomena as lived by the individuals themselves from within the contexts they inhabit (Malterud, 2001). By providing stories that detail the perspectives and experiences of the machine

operators who work in Aotearoa New Zealand's forests, the meaning of events and that individual's place within those events becomes clearer (Driver, 2014; Patton, 2015). The role of the context in which those events take place and the social structures and systems that may influence those events and the meanings individuals make is clarified through the way those elements are described (Patton, 2015). In the forest industry, policy is set by people who may not necessarily live in the same communities as those who work for them, they may not have the same life histories (e.g., educational level), and they can come from different cultures. They are trying to control what is happening within an operating environment that is uncertain and described with imperfect information. The principle of open inquiry that sits at the centre of qualitative methodologies will uncover what is happening that may be unintended and unknown and if and why that matters to the process of making stress (Patton, 2015). In doing so, those people living those stories will be given the voice (Liamputtong, 2013) that will highlight the potential barriers or facilitators to change (Starks & Brown Trinidad, 2007).

3.4 WHY GROUNDED THEORY?

Having established that qualitative methodologies are best suited to fulfil the purpose of the research, this section aims to defend the decision to proceed with grounded theory as the methodology. It will do that by explaining what grounded theory is, its theoretical basis and the situational factors that contributed to this decision.

Grounded theory is a qualitative research methodology in which the inquirer develops an explanation (a theory) of a basic social process as it occurs within a certain context (Starks & Brown Trinidad, 2007). It uses an open enquiry and inductive analysis (that is, 'grounded' in the data) to generate a theory of action happening as a result of the meanings people apply to events (Patton, 2015). As such, it is both a methodology and a set of methods for inducting a reflexive and theoretical understanding of the studied phenomenon, while attending to the social context in which the research is proceeding (Charmaz, 2014). Like other forms of qualitative research,

grounded theories can only capture moments within a person's life. However, with its emphasis on action, process and context, grounded theories identify connections between those moments and what they mean (Charmaz, 2000). Blumer described this as "lifting the veil":

> The task of scientific study is to lift the veils that cover the area of group life one purposes to study. The veils are not lifted by substituting, in whatever degree, preformed images for first-hand knowledge. The veils are lifted by getting close to the area and by digging in it through careful study (Blumer, 1978, p. 38, as published in Patton, 2015).

If what you learn about the world is determined by how you study the world (Patton, 2015), then grounded theory provides a means by which what is learnt through that study is grounded in the "human action that creates the elements and patterns of human life" (Schwalbe, 2020, p. 601).

Authors also point to several advantages of grounded theory that give the novice researcher, the participants, and the target audience some assurance over the quality of that explanation:

- The prescribed step-by-step nature of the analytical process and its various methods (Charmaz, 2000);
- The self-correcting nature of the concurrent data collection and analysis process (Charmaz, 2000);
- The focus on explaining why something is happening rather than describing what is happening (Corbin & Strauss, 2015);
- The use of purposive sampling to ensure coverage of the variation inherent in the study population (Birks & Mills, 2015); and
- The emphasis on comparative methods (Charmaz, 2000).

For this research situation, grounded theory offered the potential of a good fit between the research aims, the place this study represents in the development of the researcher's capabilities and the

assurance required by the both the participants and the target audience on the level of confidence they can have in its findings.

Grounded theory is based on a theoretical framework (symbolic interactionism) that considers the meaning of any event or experience comes either from the context or the perceptions of the person witnessing the event or having the experience (Tolich & Davidson, 1999). From this theoretical perspective, actions construct self, situations and society (Charmaz, 2014). There are three basic premises to symbolic interactionism (Annells, 1996): firstly, that the meanings that things (organisations, structures, systems, people, situations or objects) have for a person will determine what action they take towards those things; secondly, that this meaning will be derived through interaction with others; and, thirdly, the person will modify meanings as they deal with the situation by way of an interpretive process. Knowledge, therefore, is constructed through acting and interacting. There is no separation between knowledge and action: "knowledge leads to useful action and action sets problems to be thought about, resolved, and then converted into new knowledge" (Corbin & Strauss, 2015, p. 21). Furthermore, actions (past, present and imagined future) carry meanings which can be felt emotionally and are locatable within systems of meanings (Corbin & Strauss, 2015). Through that process the individual is active in adapting to the environment (Annells, 1996). People think about their lives and actions rather than responding mechanically to stimuli (Charmaz, 2014). Taken in reverse, actions are the window into the meanings people are applying to things and the social environment in which those things sit.

There are several situational factors that support the choice of grounded theory as the methodology for this study. Firstly, Birks and Mills (2015) suggest that, as a research methodology, grounded theory is most appropriate where little is known about the area of study, when the generation of an explanatory theory is a desired outcome, and where there is an inherent process imbedded in the research situation that is likely to be explicated by grounded theory methods. In this case, the arguments that stress is a process and that little is known about how that process works within the

logging industry in Aotearoa New Zealand are the subjects of both this chapter and Chapter 2. Given this work is intended to be used as a basis for recommending appropriate interventions, developing an explanatory theory is an objective of the research. Secondly, the nature of both the research participants and target audience has an impact on the decision. Men are known to be reluctant participants in social research studies (Butera, 2006) and as the logging work environment in Aotearoa New Zealand is not conducive to participant observation or researcher participation as a data collection method, it was important therefore, to be able to talk about the subject in terms that the research participants were likely to be comfortable with. That was assumed to be subject matter focused on incidents (things that happened) and actions (things they or someone else did) (Schwalbe & Wolkomir, 2001). From the array of qualitative methodologies, it appeared that both grounded theory and discourse analysis had a good fit with the research subject matter and the largely male logging work force. Both involved data-based incidents and actions, although their treatment of that differed. Grounded theory focuses on action and process while discourse analysis is focused on language and what it symbolises. Both will build an understanding of the meanings made by the participants about events and experiences and the impact of context (Starks & Brown Trinidad, 2007). Both grounded theory and discourse analysis, therefore, would have met the purpose of the study.

However, grounded theory had something of an advantage over discourse analysis when considering the target audience and their educational background. Being a practice rooted in Forestry Science which mostly uses a postpositivist paradigm of inquiry (see explanation below or refer to Guba & Lincoln, 2004), forest managers are more familiar with evidence that is rooted in an objectivist epistemology. They are used to the development of knowledge through the use of systematic quantitative procedures to verify (or falsify) a hypothetical definition of the phenomena being studied. (Charmaz, 2014; Guba & Lincoln, 2004). The development of silvicultural regimes to optimise forest value and yields involves measuring variation based on characteristics of a population being distributed along a normal distribution curve (Montgomery & Runger, 2014) and

using that understanding of variation to reach conclusions. It was assumed anyone with this world view would want some assurances on how variation was considered within in any explanation. It seemed, therefore, that a qualitative methodology aimed at inducting a theory about a social process from data collected about actions and events and analysed through a set of prescribed, rigorous procedures would have more potential for acceptance and credibility amongst forest managers.

Historically, grounded theory has been thought of as having three traditions – Classical, Straussian and Constructivist – that are differentiated by philosophical frameworks and methodological processes (Kenny & Fourie, 2015). However, the practice has now evolved into a "constellation of methods" (Charmaz, 2014, p. 14) with more recent guidance suggesting it is no longer helpful to characterise the choice of grounded theory methodology in that way (Birks & Mills, 2015). As all research can be considered interpretive "guided by the researchers set of beliefs and feelings about the world and how it should be understood and studied" (Denzin & Lincoln, 2005, p. 22) there is no one "methodologically correct" way to carry out a grounded theory study. The most appropriate methodology, therefore, is defined by the fit between the researcher's world view and the world view inherent in the paradigm of inquiry used as the framework for their research (Annells, 1996; Birks & Mills, 2015). Guba and Lincoln (2004, p. 21) define a paradigm as "a set of *basic beliefs* (or metaphysics) that deals with ultimate's or first principles … a *world view* that defines, for its holder, the nature of the 'world', the individual's place in it and the range of possible relationships to that world and its parts". A researcher seeks alignment between that paradigm and the ontological, epistemological, and methodological framework that makes up the research paradigm (Annells, 1996; Birks & Mills, 2015; Guba & Lincoln, 2004).

The differences between methodologies implied by differences in paradigms can be illustrated by Kenny and Fourie (2015) in their summary of the distinct coding structures proposed by each of the traditional versions. Classical grounded theory uses a coding structure that aims to discover an

emergent theory through a passive observer. Constructivist grounded theory uses a coding structure that aims to construct a conceptual interpretation of the social process being studied through the partnership between the researcher and the participants. Straussian grounded theory, in its efforts to create a theory that closely apprehends the data, has been considered aligned with both the Classic (e.g., Charmaz, 2000) and the Constructivist (e.g., Annells, 1996) traditions. All traditions provide explicit methods for analysing processes, but their key differences are in their view of the nature of reality (Birks & Mills, 2015).

The coding system and aim of classic grounded theory reflects its post positivistic roots (Annells, 1996). Post positivism assumes a critical realist view of reality (Annells, 1996). Reality is assumed to exist but as it is interpreted and described through the language, meaning making and social filters of the researcher it can only be imperfectly understood. Classic grounded theory is, therefore, a search for the real 'reality' that sits behind the observer's interpretation (Annells, 1996). In assuming the researcher and the objects of the research are independent entities and the researcher is capable of studying the objects without influencing or being influenced by them, the epistemology is revealed to be objectivist (Guba & Lincoln, 2004). Methodologically, the emphasis is on the researcher as a *tabula rasa* and using the emic (insider) viewpoint to assist in determining the meaning and purposes people ascribe to their actions. There is recognition that the "etic (outsider) theory brought to bear on an inquiry by an investigator … may have little or no meaning within the emic (insider) view of studied individuals, groups, societies or cultures" (Guba & Lincoln, 2004 p. 19).

More recent versions of grounded theory come from the constructivist paradigm which assumes a relativist view of reality. Reality is "multiple, processual and constructed" (Charmaz, 2007, p. 402) and dependent on the person or group holding the constructions for their form and content (Guba & Lincoln, 2004). There is no truth to be understood probabilistically (Annells, 1996) but rather constructions of the world that are more or less informed and / or refined (Guba & Lincoln, 2004). The epistemology is transactional and subjectivist. The researcher and the object of the research are

"assumed to be interactively linked so that the 'findings' are *literally created* as the research proceeds" (Guba & Lincoln, 2004, pp. 26-27). As researchers are an integral part of the research "their positions, privileges, perspectives and interactions affect it" (Charmaz, 2007, p. 402). Knowledge emerges from the interaction between the researcher and the research participants as co-constructors of the data (Annells, 1996; Charmaz, 2007; Guba & Lincoln, 2004). The aim is to build a consensus construction more refined that any of its predecessors (Guba & Lincoln, 2004).

Both paradigms of inquiry (post positivism and constructivism) appear to fit within the symbolic interactionist framework underpinning grounded theory (Birks & Mills, 2015). Annells (1996) viewed Blumer's characterisation of reality as 'obdurate' in his seminal work *Symbolic Interactionism: Perspective and Method* (1969) as more closely representative of a post-positivistic position. Schwalbe (2020, p. 601) argues, however, that amongst the methodological principles that can be derived from Blumer's perspective is that the reality of social life "consists of people doing things together" on the basis of the meanings those people make about the things (social objects) in their lives. Charmaz (2000, p. 523) interpreted that perspective as being less about "a real world to be discovered" and more about "a world made real in the minds and through the words and actions of its members". That allows those researchers seeking to understand the meaning of any event through the actions and interactions of those involved (Corbin & Strauss, 2015; Tolich & Davidson, 1999) to view those events from a relativist position "where reality is constantly reforming as a fluid construction of individuals and, in turn, their social reference groups" (Birks & Mills, 2015, p. 51).

Within Symbolic Interactionism, therefore, there is 'flexibility' with respect to the view of reality and, consequently, the paradigm of inquiry. It means the choice as to which is the most appropriate version of grounded theory comes down to the researcher's personal philosophical position (Birks & Mills, 2015). The basic grounded theory strategies are capable of bridging across ontological and epistemological differences. Defending a methodological choice, therefore, is a matter of "*which* assumptions researchers bring to these strategies and *how* they use them" because those decisions

"pre-suppose epistemological and ontological stances" (Charmaz, 2014, p. 12). Put simply, the choice is between whether the researcher considers themselves an "objective, passive instrument collecting data *from* participants or a subjective, active participant in data generation *with* participants" because that affects "the relationship between the researcher and the data, how it is collected or generated, what it consists of and how it is analysed" (Birks & Mills, 2015, p. 52).

3.5 POSITIONING MYSELF AS RESEARCHER

The choice of which grounded theory tradition to use in pursuit of the research objectives, therefore, is a decision based on my personal philosophical position and the sum of my life experiences. "The multiple selves we live out, or the many 'hats' that we wear influence the methodological approach we choose and in turn how we use essential grounded theory methods" (Birks & Mills, 2015, p. 50). Defending a methodological choice means revealing the role of beliefs and values held by the researcher in the selection of that methodology (Guba & Lincoln, 2004; Hellawell, 2006). Birks and Mills (2015) advise the novice researcher to start by clarifying the way they view the nature of reality and self and to acknowledge assumptions, experience, and knowledge as a means of establishing where they stand with respect to the proposed study. My baseline position in terms of knowledge is captured in Chapter 2, but that does not explain where this topic came from and what approach to the use of grounded theory would be the most appropriate fit (objectivist vs constructivist). The purpose of this section, therefore, is to explicate my personal view of reality and my experience relative to the topic and its participants as a means of clarifying how this study should proceed.

3.5.1 PHILOSOPHICAL POSITION

The ontological position I hold, is that, while there may be aspects of our world that are sufficiently concrete to reach a consensus on the meaning of those aspects relatively quickly or easily, in the social world at least, there is no single reality or truth we will easily agree on. Instead, "realities are apprehendable in the form of multiple, intangible mental constructions, socially and experientially based, local and specific in nature … dependent for their form and content on the individual persons

or groups" who hold them (Guba & Lincoln, 2004, p. 26). Knowledge, therefore, reflects a consensus made within a community about what is real, what may be useful, and what has meaning.

> … human thought is basically both social and public – that its natural habitat is the house yard, the marketplace, and the town square [or the interview]. Thinking consists not of 'happenings in the head' (though, happenings there and elsewhere are necessary for it to occur) but of a traffic in … significant symbols … anything that is, in fact, disengaged from its mere actuality and used to impose meaning upon experience (Geertz, 1973, pg 45)

Knowledge is generated through social processes and what is considered truth is our current accepted ways of understanding the world. This perspective is reflected in the theory of knowledge called social constructionism. From this viewpoint, humans build a sense of what the world is about (meanings) through their symbols, icons and words (Saleebey, 1996). Burr (2015) considers a social constructionist approach is based on one or more of the following assumptions:

- Approaching critically our taken for granted understandings of the world and to challenge the idea that knowledge is based on our unbiased observation of the world.
- The categories and concepts we use to understand the world are historically and culturally specific products of the social and economic arrangements prevailing within that culture at that time.
- Knowledge is constructed between people through their daily interactions.
- Knowledge and social action are linked such that different constructions of the world lead to different kinds of action: sustaining some patterns of social action and excluding others.

This world view has an important epistemological implication: that knowledge is built in the relationship between the research participant and the researcher. Within the research project they will form a partnership to look at and interpret the experiences described by the participant:

> Data do not provide a window on reality. Rather the 'discovered' reality arises from the interactive process and its temporal, cultural and structural contexts. Researcher and subjects frame that interaction and confer meaning upon it. The viewer then is part of what is viewed rather than separate from it. (Charmaz, 2000, p. 523)

Through this partnership, the participant and researcher pursue consensus about the subject of the inquiry, the phenomenon and its meanings as experienced by both the participant and the researcher (Guba & Lincoln, 2004).

3.5.2 Acknowledging Assumptions

Our past and present involvements in the research setting of interest and our interactions with people, perspectives and research practices help us to construct our grounded theories (Charmaz, 2014). However, induction is a process that requires an open mind to allow space for theory to emerge from the data (Birks & Mills, 2015). Acknowledging these involvements and interactions is an effective mechanism for establishing where one stands in relation to the research (Birks & Mills, 2015) and ensuring transparency over the researcher's place within that research (Charmaz, 2014).

Relevant Experiences

Obtaining a degree in forestry science in the 1980's provided the foundation for a working life that has been mostly in the forest industry as either an operational leader managing staff and contractors or as a consultant helping contractors manage their business. That experience has given me intimate knowledge of the operations and settings in which the participants work and, through contacts, access to those participants. It was also the foundation for my efforts to move away from the industry into civil construction and maintenance contracting, again as an operational leader, when the Canterbury earthquake re-build provided opportunities. As an experience that was significant because it meant having to manage people as a technical outsider, something that could only be done by recognising the technical expertise of the people I worked with. That work also introduced me to underserved communities and provided the platform to move into work with a more social

purpose, helping men transition out of sentences in the justice system. As part of that transition, I found myself back at university studying social work theory and practice. Becoming aware of the relationship between health and the social environment and the potential of the workplace as a location for social work practice led me to the topic of this research study.

RELEVANT THEORETICAL PERSPECTIVES

Forestry Science and Social Work approach their practice with a similar theoretical perspective although they approach building knowledge in that perspective from two different views of reality. Both are informed by an ecological perspective of the world in which they operate. For foresters, that means practicing according to "sound ecological, social, economic and environmental principles to the advantage of present and future generations" (New Zealand Institute of Forestry, 2022, p. 1). The purpose of social work practice can be summarised as:

- helping individuals cope more skilfully with their challenges and adapt to the environment they face (Aviram, 2002);
- Assisting individuals to gain access to resources, services and opportunities that can advance their wellbeing (Aotearoa New Zealand Association of Social Workers, 2014); and,
- Changing social conditions to improve quality of life for those affected by those conditions (Aviram, 2002).

Where forestry and social work differ is in their view of reality. Forestry science takes a post-positivistic ontological position which is understandable given how much of the practice is based on trying to apprehend something about a population that can only be observed from afar whether by observation or measurement. Social work, on the other hand, views reality through the historical realism of critical theory. In historical realism reality is virtual, shaped by social, cultural, economic, political, gender and ethnic values that have solidified over time into structures that are now taken to be natural and immutable (Guba & Lincoln, 2004; Lincoln, Lynham, & Guba, 2018). For this research project, both perspectives work together to meet the requirement set by Guba and Lincoln

(2004) that novices to constructivist research must first be schooled in the postures and techniques of positivism and post positivism.

Ecology studies the relations between organisms and their environment (Germain, 1991). Within the social world, ecology is used to describe the perspective of a "person-in-situation" as a whole in which both of these parts are enmeshed in a complex set of relationships and can only be understood when looked at as a whole (Compton, Galaway, & Cournoyer, 2005, p. 23). The nature of those relationships is transactional: "continuous reciprocal exchanges" between people and their environments that "shape, influence and sometimes change each other"(Germain, 1991, p. 16). Using that idea of transaction, the ecological perspective can be theorised as a system that conceptualises the relationships between and amongst people at various levels of organisation and their environments (Germain, 1991). One such theory is Bronfenbrenner's ecological systems theory captured in figure 2.1. Such theories provide a conceptual base for the development of intervention models and approaches aimed at improving the fit between people and their environments (Compton et al., 2005).

The ecological perspective informs two other theoretical perspectives informing this research. Application of the ecological perspective within the disciplines of medicine and psychiatry is conceptualised as the biopsychosocial model of health (Álvarez, Pagani, & Meucci, 2012; Borrell-Carrió, Suchman, & Epstein, 2004). Within this model, biologic, psychologic and social processes are all interacting in the determination of health and illness and must be taken into account in every health care task (Álvarez et al., 2012). Illness results from processes interacting at the level of the individual and their interactions with others and their environment (Álvarez et al., 2012). The implication is that the study of an illness must consider all three levels.

Thinking of humans as individuals, families, and communities 'in place', within nested environmental settings, engaged in transactions amongst themselves and with those environments, changes the way we think of any problems arising within those settings. Rather than seeing a person with a

problem as a case to be treated to overcome their circumstances, they can be seen as a unique set of traits, talents and resources (strengths) that can be adapted to work with their circumstances (Saleebey, 1996). The strengths perspective puts the individual in the position of expert in their own life and their personal account as the route to understanding their situation (Saleebey, 1996). Achieving aspirations through the development of personal, social and material (that is, environmental) resources, or removing obstacles to those resources, becomes the focus of the work (e.g., Hamall, Heard, Inder, McGill, & Kay-Lambkin, 2014; Ungar, 2011). Intervention starts with accounting for the resources available to that individual, family / whānau and community (Saleebey, 1996).

The ecological, biopsychosocial and strengths perspectives are all evident within the literature reviewed in Chapter 2. The place of extant knowledge is something of a contentious subject amongst grounded theorists (Birks & Mills, 2015). On one side of the debate is the suggestion that the researcher should delay the formal literature review until analysis is completed so as to prevent the researcher imposing existing theories or knowledge on the study processes and outcomes (Birks & Mills, 2015). On the other side is the recognition of the value of extant knowledge for grounding the researcher in the subject without taking a position on the research to be done (Urquhart, 2007). Bryant and Charmaz (2007) suggest there are two flaws in the idea that a researcher should delay the literature review to ensure an open mind: firstly, anyone engaging in research will have preconceived ideas which need to be made transparent rather than ignored; and secondly, the advice is usually given by experienced researchers who have developed extensive knowledge of the literature about their field. The topic of this research study reflects the theoretical perspectives gained through my work and study history. Those perspectives are also the source of the theoretical sensitivity required to recognise and extract elements from the data important for any emerging theory (Birks & Mills, 2015). As Bryant and Charmaz (2007) note, extant knowledge needs to be accounted for within the methodological approach. Urquhart (2007) suggests approaching the preliminary literature review on the understanding that its relevance will be determined by the

generated theory. Once the theory has been generated from the data the literature review can be reviewed and revised.

3.5.3 Researcher Position Relative to Participants

If the data is constructed in the interaction between the researcher and the participants (Charmaz, 2014; Guba & Lincoln, 2004) then the position of the researcher relative to the participants is part of the methodological decision (Birks & Mills, 2015). Within qualitative research that positioning is captured in the nomenclature of insider / outsider.

Being 'insider' relative to the participant population can be defined as "an individual who possesses a priori intimate knowledge of the community and its members" (Hellawell, 2006, p. 484). Conversely, the status of 'outsider' is conferred when there is not that a priori familiarity with either the setting or the subject of the research (Hellawell, 2006). Whether the researcher is insider or outsider, the personhood of the researcher is an integral part of the investigation (Dwyer & Buckle, 2009). In my case, that personhood contains elements of both positions. As a cis-gendered man with a history of working and living within key regions of the industry, with knowledge of the processes and structures that control industry practice and operations and experience working as a contractor, I can be considered somewhat 'insider' in my position relative to the 'researched'. However, I am also Pākehā, with significant formal education and researching a participant community that is: (1) dominated by men with unhelpful experiences of the education system; and, (2) 37% Māori (Ministry of Primary Industries, 2020). Both these 'differences' are highly associated with the power imbalances that exist between the forest industry workforce and their managers. So I can be seen by the participant community as both 'insider' and 'outsider'. What that means, however, is that there is no ' objective' and 'neutral' position for me to occupy in the construction of data with these participants and that it is more realistic to consider myself as 'co-constructor'.

From both the intellectual and practical points of view, the perspectives (insider and outsider) have their advantages and disadvantages as both empathy and alienation are useful research traits

(Hellawell, 2006). However, being empathetic to the situation in which the participants find themselves also has an impact on the methodological choice. The purpose of this research is to fulfil the purpose of social work with respect to this community. It is the position of the passionate participant / activist rather than the disinterested adviser (Lincoln et al., 2018). Fulfilling that purpose requires a shared narration of the research that is produced through this partnership (Geertz, 1973). It is a position that fits more closely the methodological framework of constructivism than that of post-positivism (Lincoln et al., 2018).

3.6 CONCLUSION – DECIDING ON CONSTRUCTIVIST GROUNDED THEORY

Given the extent of my experience within the field, my relationship with the participants, the theoretical perspectives I have been exposed to and my constructionist point of view, taking a constructivist approach to the application of grounded theory methods appears to be the most appropriate way to proceed with this research. As a methodology, Constructivist Grounded Theory makes a number of assumptions: (1) that reality is multiple, a set of processes rather than discrete events and constructed under particular conditions; (2) that the research process emerges from interaction between participants and researcher; (3) it considers the positionality of both the researcher and the research participants; and (4) that the data is co-constructed by the researcher and the researched (Charmaz, 2007). Using this methodological framework will ensure the coherence between philosophy, methodology and the application that is the foundation of a credible qualitative study (Birks & Mills, 2015).

4 RESEARCH DESIGN

Within a grounded theory study, the final product "is an integrated and comprehensive grounded theory that explains a process or a scheme associated with a phenomenon" (Birks & Mills, 2015 p. 13). The objective is to develop a substantive theory that takes into account the variation encompassed within the data (Hood, 2007). As Birks and Mills (2015) recommend, the quality of that theory is a function of the level of congruence between the researcher's personal philosophical position, the aims of the research and the methodological approach. As grounded theory is both a methodology and a set of methods (Charmaz, 2014), the trustworthiness of that grounded theory is, in part, a function of the study's adherence to the data generation, collection and analysis methods prescribed for the methodology (Birks & Mills, 2015). Those methods are aimed at generating a theory in which the process of abstraction is adequately demonstrated to the point where the audience is left in no doubt as to the effectiveness of the theory's 'grounding' in the data (Birks & Mills, 2015). To achieve that outcome, Charmaz points to the strategies she considers essential to the construction of a grounded theory:

1. Conduct data collection and analysis simultaneously in an iterative process;

2. Analyse actions and processes rather than themes and structure;

3. Use comparative methods;

4. Draw on data (e.g., narratives and descriptions) in service of developing new conceptual categories;

5. Develop inductive abstract analytic categories through systematic data analysis;

6. Emphasise theory construction rather than description or application of current theories;

7. Engage in theoretical sampling;

8. Search for variation in the studied categories or process;

9. Pursue developing a category rather than covering a specific empirical topic.

(Charmaz, 2014, p. 15)

Charmaz set out these guidelines to provide clarity over what methods are necessary for any findings to be considered a grounded theory, given her view that the different grounded theory traditions represent a "constellation of methods" rather than an "array of different methods" (Charmaz, 2014, p. 14). For the novice researcher, this meant recognising there was something to be done beyond other qualitative analysis methods such as strong thematic analysis or sorting of topics for the findings for any explanation to be considered a grounded theory. The intention in this study, therefore, was to follow this framework to ensure that what was produced met the objective noted above.

The purpose of the following chapter is to detail the methods of data generation (sampling, recruitment and collection) and analysis used to generate the findings for this study. The use of computer assisted qualitative analysis software to generate and manage the large amounts of data is also covered. The chapter finishes by considering the ethical issues faced in applying these methods and the efforts made to ensure the quality of analysis and findings.

4.1 DATA GENERATION

The participant population were machine operators working in the forest industry of Aotearoa New Zealand. They were either directly employed or sub-contracted to fell and / or extract trees and cut them to length and load them as logs for transport. In some cases, contractors (that is, crew owners) were filling the role of machine operator within their own crew. To meet the logistical (time, money) constraints on the project, three regions (Tainui Raukawa - Te Arawa Waka / Central North Island, Te Tai Rāwhiti / East Coast – Poverty Bay; and Murihiku / Otago-Southland) were deemed to collectively represent the economic, environmental and demographic characteristics of the industry. Study participants were recruited from those regions. The purpose of this section is to explain the rationale behind the sampling strategy and to detail how participants from each region were recruited.

4.1.1 SAMPLING

The strategy used to sample this population was driven by the need to collect and analyse data concurrently, one of grounded theory's essential methods (Birks & Mills, 2015). That means starting out with a purposive sampling approach to generate the initial data and then moving to a theoretical approach to sampling as more data is sought about the properties and dimensions of a category, the contextual conditions associated with a particular category and the relationship between categories (Birks & Mills, 2015). Participants who have particular responses to experiences, or for whom particular concepts may be significant, are deliberately sought to fill in gaps in the categories used as the basis of the grounded theory (Morse, 2007). Sampling continues until theoretical saturation is achieved. At this point, no new category properties or connections emerge from the data and all relevant data is accounted for in the core categories of the emergent theory (Ezzy, 2002).

For this study the initial purposive sample was based on observable contextual factors the literature suggested could be associated with the experience of stress in the workplace. Pfeffer (2018) pointed to work hours and perceived job insecurity as drivers of workplace strain and its associated distress while Nahrgang et al. (2011) suggested perceived risk of injury could also negatively impact wellbeing. While work hours can be established directly, perceptions of job insecurity and risk of injury can only be established indirectly through working conditions that may lead to those perceptions by operators. Job insecurity was considered to be a function of the time remaining on the main harvest contract currently supplying the operator with work and the nature of the contract used to employ the operator (wages vs piece rate vs sub-contract – owns machine). Risk of injury was considered to be a function of the workstation location of the machine in the logging process (skid based vs prime mover vs felling face).[2] This framework was applied across the three different

[2] Wages or salaried roles are assumed to be perceived as more secure than being paid per tonne of production (piece rate) either as a piece rate employee or sub-contractor because wages and salary are not directly tied to production. A machine working on the flat surface and relatively controlled environment of a skid site is assumed to be perceived as having a lower risk of injury than either the prime mover or a machine working on the felling face / cutover due to the lower risk of roll over.

regions to cover any differences associated with the locations in which the industry operates. All three regions have contractors that are working on a range of contract terms from short term (less than 6 months) to long term (3-5 years). While most operators work on an hourly wage or weekly salary, there are also some working on piece rate contracts mostly as sub-contractors. These are operators who own and operate their own machine. The key differences between the three regions are in the nature of the terrain and in the location of the provincial centres and rural towns that house operators working within the region. These factors create differences in the length the working day and the risk operators are exposed to in working on the felling face and in the cutover. The volcanic plateau of Tainui Raukawa - Te Arawa Waka / Central North Island has relatively gentle slopes and anything steep is relatively short so the risk of injury to an operator is perceived to be less than the other two regions. It also has a range of dormitory towns and centres which make it possible to live within an hour's drive of the workplace. Murihiku / Otago-Southland also has relatively easy terrain but the towns are generally further away (more than 90 minutes) from the workplace increasing the potential for longer days than what is the norm in Tainui Raukawa - Te Arawa Waka / Central North Island. Te Tai Rāwhiti / Poverty Bay - East Coast represents the most difficult of logging conditions characterised by long steep slopes and long commutes to the workplace.

Although the initial purposive sampling framework dictated the sampling locations for the whole sample, the need for sampling to meet the needs of the developing theory was achieved by stretching out the sampling timeframe. Data collection happened over four week-long periods spread over 11 months (5-6 months between samples) between February and December 2020. The logistical constraint of working away from home base created a need to collect data over concentrated periods. However, using field notes and completing some of the initial coding of completed interviews, specific experiences of interest were identified which could be pursued as the opportunity presented itself in interviews with the participants. For example, reflecting on the initial coding of the first round of interviews identified gaps in the data from those interviews on what was

happening outside of work that was helping or hindering work, what could be lost as a result of identified threats or challenges, what any incident meant about the power structure of the crew and how crew mates were helping or hindering. Furthermore, COVID 19 created opportunities to gather data that may not ordinarily have been available. The sampling time frame spanned the start of the pandemic in February 2020 when forest managers started preparing crews for restricted production and the end of the first total lockdown of Aotearoa New Zealand on April 27, 2020. This created opportunities to consider the impacts of work insecurity on wellbeing during interviews. These data needs were flagged in the interview guide for the subsequent interviews.

4.1.2 Recruitment

Within the grounded theory methods data is collected and analysed simultaneously (Charmaz, 2014). For this study recruiting participants required balancing the practicality of securing participation with the gaps in the data that appeared within the initial coding. As the operators' work context was an area of interest within the study, it was important that the power structure that governs that work context did not influence who participated (Halse & Honey, 2005). Ostensibly, that meant avoiding gatekeepers in more powerful positions than machine operators, such as their employer or the forest owner / manager they might work for (Charmaz, 2014). However, difficulty securing participants via advertising and publicity in forest industry media (e.g., NZ Logger magazine, Friday Offcuts, SafeTree newsletter, Forest Workers Network), through the network of health and safety influencers or through FIRST Union, meant resorting to personal forest owner and logging contractor contacts. Those contacts were developed through presentations on the project given at industry and company conferences.

All the contacts that assisted with recruitment did so by volunteering to help after seeing a presentation. Securing participants through logging contractors appeared to have less of an impact on the nature of the cases presented because recruitment involved me building a relationship with the whole crew (usually through supplying the kai) and the interview happening within work time.

Logging contractors who 'volunteered' their crew, left it up to me and the crew as to who participated. There were no third-party preconceptions as to who represented a 'good' participant involved in the decision to participate. Forest owners, on the other hand, appeared to have more influence over who participated because they targeted specific operators based on the forest owner's perception of the study's needs. It is, however, difficult to determine the impact of that difference, particularly as there was value to the study in the testimony of both the participants who had recent or ongoing stress experiences and those for whom stress was something from their more distant past. This latter group of participants were the source of the cases that did not fit a pattern (negative cases) that were necessary for building trust in the analysis (see reference to negative cases in section 4.3.2 Intermediate coding). In this case, those participants talked about stress in the past tense, so they described actions / interactions that led to a change in their experience of stress. The willingness of operators to participate once approached directly was also positively affected by the implied endorsement associated with the media publicity and association with the Forest Industry Safety Council (FISC), the Forest Industry Contractors Association (FICA) and FIRST Union.

Based on other grounded theory studies (e.g. Abrams & Curran, 2009; Penz & Duggleby, 2011; Reyes, Kearney, Isla, & Bryant, 2018), it was anticipated that theoretical saturation would be achieved with 22 – 26 participants. In this case, the sample at which no new codes were generated was 27 (see Appendix 1 for a participant summary).

4.1.3 Data Collection

Data were collected using a semi-structured, intensive interview designed to yield in-depth information about the events, activities, processes and relationships that operators use to construct their experience of stress and coping. Given the ethnicity of participants would not be known before the interview, all interviews were completed kanōhi ki te kanōhi (face to face) to ensure they were culturally appropriate for those Māori who agreed to participate. This also avoided any problems getting hold of participants who had limited phone access to their workplace or limited time in

which to take a call. The interview location was dictated somewhat by the recruitment pathway. Participants recruited via advertising, publicity and the influencer network were interviewed after work hours in a neutral non-work location (e.g., cafés, motel rooms and, in one instance, in a parked vehicle). Participants recruited through either the contractor or the forest owner were mostly interviewed in work time in the contractor's on-site container. All interviews were recorded on a voice recorder (e.g., mobile phone with directional microphone attachment) and the recordings were then prepared as word for word transcripts for analysis.

Intensive interviewing generally means a guided conversation between the researcher and the participant that explores the participants' experience of the research topic from their perspective (Charmaz, 2014) in an effort to "re-construct events that the researcher never experienced" (Rubin & Rubin, 2012, p. 3). Other data collection methods suited to an interpretivist approach were not considered an option given the nature of the work environment which ruled out participant observation. There was also a lack of third party documentation covering the experience of stress within the participant population (Lovelock & Houghton, 2017) and a suspicion that participants would be less likely to disclose personal stories within a focus group (4-5 participants) than if interviewed by themselves (Schwalbe & Wolkomir, 2001). Those obstacles aside, a semi-structured interview with emphasis on understanding the participant's meanings and perspectives is likely to have still been the best option. The flexibility in the approach offers the opportunity to open up an interactional space with the participant that allows "unanticipated areas of inquiry, hints and implicit views and accounts of action" (Charmaz, 2014, p. 56) that can generate perspectives previously not considered (Liamputtong, 2013).

The semi-structured interviews were designed around the primary researchable question (Josselson, 2013; Magnusson & Marecek, 2015) which, in this study, was 'how do participants construct their experiences of stress and coping'. Data capable of answering this question were gathered by examining critical stress incidents in the participants lives (Dewe et al., 2010). While the main

questions in the interview were designed to elicit narratives about critical stress incidents, the aim of the questioning process was to understand several topics about those situations (adapted from Charmaz, 2014):

1. The stressful situation or event and what provoked them.
2. The involvement of others and their relationship with the participant.
3. Any actions, decisions or activities arising from the stressful situation.
4. The potential losses from that situation (for both the participant and anyone else involved in the situation).
5. The resources available to help with that situation.
6. The obstacles to acting in that situation.

There is a good fit between these topics and the requirement by Charmaz (2014), in her essential methods for grounded theory, to analyse actions and processes. They were also thought likely to elicit the conditions, actions / interactions and consequences that would form the basis for defining relationships between codes, codes and categories and categories to categories necessary for inducting higher-level concepts during intermediate coding (see axial coding, section 4.2.2 Intermediate coding). Using these topics, an interview guide was created with the incident as the subject of the lead question and the other five topics covered as short, conversational prompts (Magnusson & Marecek, 2015). This helped to ensure that the data was able to be co-constructed by both the researcher and the participant through their conversation (Charmaz, 2014). A guideline for the interview process is detailed in Appendix 2. As with the sampling design, this guideline represents a starting position for the interview and could not be viewed as fixed. Data collection is driven by the needs of the developing theory (Charmaz, 2014), so the topics and questions used later in the data collection process were driven, in part, by the categories that became apparent through analysis completed after the earlier interviews.

As stated, the purpose of the interview was to explore the perceptions that participants had about their experiences of stress and coping. However, those perceptions were, by necessity, co-constructions involving both the researcher and the participant, as the interview setting always involved two people. Ideally, the interview would be an "actively shared space in which the individual contributions of both the interviewer and interviewee are acknowledged" (Gubrium & Koro-Ljungberg, 2005, p. 695) but there were a number of obstacles to achieving that. Firstly, participants came to the interview socialised within the context of their cultural relationships to have particular meanings about both the subject of the interview and the relationship between them as participants and researcher (Bahn & Barratt-Pugh, 2013; Butera, 2006; Gubrium & Koro-Ljungberg, 2005; Schwalbe & Wolkomir, 2001); and, secondly, the power balance between the researcher and the participant was unequal, with power within the interview space being defined by the needs of the researcher rather than the participant (Gubrium & Koro-Ljungberg, 2005). A situation, such as an interview, where someone else sets the agenda, asks the questions, controls the flow and seeks information about internal or hidden realities is to risk control and the stripping away of one's public persona (Schwalbe & Wolkomir, 2001). This could unduly influence the participants' behaviour and responses within the interview through tactics such as looking to expose the researcher's agenda and / or highlight their lesser expertise in the subject matter or setting (Schwalbe & Wolkomir, 2001). They could also resist answering questions or refuse to follow up prompts (Gubrium & Koro-Ljungberg, 2005). Furthermore, participants could undermine the research agenda through the stories and contexts they used in their responses (Gubrium & Koro-Ljungberg, 2005). Ensuring these tactics did not interfere with the data collection process meant paying attention to not only the content of the interview, but also to the way the interview was carried out.

Mitigating the risk that resistance to the interview process would not interfere with this study meant using strategies to ensure the participants had some sense of control over the process and being

open to whatever meaning of the word 'stress' each participant brought with them (Gubrium & Koro-Ljungberg, 2005; Schwalbe & Wolkomir, 2001). Specific tactics used included:

1. Using questions that positioned the participants as expert. Questions like "how did you get into logging?", "how long have you been logging?", "what machines can you operate?" and "what advice would you give to someone starting out?", were all aimed at collecting relevant data while reinforcing the participants expertise.
2. If met with resistance to questions about critical stress incidents they had experienced, the focus on the participant was re-directed by prompting with statements (e.g., "I'm wondering how that happened") rather than direct questions.
3. Letting the participant determine the direction of the interview by focusing more on effective listening techniques such as silence, affirmations, reflections, and summaries to keep them talking.

By ceding control of the interview and, to some extent, the subject matter, to the interviewee, participants were invited to disclose their perceptions of the meaning of the word 'stress' through their description of stressful events without any threat to their sense of self. Developing the interview was undertaken through a piloting process. The aim of the process was to test both the ability of the interview questions to evoke suitable memories and the impact of interviewing context, and to provide further development of the interviewing skills required to successfully elicit useful responses. The piloting process included interviewing an experienced operator and reviewing the interview transcripts with an experienced interviewer.

Of the 27 interviewees, 25 participants were willing to discuss stressful incidents they had experienced and appeared to respond to prompts about who was involved, what arose from the situation, what losses did they face, what resources were available to help with that situation and the obstacles that got in the way of acting. For the most part, the prompts were not required as that information was shared as part of the incident narrative. One participant made it clear in the

preamble that they did not want to discuss stress (they did not see the point) but was happy to talk about what life had been like for him as an operator and allowed it to be recorded. Another participant was very resistant to describing situations that involved the crew they were currently working in but was happy to tell me about situations he had experienced with past crews. In the end, all participants were able to contribute something to the data collected for the study.

4.2 DATA ANALYSIS

A key feature of grounded theory is the prescribed and structured approach to coding, sorting and organising data (Holton, 2007), which is aimed at building theory through constant comparative analysis (codes compared with codes, codes compared with emerging categories and categories compared with one another) happening simultaneously with data collection (Kenny & Fourie, 2015). Grounded theory offers a set of procedures for coding that act as a standardised framework for the analytical process (Corbin & Strauss, 2015). Coding is the process of attaching labels to segments of the narrative data so that conceptual patterns can be identified within the data for further analysis (Birks & Mills, 2015). Over three levels of coding, the data is first dissected into incidents ("actions, characteristics, experiences, phrases, explanations, images and / or sounds") and then, using comparative analysis, organised into concepts with increasing levels of abstraction (Birks & Mills, 2015, p. 89). Through this process "generalisable theoretical statements that transcend specific times and places and contextual analyses of actions and events" start to emerge (Charmaz, 2014, p. 113). In this section, I describe the three levels of coding employed for this study and the tools used to support the analytical process.

4.2.1 INITIAL CODING

Analysis began with Initial Coding, which is the process of breaking down the transcript data so as to "compare incident with incident, name apparent phenomena or beginning patterns and begin the process of comparison between the codes applied" (Birks & Mills, 2015, p. 92). Charmaz (2014) recommends reviewing the interview transcripts line by line or in small chunks to separate the analyst from the participant's world view, so that the data can be questioned critically. That means

naming each line of the transcript with a code that is a summary of the incident (Birks & Mills, 2015). Charmaz (2014, p. 127) suggests applying the following questions to those chunks of text to ensure actions and significant processes are identified:

- What process(es) is at issue here? How can I define it?
- How does the process develop?
- How does the research process participant(s) act while involved in this process?
- What does the research participant(s) profess to think and feel while involved in this process? What might his or her observed behaviour indicate?
- When, why and how does the process change?
- What are the consequences of the process?

Gibbs (2007) also suggests considering whether anything is taken for granted in what a participant may say or do and how structure and context might be supporting, maintaining, impeding or changing what is said and done.

Care was taken with how identified concepts were labelled. Charmaz (2014) recommends coding with gerunds, that is the noun form of verbs (e.g., wanting), to help define what is happening in each fragment. Gerunds enhance theoretical sensitivity because they focus the researcher on analysing actions which enable seeing sequences and making connections (Charmaz, 2014). Saldaña (2013, as cited in Birks & Mills, 2015) couples gerunds with *in vivo* codes (labels based on the participant's words) to ensure the participant's experiences are recognised as the source of the concept being coded. Charmaz (2014) suggests four types of *in vivo* codes can prove useful:

- Words or phrases that signal substantial and significant meanings to everyone. For example, 'starting on the ground' was a phrase used by several participants to convey the idea that there was a rite of passage to becoming an operator.
- Clever use of words by participants that capture experience and their meanings. For example, 'it's honest work' was a phrase used to describe what the participant felt about

operating and how proud he was to be an operator, something that was clearly felt by most participants. Implied in the use of the word 'honest' was a belief that other types of work were not 'honest' which was understood to mean that loggers / operators were a distinct group, a sentiment that was repeated by other participants.

- Insider vernacular that reflected the operators' perspectives. For example, the use of the word 'hard' to convey agreement.
- Phrases that captured actions or concerns of the participants. For example, 'fearing not earning'.

While the first three types of in vivo codes had their uses as demonstrated by the examples, most codes used were of the last type – a phrase that captured an event / action / interaction described by the participant and what that meant. Labels such as 'being', 'having', 'enabling' and 'feeling' were used to imply something was happening and its meaning.

As an example of a code that was developed using these principles, *having problems with throughput*[3] was based on the following references:

> P5: *If you're at the slower end of the chain, you've just to work through smoko while they're not working, or you've got to reduce your maintenance or you've got to do something to make it flow, be able to stay late during the day*

> P12: *When somebody starts digging out one pile and then all my fucken logs fall into a big heapy mess, jesus, that just irritates the shit out of me. My blood pressure goes through the roof*

As the references indicate, this code refers to the experience of being in the bottleneck.

Comparison of codes started as soon as overlapping codes (codes that describe the same thing with different words) became apparent (Kriukow, 2018). As that practice of comparison developed, the

[3] Codes and categories will be demarcated using italics.

significance of codes and the connections between them started to emerge and coding progressed into its intermediate phase (Birks & Mills, 2015). For example, an overlap identified after the first round of interviewing was between two codes: 'having problems with throughput' and 'being in the bottleneck'. The relevant memo records most of the data in both codes relating to bottlenecks arising from decisions others were making or because of machine capabilities. As a result of those similarities the codes were merged into one code labelled 'having problems with throughput'. That process also clearly established the meaning of that code which could then be used to compare with other codes that seemed to capture the sources of bottlenecks.

Completing comparison of codes in parallel with interviewing meant future interviews could be informed by what was uncovered or by gaps identified in completed interviews. Birks and Mills (2015, p. 93) suggested the following questions to not only facilitate coding but also to define future interview requirements in the process of trying to achieve theoretical saturation:

- Are there elements of process or action apparent in the early analysis?
- What is left unsaid in the data analysis to date?
- Are there more questions than answers? If so, what are they?
- Who are the key stakeholders in the field?
- Where else do I need to go to get more data? What should that data consist of?
- Are there contextual influences at play
- Is the original research question / substantive area of enquiry / unit of analysis remaining constant?

Using these questions additional information was sought from later interviews. Additional data was sought on the events happening outside of the workplace, the implications and meanings of events, particularly around what was threatened, and the role of power in the event. Data was also sought on how those not involved directly in the event helped or hindered resolution of that event.

At the completion of the analysis there were 291 initial codes containing 2624 references that provided the material for the construction of the grounded theory explained within the findings.

4.2.2 Intermediate Coding

As simultaneous generation and analysis of data proceeds, another level of coding is required to identify conceptual reoccurrences and similarities in the patterns of the data. These patterns are used to form groups of codes representing a higher-level concept that can be identified as a category (Birks & Mills, 2015). Intermediate coding is the process of integrating a grounded theory by elucidating the links between and within categories (Birks & Mills, 2015). Charmaz (2014, p. 189) notes that "categories explicate ideas, events, or processes in your data …. a category may subsume common themes and patterns in several codes". As a concept built up from grouping other concepts, categories (and sub-categories) start to have properties and dimensions. Properties can be thought of as the characteristics of a category that give it definition and meaning while dimensions set out the range of conditions under which that category arises, is maintained and changes (Birks & Mills, 2015; Charmaz, 2014). Using the principles of constant comparison, relationships between categories are identified and gaps in the data that need further data collection and analysis become apparent (Birks & Mills, 2015). With more data and more clarity over relationships between categories, the integration of categories starts to explain the actions or processes apparent in the emerging grounded theory (Birks & Mills, 2015) while providing an explanation of variance through the dimensions of those categories (Corbin & Strauss, 2015)

Intermediate coding is the level of coding at which the three traditions of grounded theory appear to diverge. In the Constructivist tradition, the intermediate coding procedure is known as Focused Coding and consists of deciding on which of the initial codes make the most analytic sense for the integration of codes into categories (Charmaz, 2014). Although Charmaz (2014) has constructed a set of questions to help define which of the initial codes could come to be considered focused codes, she also recognises that the researcher's analytic skill and perspectives have a significant bearing on

this part of the analysis process. For the inexperienced researcher this poses a risk to the credibility of any explanatory theory arising from the analysis. While it comes from the Straussian tradition, Birks and Mills (2015) consider Axial Coding to be a more developed form of intermediate coding due to the extent to which the process of explicating connections between and within categories is set out in procedures. Charmaz (2014) appears to recognise that working with an applied framework for this part of the analytical process has its applications and considers focused coding and axial coding as ways of achieving similar ends. She suggests the key difference is that, in focused coding, the analytic categories are emergent rather than procedural applications. By emergent, Charmaz (2014) means the categories, subcategories, and links between them reflect how the analyst made sense of the data, again highlighting the dependence on the skill of the researcher in achieving credible analysis. In her argument against Axial Coding, Charmaz considers that relying on the application of a framework may "limit what and how researchers learn about their studied worlds and, thus, restricts the codes they construct" (Charmaz, 2014, p. 149). In recognising that the different versions of grounded theory "constitute a constellation of methods, rather than an array of different methods" (Charmaz, 2014, p. 14), a review of a number of constructivist grounded theory studies (e.g., Abrams & Curran, 2009; Hinton, 2013; Hunter, 2005; Penz & Duggleby, 2011; Reyes et al., 2018) indicated that both focused and axial coding had been used depending on the preferences of the researcher. In this case, the inexperience of the researcher with this form of analysis suggests the application of a more detailed framework for intermediate coding would be beneficial to achieving a more complete conceptual understanding of the construction of stress so the decision was made to use Axial Coding as the intermediate coding method.

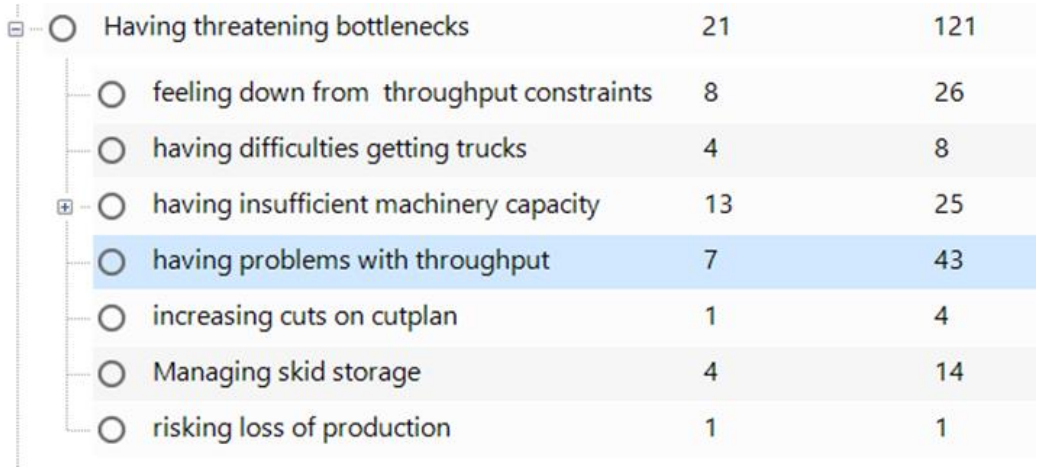
In Axial Coding, the process of building links between a category and its emerging sub-categories occurs through a specific set of relationships outlined in the coding framework (Kenny & Fourie, 2015). Using the logic of "when this happens, I do this, in anticipation of having this result", Corbin and Strauss (2015, pg 157) demonstrated the relationships between categories and sub-categories through three components:

- Conditions: the circumstances or situations (why, where, how come and when) that scaffold the social process being studied;
- Actions / Interactions: the participants' responses (by whom and how) to events, issues, or problems;
- Consequences: the outcomes (what happens) of the actions / interactions.

Using this framework, the impact of context (conditions and consequences) on actions / interactions can be analysed at all levels of the ecological system depicted in Figure 2.1 (Corbin & Strauss, 2015). That fits with the intention of the constructivist approach to learn "how, when, and to what extent the studied experience is embedded in larger and, often, hidden structures, networks, situations, and relationships" (Charmaz, 2014, p. 240). That analysis happened through looking for similarities and differences between the properties and dimensions of emerging categories (Corbin & Strauss, 2015). It could also involve comparing the properties of a category with higher-level social structures that might impact the conditions under which those properties apply (Corbin & Strauss, 2015). To facilitate more abstract thinking about the concepts inherent in a category or categories, comparisons were made with situations from the researcher's lived experience or from theoretical situations described in the literature (Corbin & Strauss, 2015). Other tools used from the Corbin and Strauss (2015) repertoire included noting participant's references to time when framing events which was useful for identifying context and process and cases that did not fit the patterns that were emerging within the data (negative cases). Through this analytic questioning the "researcher's subjectivity provides a *way* of viewing, engaging, and interrogating data"(Charmaz, 2014, p. 247, emphasis in the original). Working iteratively through the codes, and then with emerging categories, the coding framework and analytic tools were used to explicate the relationships between codes to generate categories and then group categories into increasingly higher-level categories (see Appendix 3 for an example of the analysis behind the development of a category). This process ordered the data around theoretical concepts that "subsume lesser categories with ease and by comparison hold more significance, account for more data, and often make crucial processes more

evident" (Charmaz, 2014, p. 248). Such concepts provide interpretive frames and an abstract understanding of relationships (Charmaz, 2014).

Figure 4.1 contains an example of a category developed through this process of constant comparison. *Having threatening bottlenecks* represents logs not flowing consistently through the process and appears when logs stack up in front of at least one operator while others are waiting for logs to arrive (the property). This is the category that contains the code *having problems with throughput* described in section 4.2.1 Initial Coding. The codes within the category represent the situations (the dimensions) when the participants reported that logs did not flow consistently through the process. Increasing levels of abstraction resulted in *having threatening bottlenecks* become a sub-category of *threatening targets or throughputs* which then became a sub-category of *threatening logger.*



Having threatening bottlenecks	21	121
feeling down from throughput constraints	8	26
having difficulties getting trucks	4	8
having insufficient machinery capacity	13	25
having problems with throughput	7	43
increasing cuts on cutplan	1	4
Managing skid storage	4	14
risking loss of production	1	1

FIGURE 4.1 AXIAL CODING

From this process of explicating relationships came the potential of identifying a core category or concept that "encapsulates the process apparent in the categories and sub-categories constructed" (Birks & Mills, 2015, p. 97). Given the experience of the researcher, guidance was sought from the more structured approach of Corbin and Strauss (2015, p. 189) who use the following criteria to define a core category:

1. It must be sufficiently abstract so that it can be used as the overarching explanatory concept tying all the other categories together.

2. It must appear frequently in the data. This means that within all, or almost all, cases there are indicators that point to that concept.

3. It must be logical and consistent with the data. There should be no forcing.

4. It should be sufficiently abstract so that it can be used to do further research leading to the development of a general theory.

5. It should grow in depth and explanatory power as each of the other categories is related to it through statement of relationships.

That meant using memos to trace connections between a concept that frequently occurs and all other categories and sub-categories, and their properties and dimensions, to enable the identification of a core category (Birks & Mills, 2015). As it happened, a core category emerged out of the process of sorting memos into categories and by diagramming the relationships between categories and sub-categories. There were also various attempts at writing a description of the core category which was then compared with Corbin and Strauss's criteria to test whether it had met the implied standard. Defining a core category is necessary for moving beyond intermediate coding in the development of any theory (Birks & Mills, 2015).

4.2.3 Writing Memos

Research Memos are a record of feelings, thoughts, decisions, insights and ideas with respect to the analysis process and the project in general (Birks & Mills, 2015). Charmaz (2014. p. 162) defines memos as "informal analytic notes that chart, record and detail" the analytic phases of a study and are the crucial intermediate step linking data collection, analysis and theory building to reporting findings. Writing such memos is a process that keeps the researcher grounded in the data by providing a discursive space in which to practice the constant comparative analysis and interpretation that ultimately leads to theory construction (Birks & Mills, 2015; Charmaz, 2014; Lempert, 2007). For the lone researcher, "memoing is an uninhibited activity in which you are free

to explore your ideas, instincts and intuition in relation to your research" (Birks & Mills, 2015, p. 40). As researchers engage more analytically in their memos, they lift the theoretical basis of their work (Bryant & Charmaz, 2007) . For Lempert (2007), memo writing is the means by which the researcher becomes sufficiently engaged in the data to enable a 'grounded' theory to emerge. The reflexive space within the memos did promote a level of freedom to think about what was happening within the data. Most importantly, however, once analysis got beyond the initial coding, the amount of data generated, and the breadth of that data meant that memos were the primary means of keeping track of what was in the data and providing a record of what codes and categories stood for.

While memo writing is a necessity, there are few guidelines for how to proceed (Corbin & Strauss, 2015). Charmaz (2014) suggests a free writing approach where the researcher is encouraged to write down whatever comes to mind about the subject or event that initiated the memo. Memos are not bound by writing conventions (Birks & Mills, 2015) and it is accepted they can be fragmented and incoherent as a result (Lempert, 2007). They should be considered 'open' throughout the project and rather than edit and delete content as things progress, updates were incorporated as additions, so as to avoid losing insights that might be invaluable later (Birks & Mills, 2015). In this way, memos helped to maintain a record of how thinking and the theory developed during the course of the research (Charmaz, 2014). To that end, Birks and Mills (2015) recommend memo writing commence with the project's conceptualisation. That is reflected in the guidance they have given on the subjects that may initiate a memo as follows:

1. Your feelings and assumptions about your research.
2. Your philosophical position in relation to your research.
3. Musings on books and papers that you have read.
4. Potential issues, problems, and concerns in relation to your study design.
5. Reflections on the research process, including factors that influence quality in your study.

6. Procedural and analytical decision making [particularly those decisions that resulted in codes being merged or eliminated through the process of comparison].
7. Codes, categories and your developing theory

(Birks & Mills, 2015, p. 42).

This list was the basis for memos written in support of this research study. Memos were written to capture 'why this project', the researcher's personal philosophical position and influences on the methodology choice as the proposal was being developed. In addition, memos were written to capture the logic behind any codes and categories, to keep a record of what was happening within the analysis, and to capture analytic thoughts arising from interactions with the data and participants and with papers that were being read to fill in gaps in understanding. They were also used to capture any diagrams used to visualise the process emerging from the data. Diagrams proved particularly useful in reducing data down to my perception of its core process. When developing codes and categories, raw data from participant quotes and field note observations was included as a means of clarifying and supporting analytical decisions. Through this process, the memos both facilitated and recorded the analytical processes required to generate the project's findings.

Memos needed to be organised (Birks & Mills, 2015; Charmaz, 2014; Corbin & Strauss, 2015). The development of categories and the core category were facilitated by sorting the coding memos (Corbin & Strauss, 2015) according to the relationships that were evident in the properties and dimensions of the codes or categories. That required a procedure for labelling and filing that ensured memos and their contents were easily recognised and retrieved (Birks & Mills, 2015). Memos were labelled by date and a description of their contents. They were captured electronically and stored both in NVivo and within folders on a hard drive according to the event that initiated the memo. A log was created to keep track of the memo's entry into the research journal and hyper-linked to assist retrieval.

4.2.4 Advanced Coding

This final stage of coding aims to complete the process of theoretical integration that began with the collection of the first piece of data. These are advanced coding strategies that support the level of abstraction required to produce a theory that is "both grounded in the data and demonstrates explanatory capacity" (Birks & Mills, 2015, p. 108). Birks and Mills (2015, p. 108) provided a working definition of what constitutes a theory. They see a theory as being an explanatory scheme that comprises a "set of concepts related to each other through logical patterns of connectivity". Building towards an explanatory scheme fits well with the constructivist approach. Although grounded theory relies on "empirical observations" it is also "dependent on the researcher's construction of them" (Charmaz, 2014, p. 232). As an abstraction, that "theory *depends* on the researcher's view; it does not and cannot stand outside of it" (Charmaz, 2014, p. 239). This project is a study of the frames or discourses through which the participants make sense of the situations and phenomena that combine to construct their experience of stress (Alasuutari, 1996). Through interpretation of those meanings and actions in situated events, constructivist grounded theorists "build from specifics to general statements while situating them in the context of their construction (Charmaz, 2014, p. 232). To facilitate that process of abstracting an explanatory scheme, bearing in mind the capabilities of the novice researcher, Birks and Mills (2015) advised the use of the techniques of storyline and theoretical coding. These techniques can be used once intermediate coding has achieved the following:

1. Having identified the core category;
2. Concurrent data collection and analysis has achieved theoretical saturation of the major categories (that is, additional data adds no further properties or dimensions to a category); and,
3. There is an accumulated bank of analytical memos, actively sorted according to the categorical scheme resulting from earlier coding rounds, to aid the formation of theory.

Given the level of explanation of these approaches within the literature (Birks & Mills, 2015; Charmaz, 2014; Corbin & Strauss, 2015) these were the methods used to integrate the theory presented in the findings.

Storyline is the process of conceptualising the story (a descriptive narrative) of the core category (Corbin & Strauss, 2015). The potential for a core category may be captured through a description of how categories and sub-categories integrate to form an abstract grounded theory of the area of enquiry (Charmaz, 2014). By developing a storyline, the relationships between the concepts that make up the theory are explicated, providing an explanation of the theory and the phenomenon under study (Birks & Mills, 2015). Completing the storyline paves the way for theoretical coding to proceed. Birks and Mills (2015, p. 119) explain theoretical codes as "advanced abstractions that provide a framework for enhancing the explanatory power of 'the storyline' and its potential as a theory". While also conceptualising the relationships between categories, theoretical codes may move the "analytic story in a theoretical direction" (Charmaz, 2014, p. 150). These can be codes derived from extant theoretical frameworks where they prove relevant to explaining the grounded theory (Birks & Mills, 2015; Charmaz, 2014). These codes tend to be adopted from within the discipline of the researcher or seconded from others when necessary (Charmaz, 2014).

Through applying the work of others to the storyline, the outcome of this study can be used to add to and validate existing theories and reinforce the value of the study's contribution (Birks & Mills, 2015). It is important, however, that this incorporation of extant theoretical codes happens outside of the storyline. The storyline is effectively the final product of the researcher's interpretations of the analysis arising from data generated for this study. The researcher's contribution needs to be transparent. At the end of theoretical coding there should be "no confusion as to which concepts have arisen from the data and which have been imported to add explanatory power" (Birks & Mills, 2015, p. 120)

This final stage of analysis serves two purposes. It is an aid to the generation of the final product of the study, a grounded theory, and it provides the means by which that theory can be conveyed to the audience (Birks & Mills, 2015). Corbin and Strauss (2015) suggest approaching storyline as a two-step process starting with a description, in a broad sense, of what appears to be going on here. The second step involves a statement of the main research findings using the categories identified in intermediate coding and the relationships to each other and the core category. Birks and Mills (2015, p. 114) have provided guidelines to support the writing of this conceptual summary memo:

1. Theory takes precedence.
2. Allows for variation.
3. Limits gaps.
4. Evidence is grounded.
5. Style is appropriate.

The theoretical constructs (that is, the categories and their relationships) are the focus of storyline, not the narrative behind those constructs (Birks & Mills, 2015). The relational statements linking the concepts derived from the data cover the variation found within the specific situation being studied (Corbin & Strauss, 2015). Writing the storyline identifies any inconsistencies in the grounded theory and encourages the return to the analysis required to complete the theory (Birks & Mills, 2015). Returning to the data to support the writing process ensures the storyline is grounded in the data and not produced and then imposed on the analysis. Finally, it is possible to present the theory in a compelling and interesting way (Charmaz, 2014). Categories not only allow the researcher to "conceptualize the key analytic features of phenomena, but also communicate a meaningful picture of those phenomena in everyday terms" (Dey, 2007, p. 167). Using those guidelines, a conceptual summary memo which presents a synopsis of the research findings was completed in both narrative and diagrammatic form and used as the basis for the consideration of theoretical codes and

frameworks that could help explain what was going on in the data (Birks & Mills, 2015). This memo is the basis for both the findings and discussion chapters below.

4.3 USING NVIVO

To assist with the process of analysis, the qualitative analysis software package NVivo was found to have a number of useful features. It proved effective in facilitating line by line initial coding of transcripts, as it enabled the researcher to keep track of which text had been coded and the codes used, and it then made working with that data easier through the coding structure. NVivo was also a useful place in which to create, store and manage the memos that captured coding decisions , analytic thoughts and the development of categories while coding was completed. Being able to link those memos to the relevant codes and categories for easy retrieval and display alongside the coding references assisted with the practices of constant comparison and with sorting memos that led to the development of the core category. Having a category and coding structure on display meant that as memos were sorted, the coding structure changed to reflect the developing categories. As transcripts were coded it was easier to keep track of what new codes were being created, which assisted with assessing when saturation had occured. Finally, referring to data within the writing up process was enabled by the easy access to reference data within the categories and codes.

4.4 STRATEGIES FOR ENSURING RIGOUR

The purpose of this section is to outline the criteria used to evaluate the trustworthiness of the study's outputs and the strategies used to ensure those criteria were met.

The debates around assessing the rigour of qualitative research have not yet settled on a standard framework appropriate across all methodologies (Liamputtong, 2013; Polit & Beck, 2018). While quality in qualitative research is something experienced researchers recognise, "explaining what it is or how to achieve it is much more difficult" (Corbin & Strauss, 2015, p. 341) Given the lack of a generally agreed standard and her position as the developer of constructivist grounded theory, the

framework proposed by Charmaz (2014) for evaluating constructivist grounded theory studies is perhaps the most relevant in this case. This framework is based on the following four criteria:

1. Credibility: Birks and Mills (2015) refer to this as the logic and conceptual grounding of the study. In this criteria, Charmaz (2014, p. 337) asks questions such as “are there strong logical links between the gathered data and your argument and analysis?” and “has your research provided enough evidence of your claims to allow the reader to form an independent assessment – and *agree* with your claims?” .
2. Originality: In this criteria Charmaz (2014, p. 337) reflects on the significance of the study with questions such as “how does your grounded theory challenge, extend, or refine current ideas, concepts and practices?”.
3. Resonance: Birks and Mills (2015) summarise this criteria as considering the need for the theory to make sense of the experience and the context in which the experience happens to those for whom it may be relevant.
4. Usefulness: Charmaz (2014) points to this criteria being an assessment of the utility of the theory to logging machine operators, specifically, and the wider population of machine operators, generally, and the potential of the study to contribute to ongoing development of knowledge.

The challenge for any researcher looking to use the Charmaz (2014) framework is that evaluation against criteria such as originality, resonance and usefulness can only be known after the study has been completed. Fortunately, for the novice researcher, Charmaz (2014) provides a way forward by acknowledging credibility and originality as the foundation for resonance, usefulness and any subsequent claim to contribution. As the understanding of ‘reality’ within a relativist ontology is essentially a consensus among co-constructors (Guba & Lincoln, 2004), it is understandable that credibility, the believability of the research, would be central to evaluating the trustworthiness of a constructivist grounded theory.

Trustworthiness, in this case therefore, requires both observation of the rules and standards of the methodology and the demonstration of that compliance within the report (Liamputtong, 2013). Birks and Mills (2015) outline a set of strategies for the novice researcher that aim to achieve compliance with these criteria. For them rigour is determined by:

1. Researcher Expertise: inherent in this study is a degree of inexperience on the part of the researcher, after all, learning the skills of a grounded theorist is part of the intention. However, Birks and Mills (2015) recognise that generic life skills based on life experiences are also relevant. In this case, experience with critical incident interviewing both as a recruiter and with offenders seeking work was relevant. As was the intention to use a pilot interview in a region outside of the designated study regions as a place to develop the research practice with the assistance of an experienced qualitative researcher.
2. Methodological Congruence: As discussed in Chapter 3, Birks and Mills (2015) consider this to be alignment between the personal philosophical position, the stated aims of the research and the methodological approach employed to achieve these aims.
3. Procedural Precision: in assessing this, Birks and Mills (2015) recommend paying attention to the maintenance of an audit trail through the memo-ing process, ensuring there are mechanisms to record, store, retrieve, analyse and review data and other resources that will be generated and collected in the process of the research; and demonstrating procedural logic by correctly applying the essential grounded theory methods. A number of actions were taken to ensure procedural precision. Within the sampling, efforts were made to include cases that did not fit the developing patterns (negative cases) to ensure those patterns could be adequately tested. Transcripts were checked by participants before inclusion in the data set. Early interviews, the coding of those interviews and development of categories was reviewed by an experienced qualitative researcher to ensure compliance with the prescribed coding procedures. Finally, the raw transcripts and the memos written

to facilitate analysis provided an audit and decision trail that tracked the development of the analysis from interview to conclusions on themes / categories.

In support of these strategies Birks and Mills (2015) developed a set of criteria for evaluating grounded theory research (see Appendix 4). These have been used in the design and execution of the study and the presentation of this thesis to assure the reader of the credibility of the outcomes.

4.5 ETHICS

As a context in which there is close interaction between the researcher and participants, in depth interviewing is effectively an intervention (Patton, 2015). Ensuring that interaction does not harm the participant is, therefore, a moral imperative. Being ethical in research is built on the idea that benefits accruing to some do not justify burdens imposed on others (Wilkinson, 2001). Ensuring that this ideal is achieved is the objective of the University's human ethics policy with regard to research involving human participants. Ethical approval to proceed with this research based on the guidelines set out in that policy was sought and received on 1 October 2019 (see approval letter Appendix 5). The policy guidelines required the following issues to be addressed.

4.5.1 ENSURING INFORMED AND VOLUNTARY CONSENT

To ensure respect and care for the participants the policy requires:

- participation to be voluntary and not obtained through coercion.
- that participants must be fully aware of the nature of the research prior to giving consent; and
- that participants have the right to decline to be interviewed or to withdraw at any time.

Achieving that started with the recruitment process. Whatever way in which a prospective recruit engaged with the researcher (see section 4.1 Data generation), the opening conversation involved disclosing that the research involved a face-to-face interview which would be recorded. It was explained that participation in the research was voluntary, which meant that a potential participant could decline to be interviewed. Furthermore, even if they agreed to be interviewed, they could still withdraw from the study afterwards (up to the point of the results being presented in the thesis or

other publications). They were also told that any information disclosed during the interview would be confidential and the procedures for achieving this confidentiality were reviewed. The prospective participant was then given an information sheet (see Appendix 6) and they were asked "if they would be willing to be interviewed". If they agreed, then we went through the consent form (see Appendix 6), signed it, and captured their email details for the transcript and the summary of the findings. In that process, it was reiterated that the participant could choose to withdraw at any time. At the end of the interview, the participant was reminded it was possible to change their minds about being involved and, that withdrawal from the study was possible via email, phone call or text, with the relevant contact details set out in the information sheet.

Once the interview was transcribed, participants were emailed a copy of the transcript to check. It was explained to participants that they were still able to withdraw if they no longer wished to be involved and their transcript would be withdrawn from the data. It was also explained that if they did not respond within two weeks that it would be assumed that consent to continue had been given.

4.5.2 Ensuring Culturally Appropriate Treatment of Māori

Guidance was sought from the University's Kaiarāhi Māori Research as to the requirement to consult with Māori and the appropriate conduct. This was required because the project involved Māori participants, data from Māori participants was included in the data set for the project and that parts of the Māori community may have an interest in the research results. Although it was not intended that Māori be singled out from the participants as an identifiable group or that there be statements made specifically about Māori and their experience of stress, that assessment was based on several features of the relationship between Aotearoa New Zealand's production forestry industry and Māori as follows:

1. Māori have a relatively high level of involvement in the forest industry as employees, contractors and as owners of forest and forested land, especially within the regions targeted

for participants. According to the Ministry of Primary Industries (2020), 37% of the forest and logging workforce identify as Māori. In the industry's latest available statistics on planted areas and land tenure, 404 812 ha (38% of Aotearoa New Zealand's total planted area) is listed as either Māori freehold or Crown Forestry Licence[4] (New Zealand Forest Owners Association, 2019). This means Māori are significant contributors to the forestry economy and vice versa.

2. Exposure to occupational health and safety risks are a contributor to Māori health inequities (McCracken, Feyer, Langley, Broughton, & Sporle, 2001). McCracken et al. (2001) suggest that one possible reason for the difference between Māori and non-Māori occupational fatality rates is the concentration of Māori in more dangerous forms of employment such as forestry and logging. As an objective of this study is to improve worker health and wellbeing, its findings could be of interest to Māori, particularly in those regions with high Māori involvement in the industry.

3. Government is targeting forestry as an area for development through the Billion Tree Planting program, the establishment of Te Uru Rākau and the Provincial Development Fund (Olley, 2018). This will likely increase Māori involvement in the industry as both employees and forest owners.

The submission to the Kaiarāhi Māori Research included two commitments. The first was to the appropriate application of Manaakitanga towards participants throughout the research process. The second required demonstrating respect for the participants' mana through control of the use of the data and acknowledging the value of their involvement through appropriate acts of reciprocity. Honouring those commitments meant:

[4] Crown Forestry Licenses separate the ownership of the land from the ownership of the trees on the land. The ownership of the land is held by the Crown pending any potential settlement of an Iwi claim through the Waitangi Tribunal

1. That meetings and interviews would be carried out in a culturally appropriate way. Hoskins (2012) suggested that for this process that meant:
    a. Meeting participants kanōhi ki te kanōhi (face-to-face), in a place of their choosing;
    b. Greeting appropriately which meant addressing Māori participants in Te Reo;
    c. Establishing history within the industry and location;
    d. Sharing kai (food); and
    e. Managing the ethics with aroha.
2. That the participants mana would be acknowledged through:
    a. The process of checking the transcript;
    b. Provision of a result summary at the end of the research (see Appendix 9); and
    c. Giving of koha (shopping vouchers were used) at the completion of the interview.

The process of organising and carrying out an interview were based on these commitments. However, the commitment to manage ethics with aroha required taking a broader view of the research than just that which applied to the interview. Pohatu (2004) provides a framework for managing the ethics with aroha through te take pū Āta which highlights the need to consider all aspects of the methodology when looking to build respectful relationships. When compared with the requirements of this framework, grounded theory as a practice demonstrates the deliberative and reflexive approach Pohatu (2004) sets out as the heart of the principle of Āta:

1. It aims to generate an explanation of a social process or phenomenon from the point of view of those who experience that social process or phenomenon. The explanatory theory is grounded in the participants' experience. As the intended outcome is to use that explanation as a basis for action and practice around that social process or phenomenon, it is, therefore, a means by which the participants can have an influence over their own social environment.

2. The aim of the data collection process is to get to the reality of what a participant has experienced and is expressing. In this case, data collection was via a semi-structured interview. While there are topics to discuss within the interview guideline, the intention was to have a respectful conversation led by the participant and encouraged to take the lead by the researcher through active listening.
3. Analysis within grounded theory is a deliberative practice where trustworthiness is a function of procedural precision (as defined in section 4.4 Strategies for ensuring rigour). Theory was based on breaking the data down into its elements and then looking for relationships between those elements. Analysis was completed concurrently with data collection so that the analysis informed the ongoing research practice. Decisions made within the analysis process were made reflexively and recorded in memos. The memos were the link between data, analysis and the explanation derived from the data.
4. The practice of memo writing is the heart of grounded theory research. It sets up a reflexive learning environment that creates the space to proceed with intention and awareness.

The guidance received from the Kaiarāhi is attached in Appendix 7. Although further consultation with Māori was not required it was recognised that there may well be a need for Māori to be consulted as part of the recruitment process. That was completed as contractors and health and safety influencers who identified as Māori offered to assist with the recruitment of participants. Before proceeding, these volunteers were given the opportunity to give feedback on the relevance of the topic to Māori operators, how to ensure voluntary participation within the context in which we were recruiting and the conduct around the interview.

Given that there was no way of knowing the ethnic identity of those who chose to participate it was decided to apply the same standard of respect and care to all participants.

4.5.3 Ensuring Privacy and Confidentiality

The policy states that the participants have an absolute right to privacy and confidentiality and that it must be assured at all times. The risk to that right was assessed to lie with the interview recording and the transcript. Privacy and confidentiality was assured by:

1) Storing the interview recording in a password protected file on the University's server and restricting access to the researcher and supervisors
2) Anonymising transcripts by:
    a) Referring to the participants in any publications using the number of their interview.
    b) Any reference to other people, organisations or locations was replaced by a code.
    c) Participant details and codes were kept in a password protected file stored on the University's server.
3) Requiring consent to be given by all participants for the data to be used by anyone other than the researcher (no requests to use the data by anyone other than the researcher were received).
4) Ensuring coded data could not be traced back to a specific participant through the content of the reference or the name of the code. That meant a few single reference codes were subsumed into the most appropriate code with more references.

4.5.4 Risks of Harm to Researcher and Participant

The two risks of harm were assessed as being either to the safety of the researcher or participant from being within the dangerous operating environment that is a forest and its logging sites or to the participant through distress given the nature of the interview subject (critical incidents). A plan for mitigating distress was included in the Human Ethics Committee application and approved as part of that process. Participants were warned about the risk of distress and the details of who to call if help was required (the 24-hour telehealth line, 1737) was set out in the information sheet and reviewed before the consent form was signed. They were given a copy of the information sheet once the interview was completed. A health and safety risk assessment and risk mitigation plan were

submitted to the School of Forestry for each field visit and approved by the Post Graduate Coordinator.

4.5.5 Data Storage and Future Use

All original data (recordings, transcripts) were stored and will be kept in electronic form in a password protected folder for a period of ten years on the University's servers as per the University's Research Conduct policy. Hard copies will be destroyed. Only the Researcher and their Supervisor will have access to that folder.

4.6 CONCLUSION – RESEARCH DESIGN

This chapter addressed the research methods required to produce a substantive theory that accounts for the variation in the data in a way that is congruent with the philosophy and theoretical framework of constructivist grounded theory. That congruence is one of the building blocks of rigour in a grounded theory study. Ethical approval to proceed with the research was given by the University's Human Ethics Committee on 1 October 2019. Data was generated from three groups of machine operators working in the Aotearoa New Zealand logging industry: Tainui Raukawa - Te Arawa Waka / Central North Island; Te Tai Rāwhiti / Poverty Bay-East Coast; and Murihiku / Otago-Southland. These three regions were considered to be representative of the variation present in the national industry. Recruitment of participants used a range of strategies aimed at minimising the impact of the industry's power structure on both participation and the nature of the data collected. A semi-structured interview was used to collect descriptions of critical stress incidents (what happened, who was involved, what helped and hindered resolution). The recruiting and interview process was designed to ensure it was culturally appropriate for Māori and that no participant suffered harm. Data collection and analysis ran concurrently in an interative process designed to use the later interviews to fill any gaps identified in the data through the analysis. Sampling continued until there were no additional codes created within an interview. That happened once 27 interviews had been completed.

Analysis consisted of three steps - inital coding, intermediate coding and theoretical coding – as per a set of procedures prescribed as congruent with the theoretical framework of constructivist grounded theory. Within this process, interview text was first dissected into incidents and then, using comparisons between codes, codes and emerging categories, and categories to categories, organised into concepts with increasing levels of abstraction. This process was facilitated by the computer-assisted qualitative data analysis software Nvivo. To ensure the process was private, confidential transcripts were anonymised. Memos were written to keep track of the properties of codes and categories and to trace the connections between frequently occurring concepts within the categories. That allowed the identification of a core category – a category that encapsulated the process that was evident in those concepts and connections. As a means of demonstrating rigour, memos also formed an audit trail that could support claims that grounded theory methods has been applied correctly. Once the core category was identified, a grounded theory was explicated by conceptualising the narrative inherent in that category and explained using extant theory. The grounded theory that conceptualises the process at the core of the construction of stress and coping by machine operators working in Aotearoa New Zealand's logging industry is described and explained in the next three chapters.

5 FINDINGS PART 1: LOGGING – A VALUED WAY OF BEING

5.1 CORE CATEGORY: SECURING A PLACE IN A HIERARCHICAL WORLD

Securing a place in a hierarchical world has been identified as the core category of this study. This is the category that "encapsulates and explains the grounded theory as a whole" (Birks & Mills, 2015, p. 12). The concept denotes that stress and wellbeing is constructed by the actions and interactions taken by machine operators to secure their place within the various hierarchies in which they live and work. The social hierarchies in which participant lives unfold are represented by the sub-process of constructing the valued way of being for those who operate machinery in the logging industry ('Logger'). Through this sub-process Loggers establish the preferences and adaptive tendencies that influence the things they value and the actions that define their practice and are part of the 'capital' that establishes their social position culturally, socially and economically. Logging is a valued way of being for those who operate machinery within the logging industry. It is, however, also a precarious way of being, made so through the interaction of this sub-process with the second sub-process contained within *securing a place in a hierarchical world.* This is the sub-process by which logger wellbeing is constructed responding to the events that threaten this valued way of being and coping with those threats from within the confines of their adaptive dispositions given the work resources they can access from the lowest social position in their work hierarchy. This is a hierarchy built around efficiency and risk: the most efficient extraction of profits for the least amount of risk to those who receive the profits. The logging hierarchy contains two other actors – forest owners / managers and contractors – both of whom have more power within the structure than loggers. The position of each of the actors in this hierarchy reflects the power they have over the primary resource from which the profit is extracted (the forest) and the secondary resources (machines and their operators) used to extract that profit and the economic, cultural and social capital they used to gain that power. Securing their valued way of being requires action from loggers that is limited to the resources they can control: their skills, time, and ability to influence the other two actors to use

the resources they control to the benefit of the loggers. How that contest for resources plays out impacts the health and wellbeing of the operators.

The core category of *securing a place in a hierarchical world* consists of five categories: *becoming logger, being logger, threatening logger, sustaining logger, and affecting logger*. If a process can be defined as the "adaptive changes in action-interaction taken in response to changes in conditions" (Corbin & Strauss, 2015, p. 153), then each of these categories represents a way point along a process that culminates in a health impact. Figure 5.1 shows the two sub-processes set out as a set of relationships between each of these categories (and, where appropriate, their sub-categories, e.g., *enabling, resolving, negotiating and overcoming*). This and the next two chapters will elaborate on the construction of that process as revealed in the data in three stages: firstly, by examining what it means to be a logger (process 1 in figure 5.1) and why it is valued (*becoming logger to being logger*); secondly, by looking at what conditions and actions-interactions threaten that way of being (*threatening logger*), how loggers, contractors and forest owners adapt to those threats (*sustaining logger*) using the resources they each control, and in those adaptations set up the potential for a health response by the operator / logger (*affecting logger* – see process 2 in figure 5.2); and, thirdly, by discussing the socio-cultural conditions that impact the distribution of power amongst the actors within that process and how that impacts the resource deployment decisions (*enabling, resolving, overcoming* and *negotiating*) that are critical to the health responses experienced by operators. Chapters five and six will explore the findings by describing the properties of the relevant categories and their sub-categories and illustrating it with specific excerpts from the interviews with the participants. Each of those chapters will finish with a theoretical explanation in support of the findings covered in that chapter. Finally, Chapter 7 will provide a discussion of the socio-cultural context in which logging is embedded and in doing so, explain the core category *securing a place in a hierarchical world.* The category structure that is the foundation of this core category is summarised in table 5.1 and set out in more detail in Appendix 8.

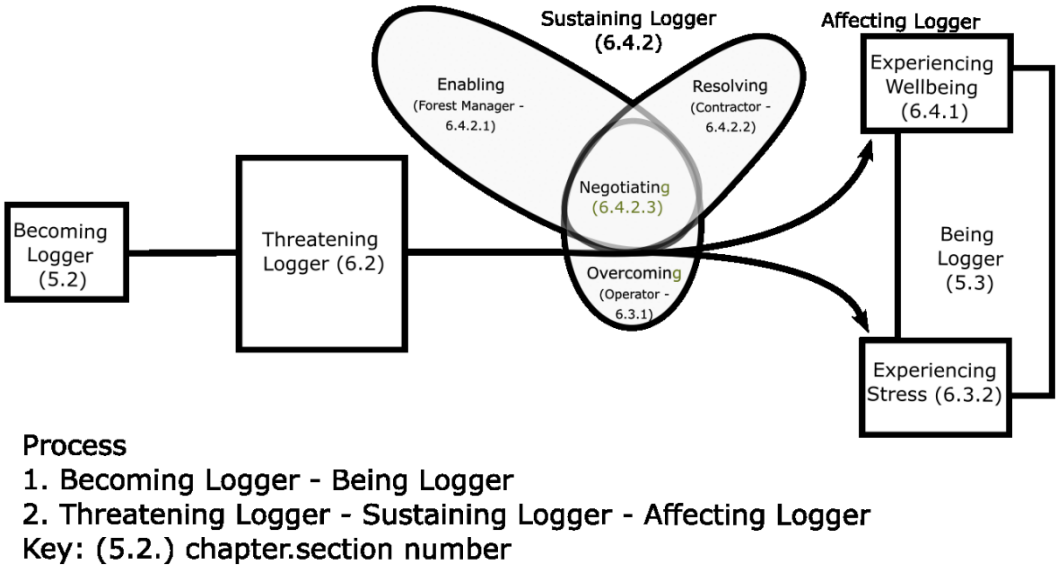


FIGURE 5.1: SECURING A PLACE IN A HIERARCHICAL WORLD

TABLE 5.1 CATEGORY STRUCTURE - SECURING A PLACE IN A HIERARCHICAL WORLD

Securing a place in a hierarchical world					
Sub-Process 1: Logger – a valued way of being		Sub-process 2: The pathways to stress and wellbeing			
Categories	*Becoming Logger*	*Being Logger*	*Threatening Logger*	*Sustaining Logger*	*Affecting Logger*
Sub-categories	*Preferring physicality*	*Feeling the pressure to produce*	*Threatening achievement of targets or throughput*	*Enabling*	*Experiencing wellbeing*
	Loving Challenge	*Enforcing crew hierarchy*	*Threatening sense of place in crew*	*Resolving*	*Experiencing stress*
	Relying on self	*Proving yourself*	*Threatening family wellbeing*	*Overcoming*	
	Belonging	*Logging as a means to an end*		*Negotiating*	

5.2 BECOMING LOGGER

As discussed in section 3.2 (The challenge of understanding stress), the process of constructing stress starts with an assessment by the participant that what is valued is threatened by some event happening within their environment (e.g., a machinery breakdown, a shutdown of the operation or an unachievable production target). The converse is also possible. Wellbeing is potentially enhanced by that event (Lazarus, 2001, as cited in Dewe & Cooper, 2012). *Becoming logger* sets out a way of being that is valued by the participants. Machine operators represent a group of (mostly) men who share a particular set of dispositions that determine how they will think, feel and act in any situation.

That shared set of dispositions incline this group towards an identity that is given life within logging and contributes a sense of belonging. Within the data the dispositions that define this group as something distinct are represented by the sub-categories *preferring physicality, loving challenge, relying only on self* and *belonging*.

5.2.1 PREFERRING PHYSICALITY

As a disposition*, preferring physicality* meant that the participants preferred approaching the world with an intensely physical orientation (sometimes at the expense of the mental, spiritual and social). This orientation was demonstrated by their love of physically demanding activity in the outdoors whether at work or in non-work activities, how they approached problems and their felt connection with the machines in their lives and the place they call home. Participants spoke of enjoying the physically demanding work they experienced when they first started in logging, prior to becoming an operator. Relaxing away from work meant hunting, fishing, cutting firewood, playing rugby, driving fast cars and riding motorbikes. They still saw themselves as working outside, despite recognising they were now sitting in a cab, e.g., P19:

> *Yeah, I just love being outdoors, eh. I can't be in a factory or some kind of job like that. Even though I'm in a cab, but I'm still outside.*

Being active and keeping busy was seen as the foundation of a happy and fulfilling life. One participant spoke about being "*a keep busy sort of person"* and expressed a fear of not "doing". Being able to act was a means of feeling like "*I'm taking control*". When being busy and taking action was not possible another participant spoke of thinking his "*life was over*" and that he would no longer be "*a man's man*". Finally, the world appeared to be defined by the 'physical'. The machine they operated and the place in which they lived were both 'actors' in their lives. In keeping with the relationship, the participants had with physical activity, the relationship with the machine was also an element of identity, e.g., P2:

> *Well, I take a sense of pride in my job in the machine I operate. So, I like to look at it and think that it's a pure reflection of what I, who I am.*

Many participants were still living in the location of their birth and had defined their work choice by its boundaries, e.g., P18:

> *Oh, it just was the industry around at the time, really. I had two options, the army or the forestry, and my partner didn't want to go to Waiouru, so it became forestry*

As one of the key dispositions that define *becoming logger, preferring physicality* meant the participants defined their place in the world in physical terms. Their sense of identity was founded on being physically capable and active, their ability with the machines they drove and operated and the place in which they made a life. *Preferring physicality* also established the nature of the challenges sought through the next key disposition in this valued way of being, *loving challenge.*

5.2.2 Loving Challenge

Loving challenge encapsulated the tendency of the participants to see their environment and the activities they undertake within it as a set of contests and challenges. In keeping with *preferring physicality*, problems were defined as something that was not working the way it should or presented an obstacle to something working. Fixing problems "*… gives you something to do, and then you do it and fix it, it makes you feel good about fixing it*" (P26). It meant overcoming difficulties

presented by the nature of the environment and it appeared to be critical to their identity, e.g., *"Every thing's [about] problem solve[-ing]. And that's where a lot of people fall over if they can't problem solve"* (P1). Furthermore, confronting risky situations provided the adrenaline required to eliminate the detested condition that is boredom, e.g., P6:

> *I get bored quite easily, and that's at work and not at work … The hardest part is trying to keep myself entertained … a bit of adrenaline here and there, yeah, for sure.*

Being able to make things work was seen as critical to this way of being. As P8 stated: *"… making shit happen is what I enjoy. When we're smashing it and we're going good. Or when we're not and we've got to fix the problems …".* For the participants, life is a physical contest between them and their circumstances and being effective at working out how to win is a key disposition within their valued way of being.

5.2.3 Relying Only on Self

A natural extension of valuing physical capability and the ability to overcome challenges and problems was the disposition reflected in the sub-category, *relying only on self*. This sub-category meant being personally responsible for one's own position within both work and non-work environments and not being dependent on others. The ability to 'stand on one's own feet' was considered 'freedom' something that appeared to be seen by the participants as working free from supervision or much control by others, e.g., *"There's not someone always over your shoulder … oh, there is, there's always people there, but you just do your job"* (P26). That included being free from the impacts of the poor performance of others on one's ability to do the job, e.g., "*… I've got these ideas of how I want to do the job, not how you want to do the job. And I'm trying to do it to the best of my ability*" (P2). That determination to do things their way carried over into non-work environments as well. One participant, frustrated with both the performance and cost of his solicitor, represented himself in the Family Court to get access to his children during an acrimonious family / whānau break up. That sense of 'freedom' was also encapsulated in the reasons given for working - feeding families, paying the bills and saving money to buy things. The way some

participants talked about others within their work environment suggested *relying only on self* was something of a 'test' that had to be passed to be considered part of the group, e.g., *"Bro, just because you're underperforming or your skills are not up to speed, none of that defers to me … I still got my professionalism"* (P12). That may reflect the experiences of some participants with unemployment and the fears of other participants associated with their lack of school qualifications, e.g., *"and it's a good-paying job, I'm not going to lie, and I don't have any school qualifications"* (P15). Unlike *preferring physicality* and *loving challenge, relying only on self* was defined not only by what it meant but also by what it did not mean, suggesting that this disposition acted as a boundary around this valued way of being called 'logger' providing a means of establishing who should belong within the group.

5.2.4 Belonging

As a result of those dispositions (*preferring physicality, loving challenge and relying only on self*) the participants saw themselves as *belonging* to a distinct group of people with one participant commenting that *"they are a different type of guy in the logging"* (P3). Within the group, physical skills and mental toughness were the currency, although there was an expectation that both would be demonstrated through action rather than words, e.g., "*you've got to be strong minded … it's going to be hard. No one's going to give it to you on a plate"* (P13). Some noted that that attitude was not for everyone, e.g., *"I've had a lot of workers who tell me they really want to do this but three days in you know they're just not cut for it"* (P1). Given that this was a selection mechanism which meant only those who had met the standard were still present, there was also little patience demonstrated towards those who struggle to measure up, e.g., *"I just find some of the guys I've … run into, it's just like, … you need a rocket up your arse"* (P22). For those that did measure up, the camaraderie that comes with that sense of belonging was really valued, e.g., *"you'd meet up with a good bunch of guys"* (P3) and *"…I enjoy the people …the little bit of banter"* (P20). All of which suggested that there were the feelings of amiability between those who are part of a group that comes from a shared set of values, attitudes and tendencies. *Belonging,* as a sub-category of

becoming logger, provides the references that indicate 'logger' is a valued way of being the participants recognised as having different characteristics from the other identities they interacted with, both at and outside work.

Becoming logger is a set of dispositions that appeared to come from similar life conditions and experiences and exist separately from the logging workplace. Even though most started working in the bush straight from school, the preference for challenging physical activities (rugby, boxing, hunting, fishing, cars and motorbikes) was already evident. Those physical capabilities were the means to get away from a place in which they saw little relevance to their future (that is, school), e.g., P14:

> *I was about 14. I didn't even do high school. I finished intermediate, just went straight into the big bush.*

Those who entered the industry later in life, came from work that was similarly demanding on physical energy and skills (e.g., dairy farming, agricultural contracting, army). Finally, a common theme amongst the participants was their attachment to where they lived borne out of connection through family / whānau and where they had been born. These dispositions (*preferring physicality, loving challenge, relying only on self* and *belonging*) are central to this way of being in the world. They represent a set of expectations on what is important and how that is expected to be achieved. Whatever situations the participants face, their actions and interactions will be guided by them. They have a significant impact, therefore, on the choice the participants have made to pursue work within the logging industry.

5.3 BEING LOGGER

Logging is a workplace in which the valued ways of being encapsulated in *becoming logger* can be embodied through the activities, expectations and 'rules' that define logging. It is a place where this group of people can comfortably enter the various contests that guide life within our hierarchical world with a sense that they have got what is necessary to secure their place. *Being logger* contains

the actions and interactions taken by machine operators to achieve this objective through the work they do. Participants spoke about actions / interactions that happened through their efforts to meet the expectations of the contract hierarchy in which they were working (*feeling the pressure to produce*). They also spoke about the actions / interactions they took to enforce the crew's hierarchy (*enforcing crew hierarchy*) and establish their place within it (*proving yourself*). Finally, they were aware that their place in the wider social hierarchies, in which the logging industry is located, was secured through what they were able to achieve through being a logger (*logging as a means to an end*).

5.3.1 Feeling Pressure to Produce

As the physical expression of the crew's objectives and performance, daily production is the central currency of the crew, and as such, it creates a felt sense of pressure to meet production expectations. When asked to talk about stressful incidents, the discussion invariably came around to production: *"It is a stressful job, to meet production and that. You've got to keep going, don't worry about that"* (P3). Both the daily uplift target and log throughput seemed to be equally important and representative of different things. For some, making daily uplift target was important because of its role in the contractor's piece rate contract with the forest owner, and therefore, its contribution to being paid. In the absence of target uplift as a key driver (either because it was not known or it was not sufficiently challenging), log throughput was more a driver. While daily uplift is highly measurable (loads leaving the skid per day), throughput was more of a feeling about how well wood was flowing through the work stations and was a source of both pride when it was going well (e.g., "*I try to just take a bit of pride and try to make things efficient*" - P2*)* or consternation when it wasn't (e.g., "*It would frustrate you when something in the line could have been done better but nothing was being done about it"* - P4*).* It was also a source of embarrassment if you were perceived as being the bottleneck (e.g., "*Yeah, so if I get behind, that's probably when I stress a bit*" - P16*)* which was made obvious to all by the stockpile sitting in front of your machine and the next machine waiting for wood. However, while it might appear to be pressure arising from some external requirement,

having a measure of one's capability and contribution so readily accessible was something that appeared to be highly valued by the participants. Several participants spoke about enjoying the production orientation because they could see what they had done both as a crew and personally. One participant with experience in civil construction work noted that a key difference with logging was the greater transparency over crew performance. Production, therefore, is a central plank in the embodiment of this valued way of being within the workplace. It is the 'battle' operators are looking for when they become loggers. It is the means of satisfying their desire to be physically challenged in their work (see section 5.2.2 Loving challenge above). As a concrete measure of competence and contribution, it provides a platform for the crew's expectations of each other and is the 'oil' that 'greases the wheels' of the interactions that go on within the workplace. It was how the participant's established their place within the crew (*proving yourself)*, the justification for any actions required to reinforce the lowly position of other operators (*enforcing crew hierarchy*) and the manifestation of their own objectives for *being logger* (*logging as a means to an end*). *As* P18 said:

> *Yeah. yeah. If you've got any involvement in the job and you've got a bit of pride in the job, you know … what needs to be done for the day and how much has to be pulled that day, so if you're down, you're always trying to do that bit extra and make sure we are getting it.*

5.3.2 Proving Yourself

Within a logging crew there is both a formal and an informal hierarchy within which each operator is positioned relative to each other. While the formal structure of crew owner, foreman and, sometimes, the 2ic[5] was made obvious through the roles and responsibilities, the informal structure was less obvious and the positions within it much more precarious. Positions within that informal hierarchy were secured through proving yourself. Positions could also be defended through actions / interactions designed to reinforce the hierarchy and ensure everyone knows their place within it.

[5] 2ic stands for second in charge. It is used to represent a worker who has formal seniority over the rest of the crew and is expected to stand in for the foreman in their absence.

Position within both hierarchies determined who had a say over the way work was organised and who knew critical information such as the target.

An operator's competence was part of the process of securing a position within the crew hierarchies. That competence was usually described in terms of the impact made on production or throughput and the responses from other crew members to that proof of competence. As described above, that competence was demonstrated through the relative sizes of the stockpile in front of each machine or the perception of 'keeping up' with the others (e.g.," I *take a wee bit of pride in knowing there's no big mound of wood there ready to cut up. I keep up with what's going on*" - P2*).* Position was also established through rites of passage. The traditional starting point for anyone within a logging crew (both ground workers – fellers, skiddies, breaker outs – and operators) was 'on the ground'. This could be considered an initiation. Participant 20 laid out that rite of passage in some detail: "*So, you'd start on the ground and all the different jobs, and then you pop on at smoko and stack a few logs and all the rest of it. It used to take about bloody eight years to get through".* He also noted the level difficulty of making that transition which is common to rites of passage for men into 'adulthood': "*And the reason it took that long is because, … to get on the machine, …you constantly got beat down and, "You've got to do five years on the skid like we all did," and all the rest of it."* What that meant, however, was that there was a clear progression within the crew which was reflected in the importance many participants gave to 'starting on the ground' (e.g., "*Yup, yeah. Started from the bottom … cutting up logs [on the skid] … cutting up logs and chain sawing, yeah."* - P14*).* So, progressing from the ground to a machine happened through being given an opportunity to try it, having some natural skills, and being willing to try (e.g., "*it's usually a natural thing. Some people have either got it or they haven't*" - P10*).* Those who had natural ability progressed rapidly and were given some leeway over their lack of time 'on the ground' (e.g., "*And I've heard a lot of them say that, that they were surprised at how quickly and how well I could do the job*"- P26*).* Capability was developed mostly through practice, making mistakes and learning from them and because of its impact on position within the crew hierarchy, training was valued. However, an

individual operator's capability was also a concern for the rest of the crew. Whether out of concern for their own position within the crew or a desire to see better performance, the other operators ensured participants knew their place (*enforcing crew hierarchy*).

5.3.3 Enforcing Crew Hierarchy

While operators committed time to establishing their position within the crew hierarchy through competence and time 'on the ground', they also engaged in actions / interactions aimed at defending their position through reinforcing the hierarchy itself and the relative position of each crew member. Position on the hierarchy appeared to be based on experience and / or length of service with this crew, proximity to the crew owner and compliance with the key dispositions of the logger identity: physical capability, mental toughness, and action orientation. Participant 4 noted that "*it's definitely the older boys"* who held power relative to their work mates "*no matter how long they've been in there or how long they've been in the crew, they just think they know better."* The expectation from those older workers was that new or inexperienced operators would make an effort to fit in and "*take the good with the bad and go in there and do it and take the knocks and the bangs that goes with it, and the growls or whatever..."* (P18). Fitting in also meant keeping your own counsel until you had established a position which allowed you speaking rights (e.g., *"Yeah, you got to earn your stripes. Yeah. Can't be talking shit that you don't know anything about. "*- P12). That meant logging can be a particularly hard place on younger operators. The younger participants referred to the challenge of starting within a crew with one participant suggesting it was "*the hardest part* [of starting] … *but just being that you had no experience, you mean[t] nothing to anyone"* (P6). As these references suggest, the hierarchy was self-policing, with various mechanisms for putting crew members in their place. These mechanisms included making the 'recalcitrant' crew member the butt of the crew's banter, ignoring them, and being unwilling to help when they were having difficulties. Participants also spoke about witnessing or resorting to physical violence to bring crew members back into line or to sort out disagreements.

Operators worked every day within two social hierarchies that place operators in positions relative to each other. Those hierarchies distribute power within the crew and influence over both the forest owner / manager and the contractor. Power relative to others within the crew determined who had a say over who did what within the crew. In the most hierarchical of crews that meant the machines themselves were positioned within the hierarchy (e.g., *"when I took the job, I said to the boss … Am I going to be upsetting anyone? A 20-year-old coming in and learning this digger, like am I not cutting anyone's lunch?*" – P5) and operating positions had to be earnt. Operating key positions such as the harvester, the prime mover, the processor and the loader (the 'spine' of a logging crew) often meant more contact with the contractor and the forest owner's supervisor which gave those operators the opportunity to influence the decision making of those more powerful actors (e.g., *"if you build up a really good relationship with your boss and your supervisor… we can work things and she's not afraid to tell me if I'm wrong and I'm not afraid to tell her*" – P2). That power and influence, that comes with time, skills and fitting in, are critical resources in securing a place within the wider socio-cultural hierarchies in which logging is located, especially as that position within the crew was often linked to the material rewards achieved through *being logger* (*logging as a means to an end*)

5.3.4 Logging as a Means to an End

The participants saw work as the means of accruing the resources necessary for making their way in the world outside work. As would be expected from a community that values self-reliance, how they and their families made their way was seen as being their responsibility. For most participants that clearly meant providing resources for their family's wellbeing: e.g., "*We've had nothing from no one. Well, it's on me to make sure I do well out here so I can provide for us."* (P12). For the individual, this narrative is like that of the 'self-made man': starting with nothing, working my way up and *"then I've ended up here"* (P13). However, for some participants, self-reliance was not necessarily a reliance on the individual. Working with family / whānau in the same crew pointed to a more collective view of self-reliance. Senior crew members either as the owner of the crew or as a foreman took the opportunity their power gave them to include family / whānau members in the business: e.g., *"My*

eldest … that's [the] partner on the loader … quite a few of them are related to me [and] that's good" (P16). When asked about what resources they got access to through their work, participants spoke mostly about money, either as income or credit, reflecting their tendency to see the world in material or physical terms. Most participants considered the money was good, making the work more attractive, particularly as it appeared to get over the threshold of what was required to buy their own home rather than rent (e.g., *"I've only got a year to go and my mortgage is paid for, and then I'll be picking fruit in a campervan, I can tell you … I won't need that extra money coming in"* - P3). But there was also recognition that their time was a key resource for the family / whānau. Participants spoke about the trade-off between time and money, particularly with respect to the family / whānau. For some, the financial security and opportunities provided by working long hours offset the lack of time with the family / whānau. Working "*massive hours, before we had kids*" was done because "*getting paid quite well* [I could] *get in and make a pig of myself and get that house deposit and all the rest of it"* (P20). For others, the work-family conflict was accommodated by the working day starting a lot earlier than the school day, meaning work and school finished about the same time, e.g., *"so finish here at three, I'm home by half past three … [just as the] kids [are] getting home from school"* (P8). Through these explanations of why they worked the participants confirmed their pre-disposition towards relying only on oneself. The benefits of work were explained in physical terms and the value they placed on those benefits was demonstrated by the sacrifices they and their families were prepared to make with their time together.

The workplace is where 'logger' as a valued way of being was exposed to the hierarchies in which the operators were located. Within the workplace, the contests within the hierarchies intersect and influence the actions / interactions operators take in pursuit of securing a position within those hierarchies. Those actions centre around ensuring production expectations were met, either as a daily production target or as the flow of wood through the process (*feeling pressure to produce*). Earning one's place within the crew revolves around a worker's position relative to that production process (*proving yourself*). As such, the production process provides a place for rites of passage such

as working in manual or motor manual work 'on the ground' before moving into a machine and demonstrating capability and skill as an operator. Defending that position relies more on fitting in with the crew, knowing your place and ensuring your actions speak louder than your words (*enforcing crew hierarchy*). Finally, the position within the crew is valued because of the resources it provides to the operators (*logging as a means to an end)* and, in seeking to rely only on themselves, the operators and their families are prepared to make significant trade-offs around the most significant resource they have: their time.

5.4 EXPLAINING LOGGER AS THE HABITUS OF A SPECIFIC MASCULINITY

Both categories, *becoming logger* and *being logger*, can be explained theoretically as the habitus of a specific masculinity. Bourdieu (1990, p. 53) defines habitus as "systems of durable [and] transposable dispositions." Within a habitus, individuals will have amiable and reciprocal relationships with each other and with the social space they occupy (J. Lee, Shirmohammadi, Baumgartner, Oh, & Han, 2019). Habitus is constructed through social discourse and different life events and experiences shared by the group (Mellström, 2004) and it directs the way the group will engage with the world in which they live (J. Lee et al., 2019). In this case, that social discourse is dominated by men who use the process of bonding to confirm ideas and practices about their masculinity and, what within their habitus, is meant by 'manhood' (Mellström, 2004). That reflects the nature of masculinity (and gender, in general) as a relational practice (Brandth & Haugen, 2000; Law, Campbell, & Schick, 1999). Within that relational practice, masculinity is being actively constructed. Rather than being a set of ideals, stereotypes and roles that are received and incorporated by individuals, here masculinity is being treated as something that we 'do' rather than something that we 'are' (Connell & Messerschmidt, 2005; Law et al., 1999; Lorber, 1994; West & Zimmerman, 2002). Looking at the habitus of logger through this lens means being aware of not only the relationships between those whose dispositions sit within the habitus, but also the relationships between this and the other masculinities that may be found within the field of logging (Brandth & Haugen, 2000). Those masculinities will differ based on history, occupation and class. As gender is

one of the ways in which humans organise themselves, their communities and their societies (Lorber, 1994), masculinities can be understood as something more than just relations of difference but also as relations of power (West & Zimmerman, 2002). Habitus is, therefore, associated with "asymmetrical relations of power at work" (J. Lee et al., 2019, p. 1468) which makes it a lens that is useful as a platform for understanding how wellbeing could be constructed in the pursuit of a place within a hierarchical world. Considering 'logger' as the habitus of a specific masculinity lends itself to explaining the fraternity evident within the data, and as the rest of the findings are explored, the position of that fraternity in the world and its precarious nature.

Given the explanation of masculinity as a relational practice, we can expect similarities between the dispositions emerging from the data (e.g., love of physically demanding activities, attachment to place and machines, responsibility as provider / parent) and those evident amongst masculinities formed in contexts like logging (male dominated, rural, machine based) both in Aotearoa New Zealand and overseas. The operator participants in this study embodied those dispositions in their workplaces through their commitment to meeting production expectations as an expression of skill, establishing a status hierarchy within the crew based on perceptions of those skills and the need to prove yourself through actions rather than words. Loomis (2017) noted that hard, heavy work in dangerous conditions within the logging industry in the NW Pacific (USA) led to the construction of a proletarian masculinity based upon a brotherhood of men who toiled in the forest and possessed or developed the attributes necessary to survive in those circumstances: hardy, physically capable, independent, and self-reliant. In exploring the construction of masculinity evident in the men who worked at two manufacturing sites in Mataura, Aotearoa New Zealand, Lovelock (1999, p. 128) found that "… a real man worked hard to support his family, often had to do dirty work, was tough and strong … and communicated through work that he did, not through what was said" . Within that group, notions of skill were used to determine social status. Men who worked in the Norwegian forest industry were described in similar ways within the Norwegian Forestry Press (Brandth & Haugen, 2000). They were attributed qualities such as being hard working and tough, along with

values such as independence, freedom and comradeship. Work was portrayed as a series of 'battles' with the workers having to achieve mastery over the natural world: the trees, the terrain and the weather (Brandth & Haugen, 2000; Loomis, 2017). Mastering machines was also an important element of this masculinity as it bestowed power on these men over those who did not have the skill set. Along with this sense of power, control and mastery, Mellström (2004, p. 372) found that "sensual delight and powerful emotions" were derived from interacting with machines for the mechanics and engineers he studied, with benefits to their sense of self-esteem and joy. In that relationship, the machines themselves can be gendered and given a place in the social world that allows them to be acted upon and reacted to as if they are members of the social group (Lovelock, 1999). As such, the machine contributes to the relational construction of the masculinity and for the men, the machine provides the means by which they acquire an identity: it is part of what it is to be a man (Brandth & Haugen, 2000; Mellström, 2004).

As can be seen from the participants' references to the policing activity going on within crews (see 5.3.2 Enforcing crew hierarchy), "gendered norms and expectations are enforced through informal sanctions of gender-inappropriate behaviour by peers" (Lorber, 1994, p. 32). When some of these norms and expectations (e.g., being competent to do the work) arise out of the groups need to be safe in the face of harm from exposure to physically risky work conditions, then that social control takes on an extra edge. In this case, the forms of social control evident included humiliation, ignoring, refusing to help and in the worst cases, physical violence. The nature of these social controls seems to be a function of dangerous and risky workplaces. Walker (2006) suggested that a social system in which the behaviour of an individual can have drastic and harmful consequences on another leads to "intensive informal social control" (Walker, 2006, p. 10). In his study of the masculinity evident at a mid-Western grain company, Walker (2006) noted two forms of social control by the experienced men over those with less experience and proven competence: humiliation and ignoring / excluding. Haas (1974) suggests these behaviours are not just a function of the risky and dangerous environment but also a response to the way in which the skills to operate

in that environment are developed and maintained 'on the job'. This is also like the logging environment where operators talked about the importance of 'starting on the ground' and proving your way into a machine. While this work is unlikely to develop the skills required to operate a machine, there is the opportunity to observe operators in action and for those operators to build faith in those lacking experience. In this explanation, humiliating banter is a way of testing self-control (and, therefore, trustworthiness) and of passing critical information from one crew member to another without having to reveal anyone's ignorance (Haas, 1972). It is also a means of demonstrating acceptance. As the more experienced crew members gain some confidence in the competence of new crew members they become more accepting of push back against the banter, indicating trust without having to say so directly (Haas, 1972). In this way, the group can take action to protect itself without anyone having to admit to having felt fear and admit new members without being 'emotional'.

In conclusion, the categories *becoming logger* and *being logger* can be explained as the habitus of a specific masculinity. That means they represent a durable set of gendered dispositions that are constructed in the relationship's logger operators have with themselves and other actors in the field (contractors and forest owners / managers). Those dispositions include a love of the physically demanding, being a good provider and parent to their families, an attachment to place and seeing their machines as an essential part of their masculinity. Compliance with the norms of the group is policed by those who have the status to do so based on their experience and skill. As a way of 'doing' masculinity, actively built in relationship with other ways of 'doing' masculinity, the habitus of logger can be understood as something more than just a different way of 'doing' masculinity. As both gender and habitus represent ways in which power is distributed amongst actors within settings, communities and societies, the habitus of the logger operators will be associated with the division of power between them and the contractors and forest owners / managers. Explaining this valued way of being through this lens contributes to an understanding of the construction of wellbeing in two ways by:

1. Providing a means of understanding why an event is threatening; and
2. Providing a platform for explaining why the participants acted towards those events in the way that they did.

Explaining logger as the habitus of a specific masculinity provides the process of securing a place in a hierarchical world with events, actions, and consequences to wellbeing. These events, actions and consequences are the subject of the next chapter.

6 FINDINGS PART 2: THE PATHWAYS TO STRESS AND WELLBEING

6.1 INTRODUCTION

If *becoming logger* and *being logger* establish the place in the world that participants want to secure, then the remaining categories encapsulated by *securing a place in a hierarchical world* (that is, *threatening logger, sustaining logger* and *affecting logger*) represent the pathways that contribute to the wellbeing experienced as a result of securing that place. This part of the process is the transaction between the person and some threatening or challenging event happening within their environment (Lazarus, 2000, as cited in Dewe & Cooper, 2012). The health outcome is generated in appraisals made by the individual of 'what is at stake' and 'what can I do about it' (Lazarus, 2001, as cited in Dewe & Cooper, 2012). In this case, 'what is at stake' is defined by *becoming logger* and *being logger.* The purpose of this chapter is to continue to elaborate and explain the construction of the core category, *securing a place in a hierarchical world* by considering the process in three stages. Firstly, it will look at what conditions and actions / interactions threaten the logger identity. Secondly, the chapter will consider how the operators adapt to those threats and in those adaptations set up the potential for a stress response. Finally, by exploring what wellbeing looks like for the participants, the chapter will consider what resources might be required to increase the potential for wellbeing as an alternate to stress. The chapter will finish by providing a theoretical explanation for the role of resources in the construction of stress and wellbeing.

6.2 THREATENING LOGGER AS A VALUED WAY OF BEING

The potential for stress is created by the obstacles that get in the way of *securing a place in a hierarchical world* through the performance of the logger habitus. As 'logger' is argued to be the habitus of a specific masculinity (see section 5.4, Explaining logger as the habitus of a specific masculinity), these obstacles can be thought of as threats to the operators' sense of 'logger' manhood. This is the case whether they are threats to the physical reality of logging (e.g., uplift / production), threats to the perceived reality of logging (e.g., production targets) or direct threats to

a logger's positions within the crew or family / whānau. Such obstacles can be found in both the workplace and at home and have been encoded to three sub-categories of *threatening logger*, namely: *threats to achieving production targets or throughput*; *threats to a sense of place within the crew*; and *threats to family wellbeing*. Each of these sub-categories is now explored.

6.2.1 Threats to Achieving Production Targets or Throughput

Given the place of production targets and throughput and the need to prove oneself within *becoming logger*, it could be expected anything that directly impacts the crew's ability to achieve the daily production target or maintain throughput[6] was referred to as stressful by the participants. If proving one's masculinity is dependent on the contribution made to the crew's production or throughput then, when expectations are not met, manhood itself is questioned. What threatens production also threatens masculine identity.

Participants pointed to several obstacles that prevented their crew from achieving the level of production or throughput they expected. These can be summarised as insufficient capacity, bottlenecks, the crew not working well together and bad weather. Logging is a linear manufacturing process (harvester – prime mover – processor – fleeter / loader) dependent on several inter-related factors for throughput. The most obvious factors were the capacity of the machines and the capabilities of their operators. Participants noted that if there was not sufficient capacity in the machine / operator combinations to get the work done within the required timeframes, then the crew would end up working late to make up the required production (e.g., *"if you're behind, you're going to end up working late, you're going to end up working extra to try and keep it ahead*" – P6). That made the crew heavily dependent on each operator being available, especially as mechanised crews have less of the ground workers that can cover for missing operators (e.g., "*Before, when you were on the ground and you could train a chainsaw operator up or you had two or three chainsaw*

[6] Throughput is defined here as the number of logs flowing through the logging process

operators …, they'd jump on a machine" – P18). Breakdowns that limited the machines availability had a similar effect unless there was a backup machine.

Storage capacity also impacted the capability of the machine / operator combination particularly around the processor and fleeter / loader. If the skid storage capacity was too small for the volume of logs that must be stored and the machines that are operating there, then the skid became a bottleneck and production was negatively impacted (see figure 6.1). The storage requirement was a function of two factors. Firstly, the availability of log trucks to maintain uplift away from the skid, e.g., P2:

> s*oon as the trucks stop coming wood builds up on the landing and then the wood builds up in front of me and then … I can't do my job properly. … it usually ends up with a big mess because … the logs start going everywhere*

Secondly, the number of log-sorts the forest owner requires the crew to cut, e.g., P16:

> *the loader drivers got to find room for 10 cuts, hey? And then, the old processor man runs out of cutting room, he gets pissed off. And you're not moving the wood*

If there was insufficient capacity in the machine / operator workstations or in the infrastructure the forest owner provided the crew to work with, then production expectations were not met.

Being a linear process, throughput can be vulnerable to bottlenecks at a workstation based on the machine / operator combination's capacity, the amount of work they must do to maintain a flow through the process and the ability of the crew to coordinate their work. As P4 noted: "*if you're at the slower link in the chain, you've just got to work through the smoko while they're not working, or you've got to reduce your maintenance for the day or you've got to something to try to make it flow, be able to stay a bit later during the day."* While bottlenecks could result from the workstation's capacity, it could also result from the crew not working well together. The participants complained about crew relationships that became an obstacle to throughput because operators could not

Figure 6.1 Example of a skid operation, where the stems are extracted using the yarder in the background, then cut up into logs and subsequently sorted and stacked for loading out (photo courtesy of Phil Taylor)

synchronise their actions. When asked to talk about a stressful incident, this sort of response from P21 featured: "*I'm up his ass all the time. But he won't go out of his way to stay back … He can do it way better. You can see, if he wants to have a day off or something like that, he'll just mow the wood down. So, he could be ahead and bunch wood. He could do it way better.*" While that highlights the need for operators to be able to coordinate well, it also points to the significance of some of the actions taken by crew members to discipline others to enforce or maintain the informal hierarchy (see section 5.3.3, Enforcing crew hierarchy" above). Actions like not helping when needed or ignoring crew members have significance amongst operators because of their impact on throughput.

Finally, inclement weather makes travelling across the ground more difficult, it slows operating on the skid as it gets muddy and it limits the ability of trucks to get to the site, e.g., P18:

> *I guess weather. It does get to you after a while. That causes stress because, I mean, you'll be going along on a good [landing]… and it's going good and then it pisses down and everything*

you were doing just turned to shit because you're struggling to move and you're trying to get things out

However, the challenge posed by the weather is also an essential part of the 'battle' with nature that helps define the logger identity. Yet, P18's comment that "*it does get to you after a while*" suggests that there are limits to this challenge. It suggests there is a period of time after which exposure to this obstacle stops being a motivational element of the 'battle' and becomes a stressor.

What was considered acceptable production or throughput was determined by comparing a certain level of activity against some expectation. Throughput was something of a felt experience (e.g., "*I've got it structured for the day and I know where I need to be"* – P22) in which things felt 'right' or operators were responding to either wood piling up in front of a workstation or machines left waiting. Production was something more measurable. It was defined in tonnes per day (as per the contract) and usually converted into loads per day of uplift. The production expectation (the 'target'), therefore, was set within the logging rate agreed between the contractor and the forest owner or manager. Not meeting the target created the perception that production or uplift was not adequate. Threats to the perception of adequate production, therefore, not only came from the obstacles to actual production but also the implicit agreement that the target was achievable. On this basis, participants pointed to three obstacles to the perceived 'fairness' of the target: unachievable targets; difficult relations with the forest owner / manager (or their supervisor); and, being measured by either the forest owner / manager or the contractor. Daily production targets could be set at a level greater than the crew capacity, given the nature of the trees to be harvested (stems per hectare, average piece size to be extracted), the terrain, the haul distances, the skid size and the log cut plan. This meant the crew was physically unlikely to meet the daily target which had ramifications for the logging company's monthly cashflow. Failure to meet that target created pressure within the crew, e.g., *"been in a forest before … where they've wanted so much out of there, which we were coming so close, but we got to a certain point in the block where we just couldn't do it anymore, and the pressure was mounting on us, obviously."* (P6). That tension was felt

because of what making target meant to the operator. It was seen as the point at which the crew's capability was confirmed and their ability to provide for their family / whānau was secured.

Given what was at stake with the production target and its place in the calculation of the logging rate, there was some potential in the situation for disagreement and even conflict between the crew and the forest owner / manager and their staff. However, that relationship went beyond solely being about the price. The forest owner / manager controlled both of the logistical elements adjacent to the logging process and through that control, had a significant impact over the crew's throughput. Those logistical elements were, firstly, the skids on which the logging crew relied for storage, operating space and access for trucks; and, secondly, the roads and supply of trucks required to uplift the production. This was the point at which the logging crew got paid. The forest owner / manager also had a significant impact on the daily work content, the storage requirements on the skid and the likelihood of securing uplift through their role in setting the log cut plan. To a significant extent, the relationship between the forest owner, the forest owner's supervisor and the logging crew (contractor and operators) determined the successful execution of the contract and, when it was not working, it was something of a threat as noted by P20:

> *And then when you get into a situation where there's a genuine problem, and they're* [the forest owner / manager's supervisor] *out of their depth, you can't have a good honest conversation with them, because once they realize that they're out of their depth or they can't come up with an answer, they just put it all on you, "You just have to manage it. You'll just have to manage it." It's like, "What the fuck does that look like," you know?*

With the advent of computer assisted log processing, throughput as measured by the number of logs and log grades cut, can be known at any point of the day and reported back to the forest owner / manager. That level of scrutiny was perceived to raise questions about the level of trust the forest owner / manager had in the operator and crew. One participant noted that *"the level of surveillance is way more than it used to be",* explaining that he felt his professional capability was being

questioned. Another noted that the numbers were always just there on the screen and that it was a *"constant pressure"* that those not operating a processor did not have to endure.

Threats to actual throughput and the perceived adequacy of that throughput were a direct threat to the wellbeing of operators because of the place of production in both the operators' perception of their skills and capabilities and the crew's financial security. Participants pointed to several threats to actual production: insufficient capacity, misalignment between workstations that resulted in bottlenecks, crew relationships that got in the way of the coordination of workstation activities and bad weather. They also pointed to several situations in which the perception of the adequacy of that throughput was threatened: unachievable production targets, difficult relationships with the forest owner's staff and the sense of being continually measured. These factors added to the sense of pressure to produce and when that informed a sense that the crew was failing to meet expectations it had a material impact on their identity and financial wellbeing which then threatened their sense of place in the world.

Having examined *threats to achieving production targets or throughput* we are now able to consider the sub-category *threats to a sense of place within a crew* and the obstacles they present to *securing a place within a hierarchical world.*

6.2.2 Threats to a Sense of Place Within a Crew

Any situation that threatened either the recognition of personal capability and experience or having input into the way the workplace or crew was organised and operates seemed to threaten the participants sense of place within the crew. These threats appeared to arise within both the formal (owner, foreman and sometimes, 2ic) and informal hierarchies that existed within the crews and were spoken about as threats to productive relationships (*challenging crew boss or owner*). In some crews, authority appeared to be concentrated around the crew boss and /or foreman so that operators had difficulty knowing what was expected of them and where they stood in relation to those expectations, e.g., "*it's just all secret. Everything seems to be secret squirrel within our crew of*

what's going on. You never seem to know what's going on" (P21). Furthermore, the leadership and managerial skills of those within the leadership structure did not necessarily lend themselves to ensuring productive one on one relationships with operators, e.g., P17:

> O*ur boss, … [he'd] turn up and … sit in the ute, and wind down his window that much and watch you, he'd never interact with you. Never talk to you, only if you fuck up, it would be, "Oi," you'd get a big blasting.*

However, achieving influence within that formal hierarchy was impacted by more than just the nature of the relationships within the hierarchy. Most operators were being paid on an hourly rate which, while recognised as not as secure as a salary[7], was considered preferable to being paid on a piece rate per tonne of uplift. However, it did mean that long hours were embedded in the work. Being a hard worker, an essential element of the operator's efforts to secure a place within the crew hierarchies, was not just dependent on skill and capability (that is, the performance of the machine) but was also dependent on 'putting in the hours', e.g., P2:

> *But now I know that I do my 10 or 11 hours a day and go home and my wages will still be there and it's not a problem, you know. … It's taken a lot of pressure off my shoulders as the old mortgage gets paid and everything else, it's just gone to work, and I make my money. I'm not worried, you know.*

While some of the lack of clarity over expectations and being able to have input came down to poor management of the formal authority relationships within the crew, that situation was enabled by the contractual arrangements within the employment relationship. When improving the efficiency and effectiveness of the crew's operations comes at a cost to the primary reward sought for working because the hours of work decrease, then the incentive is to 'shut up and put up with it', e.g., *yeah, you just do your job (P21)*.

[7] On an hourly rate, if there is no work, there is also no pay

Similarly, the way that authority was derived in the informal hierarchy also impacted the operators' sense of place through its impact on identity. Who controlled what and who got to have a say on how the crew operated was a clear indication of who mattered on the job (Hicks, 2015). In talking about stressful incidents, some participants referred to situations in which they did not feel like they were in control because that control seemed to reside in someone else, e.g., *"I don't like when I'm not kept in the loop of what's going on with my operation, because I don't know how far ahead, I need to be"* (P13) or because the elements that needed controlling were not controllable, e.g., "*People, weather, breakdowns, those three main things, no one can [control]. So those three things are what stress me out"* (P16). Similarly, who could legitimately have a say on what went on in the crew, was also taken as a sign of where one stood within the informal hierarchy*: e.g.,* P5*:*

> *The hauler driver just had so much say in what I did so, you'd get a week ahead, I mean, he'd be like, "Oh, no. I need you to feed the ropes" so I would spend the next week down the hill … then they'd go to the end of the week and there'd be no wood on the deck.*

Not feeling able to speak up appeared to invoke a sense of powerlessness*, e.g*., "*I've learned to retreat into my own bubble and just look after what I can look after"* (P12). Wajcman (1991, as cited in Lovelock, 1999) suggested that this lack of power and control over social relations is a reason why the machine figures so prominently in the construction of operator masculinity. The machine is given the status of 'personhood' and positioned lower on the social hierarchy because it cannot answer back or determine its own destiny (Lovelock, 1999). Including the machine in the social hierarchy is a means of securing a certain place within that hierarchy through the level of control the operator has over that machine.

Changes in crew structure are also changing the way influence over the crew's operation is earnt through experience and capability. Mechanisation has resulted in the loss of the ground worker roles (manual felling, skid worker, breaker out / choker setter) that played a key role in defining 'logger-hood' (see section 5.3.2, Proving yourself*).* In mechanised crews, the relatively inexperienced

operators have not, in the eyes of the more experienced operators, 'earnt' their seat in the machine, e.g., P13:

> *And one thing that frustrates me now is because of there is lack of experience around ... you see one guy who's never done a day's … hasn't got a single bit of dirt under his nail, and he's in the machine … that really boils my blood, actually. That's been one of the worse things.*

The lack of appropriate experience was seen by some as undermining what it took to do the job, e.g., P14:

> *Yeah, I don't like the way the young ones are coming in without having the ground skills, turning up and expecting the respect for the job … not that it matters these days, because things are getting easier, but a lot of respect is out the door now for the job*

This appeared to be less of a threat in fully mechanised crews (e.g., "*Nah [that hasn't caused friction]. We don't have anyone on the chain saw, everyone's on machines"* – P25) which could be interpreted to mean that it is more that the informal hierarchy itself is being undermined rather than the relative positions within the hierarchy. But contractors who respect the place of 'groundwork' in the development of *being logger* were highly respected by their operators, e.g., *"Yeah, like [the boss] with [the new recruit], he's got [them] on the axe. That's how we started. Just trimming and cutting off bloody surfboards [branch stubs], and now she's QC [Quality Control]."* (P10). Furthermore, some of the younger participants recognised the expectations of those more experienced than them and made some effort to comply, e.g., P26:

> *I think they wanted me to just spend time, like do your time on the ground and then work your way up … [so] I was on the ground [at the start but] I only did six months while I was learning the processor at the same time.*

Regardless of the process of change, it was clear change was happening and that for some participants, it was seen as a threat to their sense of identity.

The participants sense of place within the crew was threatened by several conditions and actions / interactions that threated either recognition of their personal capability and experience or the level

of input they were able to have into the way the workplace or crew was organised. Some of these threats came from the formal structure of the crew. They included the concentration of power around the crew boss and / or foreman, the leadership skills of those within the leadership structure and the way operators were paid. Other threats came from the informal structure. These included who had a right to give input into what went on in the crew and how that right was earnt now that mechanisation was changing the traditional 'rites of passage'. As with *threats to achieving production targets or throughput,* any *threat to establishing a sense of place within the crew* added to the participants sense that their valued way of being was precarious and, therefore, threatened the security of their place within the various hierarchies in which they lived and worked. The next section will address the last group of threats to this sense of security.

6.2.3 Threats to Family Wellbeing

In answer to the question 'what the most stressful incident was you have ever experienced', participants invariably referred to something that threatened the integrity of the family / whānau or their ability to meet the needs of the family / whānau. This reflects the place of family / whānau in *logging as a means to an end* within *being logger* (see section 5.3 Being logger). Analysis of these references generated four sub-categories: *fearing loss of income; fearing loss of personal capability; getting somewhere to live;* and *threatening family situations.* The common property of these sub-categories was the threat posed to the disposition of the logger habitus encapsulated within the sub-categories *being logger* and *becoming logger,* such as *relying only on self* and *being responsible to the family*. *Fearing loss of income* could be defined as a felt sense of concern about the potential for income to be negatively impacted by a change in the available hours of work, something that was driven by concerns there would not be enough money to meet the family's financial commitments, e.g., "*if you were an employee and your boss wasn't paying you, what can you do? You'd be bloody stressing about it if you had a mortgage and shit like that"* (P4). Participants spoke about being exposed to this risk through two features of their work that can render their income insecure. That is, the risk of market downturn and the risk of the contractor's contract to log being terminated.

With limited contractual guarantees over access to the harvest, a reduction in the market price for logs sometimes resulted in either a reduction in the weekly allowable production or a complete shutdown for the contractors and operators. For the participants, these conditions contained two threats to their sense of manhood: the threat to the weekly income, e.g., P5:

> *it was a bit of a worry. I knew we weren't going to get laid off or anything, but yeah, it was just quite annoying to be making a lot less money. And I knew the work was still going to be there at the end of the day. Just didn't get paid when there was no work*;

and the participants lack awareness or control over the situation, e.g., P6:

> *we were working fine, and everything was on the up. You know, there was talk of new machinery… And then all of a sudden, it was like within three days we went from hearing that we were going to be getting shut down …, knowing that we were going to get shut down and then being shut down.*

Some regions appeared to be more susceptible to this risk than others. In Te Tai Rāwhiti, for example, participants recognised that lack of access to onshore processing and their region's consequent dependence on log export meant that options for continuing to produce in a log price downturn were more limited than in the other regions.

All logging contracts have a termination date that could leave the contractor without work once the contract has ended. Exposure to short term contracts meant that some participants were exposed to loss of income once the current stand of timber was harvested or the contract ended. Again, the threat to the weekly income was compounded by the lack of control over the situation, e.g., P4:

> *the faster we work, the faster we're burning through the work that's keeping us going ... we need to work more to make money but the more we work, the more we're putting ourselves out of work.*

In addition, for some participants, the sense that logging skills are quite specialised or that rural workers have few job opportunities, added to the sense of precariousness associated with the volume of wood to be harvested, e.g., P12:

> *I enjoy coming out to the bush that much. If I lost that, I wouldn't know where to start. Knowing how hard it is to retrain. And there's not much job opportunities [where we are]. How am I going to pay my bills?*

Some participants also suggested that these fears were a function of not being 'good with money'. By that, it was meant that financial management skills were lacking, e.g., P8:

> *there's some big money going around operators. If they're worried about money, it's because they're not … managing it properly … not that I'm great with money, but [I] could guide them a little bit with that or tell them to get help with that … just don't blow it all on piss like we used to. … that and starting with keeping good money, put some of it away sort of thing.*

Whether it was due to the market, the supply of harvestable wood or the lack of confidence in their own financial management skills, it was clear that *fearing loss of income* was a significant stressor for the participants.

Fearing loss of personal capability was an indication that the health and safety risk of operating in logging was also not something the participants took lightly. Participants spoke about the felt sense of risk associated with the physical hazards they faced when operating a machine, whether that was for themselves or for their colleagues. Some had made decisions on what machine to operate based on their assessment of the risks that machine faced, e.g., operators were opting for machines that worked on the flat surface of the skid such as the processor or loader rather than work on the slopes and rough going of the cutover (harvester or skidder – see figure 6.2). That decision was being made because of one of two prior experiences. Firstly, having experience with operating machines at the edge of their operational limits, e.g., P12:

> I *don't know whether there's a limit to it, I got mates that drive them [tethered harvesters], and they're mad. They're worse than me. It's only a matter of time before someone gets... Something's going to happen*.

Secondly, having had a personal experience with a traumatic event, e.g., P3:

I'd tipped the harvester over, and it had 1100 litres of diesel in the back of it. And when it tipped up on its side, the breather was halfway up the tank. And 5 or 600 litres of diesel run out of that thing, while I was locked in it. It had three exits, and the way that it fell over the logs, it'd blocked the three exits, I couldn't get out. I'm sitting in there, and the exhaust pipe went out the back, right beside the breather. And for the start, until it cooled down... … the exhaust pipe, it was white. And I thought I was going to burn to death. And a guy came in, and he was going to cut the windows out of this thing with the chainsaw, to get me out of it.

Figure 6.2 An example of a forest harvesting machine working on steep slope (photo courtesy of Phil Taylor)

Participants also spoke about the concern they had exposing families to these risks, e.g., "t*he last thing I ever want to have to do is ring a wife or ring someone and say I've killed your son or your son's been killed"* (P1). It appeared, therefore, that the concerns over the safety risks of the industry were twofold: firstly, there was concern for themselves; and secondly, there was concern for what it might mean for their family / whānau if they were killed or seriously injured. A follow up question about whether they would be happy for their children to work in the industry highlighted this duality. Someone who had been exposed to the industry's dangers answered in the negative, e.g.,

"*Nah. Nah. And I suppose some of it is down to the risk, the danger side of it. Yeah. I mean, I've known people, injuries, and that have died over time I've been there and yeah, a fair few. You know?"* (P25). However, those who had seen change in the industry's safety practices actively encouraged family members to work in the industry e.g., P2 defended his son's decision to work in the industry: "the *wife was a bit worried for starters. But I said the way things are now it's a totally different scenario you know … that's what I find from a lot of people saying, 'why is he in the industry?' I say, well, things have come on in leaps and bounds from when I first started".* Whether the participants were encouraging their children to seek employment in the forest industry was a significant sign of their thoughts on the potential of the industry as a place in which to fulfil their identity. Men who work with machines have long socialised their male offspring to appreciate the value of operating skills (Lovelock, 1999). If they were now not choosing to do so they were making a judgement about the industry's potential to provide a fulfilling life based on their experience of the risks.

Getting somewhere to live referred to the challenge of securing housing within the mostly rural and provincial localities in which these participants lived. The challenge of buying, building or renting a house, when the region had less houses than required, presented something of a threat to the participant's norm of *being responsible to family,* e.g., P25:

> *for instance, my workmate … I went to an open home with him, oh, a few weeks ago because he's trying to buy a house and that ... he's also got to be out of his house, just found out a couple of days ago, by the end of the month.*

Where participants lived relative to the forest, they were working in, also had significant implications for the time they were able to spend at home with the family / whānau. Participants talked about commuting times ranging from 30 minutes (largely considered acceptable) to 90 and 120 minutes (generally considered unacceptable). The longer commuting times appeared to create some tension within the participants, e.g., "*If we have to travel far then it takes a bit of toll on you. You got to wake up a bit earlier, get home later."* (P19). That tension could also have an impact in the family home, e.g., P17:

> *Dad coming home and just fucking losing it. Didn't know how to manage it. So, I'd be up until eight o'clock, half past eight, and especially little kids and that, just being fucking annoying, the noise. 'Dad can we do this?' 'Fuck off, I'm not doing nothing.' Shit like that.*

Something that appeared to engender feelings of guilt within the affected participants.

Finally, *threatening family situations* referred to those situations in which the integrity and wellbeing of the family / whānau unit was at risk. Participants spoke about difficult family / whānau circumstances such as children who had mental health challenges, e.g., P18:

> *My partner has got a couple of... Oh, they're in their 20s kids, and I've been with her for 15-odd years now, so I knew them when they were littlies. Pretty young. But yeah, they've sort of gone down the wrong track and the drugs and every other bloody thing,*

or were neuro-diverse, e.g., P12:

> *I got an autistic son, autistic, Asperger's son. He's just turning 13 this year … As long as his creature comforts are met and things, he doesn't... He's a bit verbal, little verbal but more understanding … yeah, it's been a bit of a difficult experience*.

They also talked about experiencing a breakup in the family / whānau unit and the impacts of that on their own mental health, e.g., P13:

> *I sucked it up and just bottled it and carried on going. Went through my hard times with my ex and all of that. Man, I'll tell you what, it was hard. … I went through some deep times, dark times, and was in some dark spaces, and almost lost my job because of it.*

As *being responsible to family* was a key reason given by participant's for working, anything that threatened the wellbeing and integrity of the family / whānau unit threatened their sense of identity and belonging. Participants placed a lot of importance on this intention to the extent that when it was not being met, work had something less of a priority over the use of their time. Many participants noted that time off from work was required to work their way through the challenges such situations posed. They also noted that failure to adapt to the time requirements for work

precipitated some of these situations. That conflict between work and home for an operator's time highlights the significance of their most important asset – their time.

Securing a place in the world through the habitus of logger is made more difficult through a number of obstacles participants appeared to face. Anything that threatened the flow of wood through the logging system or the achievement of target, threatened the operator's perceptions of skill and capability and the financial security of the crew. These are both elements of the logger habitus encapsulated in *proving yourself* and *logging as a means to an end.* Relative positions within the crew and rewards able to be achieved by *being logger* could also be directly threatened by who gets power and authority over what within the crew. A *challenging crew boss or owner* who concentrated authority within a formal crew structure or who did not have the skills to have productive relationships with their operator employees resulted in participants feeling frustrated or undervalued. Being paid on an hourly rate (wages), which embedded long hours as a proxy for 'hard work', also created threatening conditions. Similarly, the informal hierarchy within the crew limited the say some had over their own work and gave significant influence to others (*having no input).* Threatening changes were also evident in how someone made their way up those hierarchies. With the loss of groundwork as crews mechanised, the traditional rites of passage were being undermined, creating tension amongst older operators who viewed younger operators as not necessarily having earnt their 'seat'. Finally, both threatening production and position within the crew contributed to threats to family / whānau wellbeing through *fearing loss of income* and *fearing loss of personal capability.* That was on top of hazards in the non-work social environment that threatened the operator's pursuit of a secure place in the world such as *getting somewhere to live* and *threatening family situations.* These were difficulties that threatened *being responsible to family,* a key goal of *logging as a means to an end.* They are all threats to the sense of logger identity that form the basis for *belonging* within the fraternity and for achieving the ends sought in being an operator, both of which define the place the participants are looking to secure.

Threatening logger and its sub-categories, *threats to achieving production targets or throughputs, threats to a sense of place within the crew* and *threats to family wellbeing,* encapsulate the conditions and actions / interactions that threaten the operator's sense of place within the world. This is the first step in the process of establishing wellbeing outcomes for *being logger* (see figure 5.1). Next, we will examine how the operators adapt to those threats and how those adaptations created conditions the participants associated with stress.

6.3 SUSTAINING LOGGER TO AFFECTING LOGGER: THE PATHWAY TO STRESS

Sustaining logger (see figure 5.1) denotes the actions / interactions taken by each of the parties (operator, contractor and forest owner/ manager) that sustain the ability of the operators to live in accordance with their valued way of being. Each party has sufficient agency[8] to pursue their own interests but have differences in power over the various resources (e.g., logging skids and roads, logging trucks, logging machines, operator time and skills) that can be used to achieve those ends. It is this power over resources that is the foundation of the various hierarchies in which the actors within the logging industry are located. However, regardless of who has control over the deployment of resources and their reasons for doing so, any resource made available to harvest wood from a specific setting could be used by operators to secure their place in the world. Stress and wellbeing, therefore, is a by-product of this tension between the actors over the use of each other's resources.

As explained in Chapters two and three, resources are at the heart of the second appraisal in the Transactional Framework of Stress (Dewe & Cooper, 2017). Having assessed 'what is at stake', the threatened individual will then make an appraisal of 'what is available to help cope with the threat'. In this appraisal, the key word is 'available'. The stress response will depend on the resources the participants are able to access. Having considered the threats and obstacles the participants faced in pursuing the valued ends of 'logger-hood', the rest of the chapter turns to the question of 'what

[8] Agency in this case is defined as "the socially determined capability to act and make a difference (Barker, 2008, p. 454)

resources could they use' to overcome those threats and what were the health outcomes experienced from exercising their agency. This section will consider the resources the participants can access as a result of their agreement to do this work (*overcoming* in figure 5.1), how they can be used to resolve the threats they face and the relationship those resources have to the health consequences participants described as their experience of 'stress'. Section 6.4 will consider the adaptations that skilful operators can make to achieve health outcomes they describe as 'wellbeing' and the resources controlled by the forest owner / manager and contractor that, if available to operators, could assist with that process.

6.3.1 Sustaining Logger: Overcoming

The sub-category, *overcoming* (see figure 5.1), denotes the choices the participants described when faced with a situation that threatened their place in the world. Those choices were limited to the two resources the participants directly controlled: their skills and time. Time is the critical dimension of this sub-category. The question the participants were always asking themselves was 'how do I make the most of the total time I have available?' P3 in describing the way a crew mate went about his work as a skidder operator captured the operator's challenge:

> *He would time himself … to see [what speed is required] … to take him five minutes for his drag to come in … he knows whether he's got to be doing seven mile an hour or ten mile an hour or whatever, to keep the flow of the wood going.*

That focus on time reflects what the participants as employees had agreed to supply to their employer in exchange for their remuneration and any other benefits. The actions / interactions the participants took to make the most of the time they had for securing their place in the world were encapsulated within the sub-category *working long hours to solve problems.*

Both the World Health Organisation and the International Labour Organisation define 'long working hours' as greater than or equal to 55 hours per week (Pega et al., 2021). Furthermore, systematic reviews reported evidence of a higher risk of ischemic heart disease and stroke amongst people who

reported working those hours (Pega et al., 2021). When asked what they did not like about working as an operator, the most common response was 'the long hours'. Participants in this study consistently reported workdays (including travel) of more than 11 hours per day with some working more than 55 hours per week. While the burden appeared mostly to fall on loader operators, who arrived early (3.30 – 4.00am) to load out trucks (e.g., "*[massive hours?] 75 – 80 per week including Saturday morning"*- P20), others were also reporting days in excess of 11 hours (including travel) after they had dealt with maintenance (e.g., dropping off or picking up chains) or reporting (e.g., uploading log files from processors).

When asked why they needed to work longer than the 9-10 hours per day that other participants reported, the response pointed to the need to overcome a problem that threatened production. Some participants considered their hours to be an action taken to overcome obstacles to meeting target (*doing long hours to overcome obstacles to production*), e.g., *"if you're in a shit block … it's going to be hard, so your hours will creep up"* (P6). Others could point to their own decisions to "*have a nice stockpile of wood"* (P21) for the next workstation, particularly if they were working on the harvester or the prime mover, e.g., P5:

> *Because you're the start of the chain, the woods gone deep, the hauler can't pull it, there's no one on the pole, there's no one on the skidder, there's no one on the processor, there's no wood to load out.*

Equally, those working on the skid (processor and loader) were "*prepared to come early and load trucks"* (P2) so that they could maintain the space on the skid for processing and storing wood as any "*backlog…works its way back to everybody in the bush"* (P2). Finally, while some participants worked what they considered to be reasonable hours, their workday was extended somewhat by the commute they faced to the workplace, e.g., "*we were starting [work] at 5.00am, so leaving at quarter to 4.00am"* (P25). If they were the driver of the vehicle, the commute was also considered to be 'working', e.g., "*I'm driving as well, the other fella just goes to sleep"* (P25). Whether that was

work recognised by the employer was not consistent amongst the contractors with "*some crews do [pay for travel] and some crews don't',* (P6).

While working longer hours, than those considered acceptable, was something that generated complaints, responses were mixed to a follow up question about whether participants would work shorter hours if they could. As hourly rate workers, the operators benefitted from working long hours by being paid more. While some were working on salary with a fixed weekly pay (e.g., "*and that's a good thing because I never work over my hours"* – P19), if hours were not controlled then hourly wages meant greater transparency - and therefore trustworthiness - because it was apparent in the weekly pay. Operators also benefitted from longer hours, in terms of their position within the fraternity, through being seen as hard worker, willing to do whatever it took to get wood out. When asked what big hours meant to him, P17 responded that:

> *If you've got any involvement in the job and you've got a bit of pride in the job, you know … what needs to be done for the day … so if you're down, you're always trying to do that bit extra and make sure we are getting it.*

That also meant working weekends to get ahead or catch up, e.g., P13:

> *Nobody loves doing that. I try not to, but if I have to, I have to. If I have to get ahead somewhere, I'll put the hours in to do it.*

Participants justified it to themselves by explaining it as "*something we had to do to get where we are"* (P8) and for some, it was a short term means to an end (as described in *Logging as a means to an end)*, e.g., "*doing those big hours and all that sort of shit … it was all worth it, it all paid off"* (P8). However, for others it was now something they accepted as being part of the job and their life had adapted around it, e.g., P22 defended his 13-hour day by saying "*it doesn't worry me because I've got it to a pattern … things structured where I can [do those hours]".*

Having examined the participants use of their time and skills as a means of sustaining their valued way of being in the face of any threats, we can now consider how the use of those resources contribute to the participants experience of stress.

6.3.2 Affecting Logger: Experiencing Stress

Participants described stress in quite specific ways, which were mostly associated with sitting down for long periods working on mentally demanding tasks. These were captured within the sub-categories *getting fatigued operating* and *experiencing fatigue outside work*. P22 noted that "*mentally, you're absolutely shot at the end of the day"* something that P18 suggested was unexpected: "*I go home more tired now than what I did when I was physically on the ground, busting my arse".* Participants also described the progression of fatigue over the week as lack of sufficient recovery one day to the next meant fatigue compounded over the week. This was particularly so for those who worked Saturdays so that when "*Sunday comes, you sort of can't be bothered doing anything … because you're tired"* (P14).

A number of outcomes were attributed to that fatigue. Firstly, despite the love of physical exercise and being physically fit, those participants who had been *"gymmers"* (P5) noted *losing motivation to exercise.* When they *"[got] home late at night, [they were] not motivated to go for a run"* (P1). Participants also recognised that sitting for long hours at a time had contributed to them *gaining weight* so much so that they had a name for it: "*digger figure"*, (P2). For example, "*I've packed it on. I used to be pretty skinny"* (P26). Given the nature of physical capability and activity within the habitus, it was something that concerned those who had noticed it, e.g., P25: "*I'm conscious of it because I've always been quite, well, we used to joke you're nearly growing horns on your head when you're on a chainsaw and that, how fit you were".* However, it appears it was not just about the lack of activity. Some participants talked about using food (*desiring unhealthy foods*) and other substances *(using alcohol and other substances*) as a means of coping with the mental strain of their work. For example, P17 talked about his unhealthy eating habits and asked "*what was it for?*

Relaxing and trying to calm me down, comfort eating". P7 noted that he "*was drinking a bit much, … probably drinking to get to sleep".*

Secondly, long hours of work and the subsequent recovery time made it difficult to enjoy time with the family / whānau or life outside work (*working long hours reduces enjoyment of family, being aware of consequences of long hours*). Some participants were not so much concerned about the impact of fatigue on themselves but more about "*how you're affected [by hours on the job] that can stress you at home, if you get tired"* (P18) and the pressure that put on relationships at home. For example, P15 noticed that *"I didn't see it, but nah, my wife said, "Yeah, all the time grumpy. Tired. If not grumpy, tired."* That was particularly so towards the end of the week with families placed in the position that "*they sort of know by Thursday, Friday, I'm fucking shitty as"* (P17).

Finally, on top of the impact of fatigue on relationships, the length of time at work made family / whānau life more difficult (*recognising consequences of long hours on family*). Older participants noted that *"they [my children] hardly seen me through most of their lives"* (P16), something younger participants were struggling to reconcile. For example, P20 reflected that "*sometimes it can make that couple of hours with the kids a little bit harder and then you'd be just wanting to get their stuff done and then hitting the sack "*. That added to the difficulty of maintaining a solid relationship with the partner with participants noting that they would get "*frustrated with my partner, only because she gets wound up because I'm not really there",* (P13).

Other problems were directly attributed to what the operators called 'stress' such as conflict within the crew and physical health disorders. Conflict sometimes appeared to be a consequence of the contest for positions within either the formal or informal hierarchies within the crew (see section 6.2.2 Threats to a sense of place within a crew). For example, P25 appeared to get into a conflict with a crewmate over him learning to operate the relatively high-status position on the processor: *"whether he felt it was threatening his role, I'm not too sure but he suggested that I get a job elsewhere and … we had a good row over it".* Alternatively, conflict also arose between crewmates

that did not get along (see section 6.2.1, Threats to production or perception of production (targets)), e.g., P23:

> *he chucked a couple of swear words in there too. So then I got pissed off at that, but I didn't react to it … he … did it once more and that's when I just went off at him, and … it hasn't happened since.*

Stress was also considered the cause of diagnosed physical health disorders such as diabetes and eczema (*connecting physical health with stress)*, with two operators admitting to having type two diabetes and one having eczema, e.g., P5: "*there were days when you'd just be pulling your hair out. I had eczema all over my arms, just from scratching at them".* As indicated by P5, the participants made this connection by recognising that their symptoms were made worse by hard days at work.

Participants suggested chronic experiences of stress were resolved by either leaving logging and working within some other industry for a period or by looking for work in another crew. The common element of either method of resolving the problem was participants' sense of powerlessness about changing their immediate work circumstances. P12 described a situation in which he felt he "*was getting nowhere, watching fellas upgrade and I was still teaching them on the skids … and just thought, bugger you".* He then "*started with this other fella and I was with him for 16 years".* Frustration with conditions within the crew tended to be resolved by changing crews although one participant, that had come to logging via significant experiences outside of logging, chose to resolve a bad experience with a crew by returning to his trade for a time. Those who chose to leave logging altogether were more frustrated with the general working conditions that were similar in every crew. Of the participants, four had left for a period or were in the process of leaving and a few participants were able to talk about colleagues that had left. The reasons indicated for leaving were the precarious nature of the work through exposure to markets and safety hazards, the conflict between the circumstances within the family / whānau at the time and hours of work and the exposure to repetitive work for long periods (*leaving logging*). Importantly, however, two participants had returned once their family / whānau circumstances changed.

In conclusion, participants described 'stress' as the conditions experienced through working long hours and the subsequent fatigue, conflict and other physical health disorders. It was the consequence of threats to 'logger-hood' being resolved through extending the hours of work. Many of the threats listed in *threatening logger*, such as insufficient production or throughput, position within the crew and insufficient or precarious income, could be overcome by working long hours. Working long hours, therefore, appear to be embedded in the industry with those actors in control of the working hours both benefitting. For contractors, working machinery longer reduces debt faster or solves production difficulties with less requirement for more machines and operators. For the operators, working long hours can increase the weekly pay packet and their reputation for being a hard worker. However, it could be argued that the conflict working long hours generates, both within the family / whānau and in the operator themselves, is at the heart of the stress experience. Time taken working, commuting and recovering reduced the time available to meet family / whānau needs and enjoy that aspect of an operator's life. Sitting down for long hours, not being extended physically, runs counter to the valued way of being represented by the logger habitus. Coping with these stressors appeared to be difficult for participants because they did not have power over some of the resources required to ensure work could be completed within an acceptable timeframe. They felt like they had no choice but to do the hours. As a result of that sense of powerlessness, they appeared to resort to being more assertive in the contest for positions within the crew, changing crews or leaving logging altogether to resolve the stressor in a way consistent with their intentions to secure a place in our hierarchical world.

Having concluded that stress is a function of operators looking to *secure a place in a hierarchical world,* using only the resources they control to cope with any threats they face, we can now consider the alternative experience of wellbeing and how that is reliant on access to resources controlled by the other actors in the field – the forest owner / manager and the contractor.

6.4 SUSTAINING LOGGER TO AFFECTING LOGGER: THE PATH TO WELLBEING

Experiencing stress represents one of the health outcomes for the habitus encapsulated in *becoming logger / being logger. Being logger* can be a stressful experience, but equally, it can be an experience of wellbeing. In either case, the operators are still experiencing the benefits of securing their place in our hierarchical world. As indicated above for experiencing stress (see section 6.3 Sustaining logger to affecting logger: The Pathway to Stress), the health experience of *being logger* is a function of the resource's operators can access. However, unlike the pathway to stress which rests upon the use of the operator's time to 'overcome' the threats operators face in *being logger*, the pathway to wellbeing is founded on access to resources either directly controlled by the other actors in the logging field (forest owner / manager and contractor), or whose use is negotiated between various actors including actors outside the workplace (e.g., family / whānau). The purpose of this section is to explore the findings within the data that explain what the experience of wellbeing looks like within the logger habitus (*experiencing wellbeing* in figure 5.1). It will also consider how resources either controlled by the forest owner (*enabling* in figure 5.1) or the contractor (*resolving* in figure5.1) or negotiated between the forest owner, contractor, operator and their family / whānau (*negotiating* in figure 5.1) create the potential for *being logger* to be a 'well-ful' experience.

6.4.1 AFFECTING LOGGER: EXPERIENCING WELLBEING

Wellbeing has been interpreted as a set of outcomes that ensure that what is valued within the habitus of logger can be performed across all of life's settings – work, family / whānau,and community. The participants recognised that achieving this state was facilitated by having the time to recover (e.g., "*it takes you two days to recover from your five days*" - P3), be at home (e.g., "*the most important thing for me ... is that I get to go home every night"* – P13) and do things with or for the family / whānau (e.g., "*Sometimes you come home and just straight away you're into doing ... pick them up, cook tea ... they're neat kids"* – P21*).* Participants referred to three key sets of actions / interactions that promoted a sense of wellbeing. These have been labelled *acting, enjoying* and *securing.*

Acting referred to having the time and energy to act on what was considered important in each setting. For the participants that meant, firstly, being physically active. Given the place of physicality within the participants' view of the world, being able to exercise control over their physical wellbeing was important to their sense of a place in the world. P1 admitted that he was '*happy*' despite needing to lose *'a bit more weight'* because he was *"going back to rugby this year".* The attractiveness of working in the 'bush' was in some part due to the physical nature of the work. However, once the participants started operating machinery that part of the work disappeared and needed to be replaced by physical activity outside of work (e.g., "*my whole shed's full ... of gym stuff ... [and it gets used] every night"* – P16). Secondly, as much as the tension between work and non-work settings could be a source of stress, being in a position to balance that tension was also described by participants as a source of satisfaction and ease. Participants were involved in coaching their children's sports teams (e.g., "*I coached her through school sports ... as many things as I could do"* – P22), being active at their children's school (e.g., "*I'm on a Board of Trustees"* – P20) or being actively involved in parenting, sometimes to a significant extent due to the breakdown of relationships (e.g., "*I ... was a single parent, I had my kids week-about, I've done it since they were two and four"* – P25). These opportunities were facilitated at work by early finishing times (that is, 3.00pm – 4.00pm) and by having some flexibility over early start times (e.g., "*so if I've got a board meeting and I'm not going to get home until nine or 10 o'clock at night, I just won't get earlies the next day"* – P20), weekend work (e.g., "*We don't work weekends ... sometimes he'll give me the day off on Friday and I have a three day weekend. ... I have my daughter every weekend"* – P19) or even whether work was full time (e.g., "*I was initially just part-time"* – P25). Having some flexibility over time at work had come with the potential for job sharing or job rotation that seemed to be associated with mechanisation.

In considering what they liked about operating, participants described the conditions required for them to enjoy their work (*enjoying)*. As a reflection of the role of skill and capability in establishing status within the crew and the fraternity, having time to do things well at work was highly valued

and a source of wellbeing. To the participants, that meant operating without any sense of time pressure from adjacent work stations or the target, e.g., P5:

> *if you've got production pressure but you've got nice easy ground, it's fine. But as soon as it gets really difficult... [if] I've felled a few days ahead and you come across a really tricky bit, that's fine. You can take your time and deal with it but then as soon as you come across that same tricky bit, with the hauler right up your arse and that pressure on*

Getting ahead of the following work stations meant there was the opportunity to plan the work to be done. For the harvesters and prime movers that meant setting out routes where "*going for a walk to see how you're going to work a piece"* (P25) could be useful. Similarly, for those operating a processor or loader on the skid, that meant having time to think about the 'jigsaw puzzle' that is log making or organising log stacks (e.g., "*in my head I have what I need to be doing during the day and where I need to be at"* – P22, see figure 6.3). The sense of achievement that comes with production and throughput also appeared to be a condition that enabled the operators to enjoy their work. P2 noted that "*if you're getting the trucks away, everybody's a lot happier*" while P4 put more emphasis on throughput in his comment "*if its flowing through nice, you're sweet and you're doing what needs to be done".* Within these references there is the sense that participants saw themselves as professionals going about their work in a methodical and professional way and, if given the chance to work that way, the work itself was enjoyable.

Furthermore, operating had the potential to create mind states beyond a sense of satisfaction at a job well done. As noted in *becoming logger*, a key disposition of the habitus was *loving challenge* as a means to counter the dreaded condition of boredom. This was a preference for action that was physically and mentally engrossing. P2 talked about getting *"into my own zone of what I'm doing and I really enjoy my work".* Others spoke about "*getting into a groove*" (P22) or getting "*into a bit of a rhythm with the logs and your sorting and fleeting"* and starting to *"have fun with it" (*P23). These references point to operators getting into a state of flow and how much that is a valued part of their

Figure 6.3 Example of two machines working in close proximity to sort and organise log stacks (photo courtesy of Phil Taylor)

work. Csikzentmihayli (1990, as cited in Demerouti & Fullagar, 2013) defined flow as a state of mind that happened when a person was so engaged in an activity that their sense of what was happening around them was lost. Bakker (2005, as cited in Demerouti & Fullagar, 2013) defined three dimensions of the activity that were central to the flow experience: absorption, enjoyment and intrinsic motivation, all elements referred to by the participants in describing their enjoyment of work. Furthermore, the definition of flow as a mind state was something that arose out of Csikzentmihayli's work on boredom and anxiety (Demerouti & Fullagar, 2013). He found all three conditions (boredom, anxiety and flow) to be a function of the relationship between challenge and skill. Where there was a balance between challenge and skill, the result was flow. Where there was a mis-match between challenge and skill, boredom or anxiety were more likely to arise (Demerouti & Fullagar, 2013). Experiencing flow could therefore, be considered an objective operators have for their work.

The last sub-category of *experiencing wellbeing* reflected what participants considered to be financial security (*securing).* It contains references that describe what participants thought financial success meant to them. While many more participants spoke about the impact of income insecurity on their stress levels, those that did speak about the financial benefits of their work referred to it in two ways. Some spoke about having access to financial resources accumulated as a result of their work along with what they were doing with those resources to increase their sense of flexibility and security. P3 described how he had "*only got a year to go and my mortgage is paid for, and then I'll be picking fruit in a campervan".* Owning a house appeared to be at the centre of this participant's financial aspirations. P8 considered that "*financially we're pretty .... we don't have too much worries, we've got the house we wanted"*. While others talked about *having signs of success* which were representative of status assets such as cars (e.g., *"We have a few creature comforts. The big ones is I went and scored ... [the] ... V8s"* – P12) and other sought after equipment (e.g., "*big boat ... Jet skis, motorbikes"* – P16). As reflected in *logging as a means to an end* (see section 5.3.4 Logging as a means to an end) the work was undertaken as the means of accruing the resources necessary for making their way in the world outside work. A natural outcome of that is a sense of wellbeing when that is achieved.

In conclusion, wellbeing is a function of having time to engage in physically demanding activities, be involved in family and community life and do things well at work through being able to spend time planning the way the work will happen. When work was enjoyed it was because production was meeting expectations, wood was flowing smoothly, or challenge and skill were sufficiently in balance to develop a state of flow. Finally, operating was the provider of financial capacity to provide a sense of security and access to material signs of success. These aspects of wellbeing mirror the valued dispositions encapsulated in *becoming logger* and signify that the decision to secure a place in the world through work as an operator in the logging industry was a good choice. Achieving wellbeing, therefore, is a function of the resources used to sustain this valued way of being in the face of

threats. In the next section, we will consider what resources are required to promote wellbeing and how they can be accessed by the operators.

6.4.2 Sustaining Logger: Enabling, Resolving and Negotiating

Securing their place in the world in a way that promotes wellbeing requires the balancing of the operators' time across the settings in which they live – work, family / whānau and community – in accordance with their interests. Amongst the participants, the time spent at work appeared to range from approximately 10 hours per day including travel to as much as 14-15 hours per day including travel. All participants referred to long hours as a feature of the job that was a stressor. However, some talked about this as an experience of their past work life and could describe reasons why that was not something they experienced now. Those reasons represented a set of resources that not all participants could access because they were under the control of one of the other actors within the logging field or because gaining access required agreement with an actor from the range of social settings in which the participant lived. These are the resources encapsulated within the remaining sub-categories of *sustaining logger*: *enabling, resolving* and *negotiating*.

6.4.2.1 ENABLING

Enabling denotes resources that facilitate *being logger* that are completely within the control of the forest owner / manager. They are deployed primarily to achieve the forest owner / manager's interests but, once deployed, are able to be used by both contractors and loggers to achieve their own interests. *Enabling* includes offering contracts that enable both the development of operator capacity and capability (*developing capacity and capability)* and the balancing of the risks associated with the dependent nature of the relationship between the forest owner / manager and the contractor (*reducing commitment risk*). It also includes ensuring there is adequate access to the supply chain resources (*providing adequate resources)* that are either provided by the forest owner / manager (roads and skids) or contracted by the forest owner / manager (trucks, ports, processing plant storage).

Although *developing capacity and capability* is ostensibly within the control of the contractor, it is a strategic decision that can only be enabled by the forest owner / manager. Sub-categories of *threatening logger* such as *challenging machinery and operations* and *having threatening bottlenecks* capture the challenge of learning to operate technically demanding machinery and fulfil time and profit critical roles. *Working short staffed* and *threatening family situations* also highlight the risk associated with not having access to sufficient staff. That means a key task for the contractor is developing the machinery and operator capacity and capability to meet the demands of, not just this contract, but future contracts as well. However, given the emphasis on competition (as promoted by short term contracts or block to block pricing), efficiency (as conveyed through piece rate pricing) and the sequential nature of the logging system, the forest owner / manager are encouraged to offer contracts that are based on a minimum of equipment and a daily uplift target that assumes maximum feasible machine uptime. Such contracts are unlikely to allow for development of the crew's capability and capacity and a logging system that is resilient in the face of setbacks and challenges. Enabling that development, therefore, is something a forest owner / manager can set out to do and capture within the structure of their contracts.

The resources required to develop capacity and capability were identified within the narratives offered by participants on how they became operators and how their crews developed capacity. Developing an operator depends on there being opportunities within a crew for an inexperienced operator (*getting the opportunity to try on operating*). While some of the participants got an opportunity to try operating machines when a vacancy came up within the crew (e.g., "[I] *was probably only there for a year and I … started off running the hauler … [the boss] said anyone interested in the gang and I put my hand up to do it*" – P1), others transitioned out of work on the ground (feller, skiddie or QC) by covering for more senior operators while they were on breaks (e.g., "*And jumping in a digger whenever I could"* – P8). More recent recruits got opportunities through developing operating skills in other industries (e.g., civil construction, agriculture) or through an 'apprenticeship' where the transition from groundwork (e.g., QC) was enabled by the availability of a

machine that was less critical to the crew's production (e.g., fleeting and sorting with a Bell logger). Providing those opportunities was enabled by *having achievable targets* that relieved some of the production pressure and allowed crews to take risks such as developing inexperienced operators (e.g., " *I find that we don't have any problem beating target so that means, if I look at what [the] others are doing, I think it's working, so let them make the decisions where they are … "* – P2). Having sufficient machinery to offer an operator an opportunity was also enabled by contract term expectations which enabled investment in machines with a working horizon that allowed debt repayment (e.g., *"They're going to give me another five years' worth of work … I'm going to work at about 400 tonnes per day with enough gear to do about 550 … but they want the forest to be sustainable"* – P7).

Operators and the contractors they work for are, to some extent, 'locked into'' the harvest manager / forest owner they work for. All their equipment and expertise are committed to that contract. While it is working on a job it is not able to go and work for anyone else. Furthermore, there is also a high shifting cost if the decision is made to go and work for someone else. The impact of that commitment is reflected in categories such as *fearing loss of income* and in responses such as *working long hours to solve problems*. Participants highlighted several ways in which the forest owner / manager alleviated those insecurities by re-balancing the risks inherent to the contract (*reducing commitment risk*). The nature of the forest company's estate and the way contractors had been treated through the business cycle generated a sense of security in the operator's position. P4 noted that:

> *Contractors I've worked for have had really good contracts with really well-established forest companies in ex-state forests … so … people have been cut down [to] three or four days per week with low targets … and we've just been going as normal*

An increasing amount of wood being harvested within a region also translated into a sense of security through the demand for operators amongst the local contractors. Participants were aware of the amount of work that was available in their region. For example, both P12 and P14 commented

"*there's heaps of work"* and "*there's no shortage of work out there"* and appeared to assume that their income was relatively secure as a result.

While that sense of security is founded on access to harvestable wood (e.g., *"we've been told we've got two years in this forest alone, so that's pretty good to hear*" – P8), much of the trust is built in the day-to-day relationship between the operators and the logging supervisor. Participants spoke warmly about mutually respectful relationships. For example, P2 acknowledged that he was "*not afraid to try something with [his] mechanical processing … even if the supervisor is standing and watching [because] she'll ask why you did that … and she's not afraid to think that's not a bad idea"*. P20 acknowledged that relationship came with responsibilities for the operator. "*My supervisor is an ex-logger … he knows his shit. We get on well, he knows he can trust me, it's like a no-surprises agreement, if I ever fuck up, I don't hide shit, it is what is, let's move on".* However, that comment could also point to the potential for difficult relations between what are essentially two different masculinities – the loggers and the professional managers. The logger identity is not only built in the relations between themselves but also in their relations with those who occupy masculinities in proximity to them (Brandth & Haugen, 2000). That potential for difficulty arises from the asymmetric power relations between the two identities (J. Lee et al., 2019). The references from participants encapsulated in *having respect for forest owner's supervisor* suggests a property of *reducing commitment risk* is a willingness on the part of the manager to re-balance the power differences inherent in the nature of the relationship as displayed by P2's supervisor. Furthermore, Brandth and Haugen (2000) found that, like P20's supervisor, the most respected men amongst the forest workers in their research seemed to be those who could perform according to the habitus on display in both the forest and in the office because they had spent time working as a logger. The operator's sense of security over their position in the world is founded not just on their access to work but also on the sense that they and their way of being matters to the other actors in the field, something that is only reinforced through relationships that reflect their mutual dependence.

The final sub-category of *enabling* was *providing adequate resources.* By providing the roads and skids on which logging crews work, the forest owner / manager designs the workplace and through their relationships with the next steps in the supply chain, they control the uplift of logs away from the crew. Codes in *Threatening Logger* such as *having difficulties getting trucks*, *increasing cuts on the cut plan*, and *managing skid storage* point to the impact resources controlled by the forest owner / manager have on throughput. As well as referring to incidents that threatened throughput, participants also provided incidents that highlighted what happens when there are adequate skid and truck resources and how that is valued. When operators have access to sufficient trucks uplift balances with production and there is no build-up of log stocks on the skid. Thus, throughput is maintained across all workstations (*having access to trucks*). Uplift is also the way production is measured and as such is highly sought after, e.g., "*never have problems getting trucks … there's always trucks ready to come here [so] it's an easy place to get the loads in"* (P10). The forest owner / manager had secured enough trucks in the rotation to ensure availability when required. The problem of insufficient trucks can also be solved by *having adequate skid capacity*. While P20 noted that "*as a loader driver … the things that make my job hard or stressful are when [forest owners] don't take into consideration … what skid size we've got"*, fellow loader driver P18 suggested that the forest owner having given them some freedom to construct and set up their own 'dump' had made things easier for him in his work.

Having considered the forest owner / manager's resources that, if deployed, will promote wellbeing amongst the operators, we will now consider the contractor's resources that can also increase the potential for *affecting logger* to be an experience of wellbeing rather than stress.

6.4.2.2 RESOLVING

Resolving encapsulates the ways in which the contractor uses their skills, time and resources to improve the immediate conditions under which the operators go about *being logger*. It covers a range of conditions such as what machines operators will work with, how they will be organised, how well they work together and the rewards (monetary and emotional) operators will receive for

their work. Merriam-Webster (n.d.) defines 'resolving' as "to make progress from dissonance to consonance". That describes the meaning of resolving used here. It reflects the 'orchestra' like nature of a logging crew. In *resolving* the participants referred to the actions required to have a well-functioning crew (*building a tight knit crew)*, treating employees 'like family' (*demonstrating respect*), ensuring there were adequate staffing numbers by building in both short term cover and replacement (*recruiting operators*) and doing what was necessary to reduce operator turnover (*retaining operators*). It also included any actions taken to prepare financially for threats to ongoing work and responding to those threats in a proactive way (*being prepared*).

If meeting production expectations within a reasonable weekly timeframe (less than 55 hours) was a contributing factor to *experiencing wellbeing*, then in P8's opinion *being a tight knit crew* was how that was made possible. *Being a tight knit crew* was the code that defined the properties and dimensions of *building a tight knit crew.* In talking about what had changed to reduce the working week from 70 hours per week P8 gave the following explanation:

> *We're just a real tight-knit crew. If there's a problem, it's everybody's problem, and we all work together to nut it out, really. It's not one person doing 10 more hours a week than another person. Everybody pretty much does the same hours. And we can all swap around a bit. So, if someone needs to go and do another job, jump on another machine and that sort of stuff, we can. Just to make everything work better, really. Everyone knows the target that we've got to hit, and they get paid good money to hit it. So, it's more of a team effort now, which is awesome.*

Within that explanation are the three elements of what participants referred to as a 'tight' crew: operators *being multi-skilled* and able to cover a range of positions within the crew; everyone knowing the target and *having input* into how the team organised itself to solve problems; and *being paid well.*

Having operators capable of covering a variety of machines meant that breaks could be taken

throughout the day (e.g., "*so he shares the load a bit … just want to … break the processing up"* - P26) or early load outs could be rotated amongst a group of operators (e.g., "*me and the old man, we share the earlies"* – P14). It also meant spare or flexible machines could be used to clear up bottlenecks (e.g., "*just did everything there … whatever needed done that day, that's what I was doing* – P4). Being someone able to operate a range of machines was also a source of pride for those who could (e.g., "*there's not many machines I can't drive … obviously, there's operators a lot better, but I can hold my own with most of them, you know"* – P18) and an aspiration for those who were relatively new to operating (e.g., "*I look up to him quite a bit, just how he … can do anything out here … operate anything"* – P23). In fully mechanised crews, multi-skilled operators were considered "*absolutely vital"* (P20) for the crew but were also a means of establishing your position within the crew.

In *being a tight knit crew,* participants also referred to the importance they placed on *having input.* P6 talked about having "*having worked in crews where the foreman has been great … [and has been] like look how do you want to do this … and then … bouncing ideas off each other to plan out the whole block and what I've found in the past is if you can do that, the job normally goes a lot better".* P8 referred to going "*for a walk [to] get your input"* and "*the more input the better, the more ideas the better". Having input,* therefore, meant having an opportunity to have a say over how the work was done, something that was consistent with *relying only on self* in *becoming logger*. In this, there is an element of contributing to the performance of the crew and, therefore, being given an opportunity to enhance one's position within the crew. The participants who were also foreman recognised they had a role in creating that opportunity, e.g., "*I take a bit of pride in that and what I do to grow that is things like, you listen to everybody … you try their ideas, you give everyone a voice. It empowers them"* (P20). However, it was suggested by other participants that conditions which created a safe place to have a say went beyond the formal hierarchy, e.g., "*if you've got a really good relationship … amongst where you are, your day goes good and people aren't afraid to say something … [like], you know, we need to do this … then people take it on board"* (P2). Feeling

comfortable speaking up was also recognised as important for getting help, e.g., *"it's alright if you're doing it wrong, it's OK to say I don't know"* (P13). Furthermore, participants recognised that creating those relationships meant spending time together. Despite the difficulties of doing so, some participants were strong advocates of having 'smoko' with work mates, e.g., "*I think if people got together and had smoko would be beneficial to the industry"* (P25) even if that was with a sub-section of the crew, e.g., "*so I was processing today and had smoko with the wheel loader guy on the skid"* (P25). For most, however, it was clear that having radio communications between the cabs had taken over the role of smoko, e.g., "*even out on the job, we're yapping all the time on the radios"* (P18) and *"it makes the day a lot more fun … just giving each other stick"* (P19). While the references in *having input* point to ensuring operators can access dignity (the feeling that you matter - Hicks, 2015) as an element of *experiencing wellbeing,* that resource is made available through the quality of the relationships in both the formal and informal hierarchies.

As a factor in meeting production expectations within acceptable work hours, *being well paid* was the final element of *building a tight knit crew* as it removed the incentive to work long hours to achieve a satisfactory level of income. Participants referred to satisfaction with what they were paid in several ways. Those who had worked outside the logging industry recognised that the industry paid well compared to alternative work such as dairy farming or civil construction. Those who were being paid a salary (that is, a fixed amount per week for a fixed number of hours) recognised that as well as the sense of security that came with that (e.g., "*people get stressed over money … I just said [to the crew owner] I want X amount every week, in my hand"* – P3) there was also the incentive to work to the fixed hours (e.g., "*[it's] a good thing because I never work over my hours"* – P19). Those who were paid for some of the travel time recognised that this was not the norm for the industry and, as such, it was something others did not get. It was also seen as recognition of skills and responsibilities, particularly if the participant drove others to work. Finally, amongst those being paid on an hourly rate basis (wages), being paid for down time was highly valued (e.g., *"[the boss] has said that if we do our target in four days, he'll pay us for Friday … so that's an incentive*" – P10).

Being well paid suggests that working long hours is, in part, a structural condition. It is an adaptation to the hourly pay structure. When a pay structure either fixes hours or incentivises less hours, operators can secure their position working less hours and wellbeing can be enhanced.

As part of talking about their stressful experiences, participants were quick to praise those employers they had worked for that treated them like 'family' or had tried to have a 'family-like' environment. Being treated like family, therefore, was the property of the second sub-category of *resolving – demonstrating respect.* As an example, P22 expressed his appreciation for his employer and the way he had been treated: "*he treats you like family … nothing's a problem … he looks after us, any health issues, let him know and that sort of thing".* Those participants who occupied the role of employer also spoke about their intention to treat employees like 'family', e.g., "*in turn, I want to look after my guys like they're my family"* (P1). Clearly, working for an employer that was respected because of their efforts to treat their employees like 'family' was something valued, and some participants attributed their continued willingness to work in that crew to the way they were treated, e.g., "*they're very good bosses … that's probably the main reason why I'm here"* – P27.

Several participants were also able to identify what it was their employer had done to earn that respect and loyalty. P5 appreciated an employer's willingness to remain calm when machinery sustained damage, e.g., *"usually he was pretty good about it … there wasn't really any damage that got angry at me about".* For P3 it was because "*he's the only guy I've ever worked for that you don't have to want for anything … you just ask him for it, and he provides it".* For P8 and P20 that willingness to provide extended to using specialist manual falling contractors to help with felling trees on ground too difficult for the mechanical harvester and not putting their employees at risk. Being willing to help employees work through problems at home was also recognised and admired. For example, participants referred to employers that were willing to help with housing problems by helping with the bank or providing time off to secure accommodation. In some instances, the employer was acting as a pay day lender, (e.g., "*such and such has asked me for an advance for the*

last three weeks in a row" - P7) or providing for dental care (P26). Finally, P9 and P19 appreciated the concern their respective employers showed towards their work life balance: "*he's real considerate that you have a life outside of work"* (P9) and "*it's good with these bosses now … they look at … that sort of thing to see if you're spending more time at work and not at home"* (P19). These did not appear to be actions employers deliberately took to retain employees. Participants admired these actions because they appeared to be taken in response to their specific problems and concerns without an expectation that something extra would be given in return. It also runs counter to the "hard man" narrative referred to by P1 as the "*old hardness …. you've got to show a certain amount of mental hardness to be doing it day in day out"* that is interpreted to be what it takes to belong (see section 5.2.4 Belonging). It suggests operators are not 'hardened up' by physically difficult work or rites of passage or being made to 'stand on their own two feet' but by being shown some care and attention.

The third sub-category of *resolving* was *recruiting operators.* With *working short staffed* being a threat to the wellbeing of operators, any action contractors took to recruit operators helped to resolve this threat. The experiences of the participants in this study contained references about those actions. Several participants had experienced being 'shoulder tapped' for roles by contractors (*being recruited to operate*), e.g., "*and [the contractor] hit me up one day and was like 'do you want a job'"* (P27). Responses to the question 'how did you get into logging' suggested word of mouth was the dominant recruitment channel. That also included recruitment of operators from outside the logging industry (e.g., agriculture). Two participants indicated they had come back to logging after leaving for opportunities in those other industries (*returning to logging*). Neither of these participants were looking to return and did so once offered work. It also appeared participants moved crews to enhance their position through an increase in their hourly wage rate, or for a more recent machine or truck, e.g., "*some guys will jump because of a new machine … they might not offer you the extra dollar, they might not offer you the new hilux to go with it … but the comfort of a new machine is always good" (*P6). Finally, some of the operators had been recruited from other

industries by *being paid to train* at an industry course before starting work in the crew. These experiences pointed to the need for contractors to maintain a network outside their crew and the industry to ensure they can recruit operators when required.

While *demonstrating respect* referred to actions taken by employers out of a sense of caring and respect for their operators, in the next sub-category of *resolving, retaining operators,* participants also noted deliberate actions their employers took to reduce operator turnover. Given the threat to operator wellbeing represented by *working short staffed* (see section 6.2.1 Threats to achieving production targets or throughput), participants benefitted from these efforts, despite the motivation being to advance their employers interests. In fact, the dispositions described in *being logger* (see section 5.3.3 Enforcing crew hierarchy) suggested participants were inclined to stay because of the potential benefit to their position within the crew (*being older or loyal matters*). It could also be argued that working to reduce stress could be the most effective means of retaining operators because the greatest risk of turnover lay with those operators experiencing chronic stress. *Quitting [the] crew* (see section 6.3.2 Affecting logger: Experiencing stress) was suggested by participants to be one of their strategies for dealing with chronic stress. The actions / interactions of the participants, therefore, suggest the actions / interactions encapsulated within *retaining operators* are an example of resources deployed on behalf of the contractor that can be accessed by the participants to secure their position.

Participants referred to three ways that contractors actively encouraged operators to stay within their crews but are outside the traditional means captured within *being well paid* (see *building a tight knit crew* above). Firstly, some participants worked for contractors who were actively *using experience to mentor young fellas*, e.g., "*I've had probably three or four loader drivers … that they've put in the crew … giving them the opportunity to improve … teaching them how to load"* (P20). This is a positive way of reinforcing the standing of the experienced operator within the crew and the logging fraternity while using a model of learning that works well within the logger habitus. As a

result, the risks faced by younger operators, due to their inexperience, and the risks posed by that inexperience to the other operators and the contractor is reduced. Secondly, several participants highlighted the necessity for *being the right person* by pointing to the risk of putting operators into roles for which they were temperamentally or physically unsuited (e.g., "*it's because I'm too tall … its smaller than me and my knee's hard up against the bloody … I refuse to drive the thing*" – P19). Such risks lead to operator turnover. One participant signalled his intention to leave during the interview as a result of working in a role that required him to do things, he was not comfortable doing e.g., "*[processing] is probably not my preferred job out here"* (P26). Finally, working a new machine is highly valued. For P6, "*your day can be made a lot easier with a later model machine".* Whereas for P25 there was a certain amount of pride in working on a new machine: "*Yeah, just put on a brand new machine, they had 50 hours on the clock and yeah".* In *using experience to mentor young fellas, being the right person* and *working on newer machinery*, contractors were employing tactics that would reduce operator turnover and improve their productivity and profitability. However, those tactics also had the benefit of enhancing the social position of their operators.

The final sub-category of *resolving, being prepared,* was a response contractors took to the threat represented by operators *fearing loss of income* (see section 6.2.3 Threatening family wellbeing). That threat can lead to loss of operators from crews. By way of example, two of the participants left their employment over the two COVID-19 lockdowns the study spanned. In response to market downturns where the forest owner / manager placed constraints on weekly uplift, those participants who were also contractors referred to a set of adaptations that included: knowing how far to push production beyond the quota before there was a potential reprimand from the forest owner / manager; restricting working hours (and, therefore wages); and slowing spending. For example, P1 referred to "*thinking about how we can squeeze every bit out of the time we've got*" and P6 mentioned that "*the belt gets tightened up a little bit*" and that in one instance they "*went to four day weeks … and then shorter days when it was getting real iffy*". Participants also referred to ways in which their employer had prepared for the potential of being shut for a period. *Being prepared*

financially meant being able to meet minimum debt servicing requirements and some level of wage support to retain staff, e.g., "*spoken to the finance company and they're like "yeah, interest only, no dramas at all" … and if we end up parked up, allowances would drop off but wages would be paid*" (P4). P4 also talked about "*doing a bit of firewood or something*" if being forced to shut. "*It's just do some firewood, pay the wages*". P6 considered job security should be a key concern of anyone considering whether to join the industry (e.g., "*so that's the little hidden thing, I suppose*") and who to join (e.g., "*with the bigger companies, the more well set up companies, a lot of the time should be safe*").

Like forest owners / managers, contractors have resources they can deploy that enhance or maintain a crew's productivity and, therefore, assist operators to cope with any threat to their sense of a place within the world. However, not all resources that can have this impact are under the control of a single actor. There are a number that require some cooperation between various actors if they are to be successfully deployed. These negotiated resources are the subject of the next section.

6.4.2.3 NEGOTIATING

Negotiating refers to resources that can only be deployed through agreement and coordination between, at least, two of the actors in the logging field. In negotiating the logging contract and in the way it is operated, the forest owner / manager and the contractor agree on several terms that impact resources operators can then access. Similarly, within the relationship between the contractor and the operators there are agreements being made about how best to work together that will enhance potential for the operators to experience wellbeing. However, negotiated resources are not just limited to those that will be deployed within the logging operation. In adapting to the threats to their identity encapsulated in *threatening logger* (see section 6.2 Threatening logger as a valued way of being), the operators also made use of family / whānau and community resources which required a degree of negotiation with those parties. Unlike *enabling* and *resolving*, where the resources are deployed for the benefit of the controlling party (forest owner / manager and contractor respectively), the wellbeing of the operators could be a factor in the

adaptations pursued through negotiation, regardless of whether the operators were directly involved. This section will explore the participants references to negotiated resources by examining the agreements made within three different relationships: the forest owner / manager and contractor (*negotiating contract terms*); the contractor and operators (*building operator capacity*); and the operator and their family / whānau (*adapting)*.

Negotiating contract terms represented the ways in which the negotiated relationship between the contractor and the forest owner / manager impacted on the resources available to the operator to cope with threats to their sense of identity. Elements of the logging contract such as the crew day rate, the process for calculating the production target and the term had an impact on the machinery available to do the work and the number of operators working within the crew. Sub-categories of *threatening logger* such as *challenging machinery and operations, having threatening bottlenecks* and *having threatening targets* captured the difficulties of maintaining the flow of wood through logging's core process: harvester – prime mover – processor – loader. *Building machine capacity* denoted the resources that made this process more able to perform as required in the face of obstacles and set backs. These resources ensured the work was done within a healthy daily and weekly time frame. Participants referred to machinery that could work different positions within the core process (e.g., *"my machine is all guarded for the bush so it can do both felling or processing ... so I've been processing the last two days ... and then tomorrow I'll be falling again"* – P25) or choosing core process machinery that was adaptable and therefore, more able to cope in difficult situations (e.g. tethered skidders rather than using a hauler). That flexibility was enabled by having spare machinery and floating operators that could provide support for the core positions when required (e.g., excavator loaders either bunching in the cutover to improve prime mover turn around times or assisting processor throughput by fleeting on the skid).

The way the contract was being operated between the forest owner / manager and the contractor also provided resources that positively impacted operator wellbeing by *enabling a sense of security*

and *enabling recovery.* Where relevant, operators expressed their appreciation for the efforts made by forest owners / managers and contractors to keep them employed or paid through any market downturns or the COVID-19 shuts (e.g., "*they got the wage subsidy and they just paid us ... they [topped up the subsidy] so we got our full pay right through"* – P19). Participants also expressed more confidence in the safety of logging operations (e.g. "*things have come on leaps and bounds from I first started ... I had my fair share of accidents when I was younger but there are a lot more [protections] in place now"* – P2). Finally, while having a good break at the end of the working year was almost universally recognised as critical for recovery (e.g., "*I try and take holidays like, we're coming up Christmas time and I just ... my phone goes this way and everything else goes that way ... I don't want to know about it"* - P22), some participants were recognising that a break in the middle of the year was also beneficial (e.g., "*I don't like working a full year now ... we [have] made a thing about having a mid-year holiday"* – P19). Security and recovery were enabled by forest owners / managers that were prepared to provide operators with either income support or work during market downturns and the flexibility within the crew capacity to ensure crew members could take time off as required.

Building operator capacity encapsulates the ways in which an operator could negotiate a more effective relationship with their contractor. Participants referred to four ways in which they could gain some sense of control over their circumstances and wellbeing: *adjusting to time constraints, building influence, buying a machine as a sub-contractor* and *having useful capabilities.* Experienced and skilful operators negotiated with their crew boss / foreman to adapt their logging system to make wood flow more smoothly through the workstations (*adjusting to time constraints)*. These were participants that had a good feel for throughput based on what wood was coming to them and what was leaving (e.g., "*it's more a sense of, I'm in this flow, there's a volume coming into me, and there's a volume leaving me, they better be the same*" – P4). With this sense of flow, they were able to suggest adjustments to the operation that could improve throughput (e.g., "I *know I can read what's going to happen or see what's going to happen and I can see that there's an easier way*" –

P10). Participants also referred to the way they could make the work of the next operator easier as a way of improving throughput (e.g., "*I know that if I can do my job effectively and efficiently, and do one little thing for someone else, it'll make everyone else's day, it just flows on down the thing*" – P9). That need to make things easier for others to make things easier for themselves also applied to other actors in the supply chain. Operators built influence (*building influence*) through building good working relationships with those actors that had power over production expectations and any resources applied to meet those expectations (foreman / crew owner, forest manager supervisor and truck dispatch). Participants recognised that these relationships were reciprocal (e.g., "*look after your machinery and … your gear … and you'll get looked after by the boss*" – P8) with both parties standing to gain through an effective relationship (e.g., "*if you ring up [dispatch] and be a prick, well, they are not going to be in a hurry to help you out … they can't see what your biggest hassle is, so they have to work with what they're working with*" – P18). It also meant having less fear about making mistakes or trying different things (e.g., "*I'd like to think that I've got a really good relationship with my supervisor and … she's not afraid to tell me if I'm wrong and I'm not afraid to tell her"* – P2). There was always a risk, however, that the other person in the relationship would not necessarily respond to these efforts by operators. Two participants spoke about getting past this dependence on other actors for control over their work and work security through purchasing their own machine and working as a sub-contractor (*buying a machine as a sub-contractor*). For example, P7:

> *The [crew owner] noticed that I was a bit better on it, but he was still struggling with the fact that it was breaking down quite a bit. [So] I said, 'Oh well, I can buy it off you if you like' and he goes, 'yeah okay'.*

The final way participants and contractors could work together in *building operator capacity*, involved capabilities that were useful in building those reciprocal relationships and turning potentially stressful situations into something healthier. Those capabilities could be summarised as: accepting of others and the nature of logging (e.g., "*because I'm not always right*" and "you've *just*

got to take it as it is what it is" – P10); having empathy for those you work with (e.g., "*one of the things you're very fortunate to be able to do is that, not just have a person listen to you, but also be willing to do that, because that's the first step*" – P20); being patient in difficult situations (e.g., "*if something stresses me out, I'll just let it pan out and then stress just disappears*" – P2); and being willing to persevere (e.g., "*I honestly don't know what got me through it, I just keep pushing … because if you don't, what have you got to look forward to*?" – P13). These are capabilities that can be developed, particularly through mentoring relationships within the crew. Here again, some of that is within the control of the operator themselves. A common response to a question about the advice you would give to someone starting as a new operator was to ask for help (e.g., "*Yarn about it to your mates, eh. Someone will have a better solution than the one you*" – P8).

Adapting denoted ways in which the operator and family / whānau adapted life outside work to either minimise the health impacts of the rigours of logging or make the sacrifice made by the family / whānau worth it. Participants referred to adjusting sleep patterns as a means of coping with long hours (e.g., "*I've got to be in bed by 8 otherwise I'll be feeling the pinch*" – P13) and being aware of how it was best for them to decompress from the day. For some, that meant keeping work and home life separate (e.g., "*I try and leave all my problems here and then have a clean mind when I get in so I'm not bringing that shit home*" – P12), while for others talking things through with a wife / partner was their means of relaxing (e.g., "*I've learnt to relax, I think, thanks to my wife because I take it home*" – P15). Making those adjustments at home worthwhile for the family / whānau enabled providing the family / whānau with a house to live in within a location that met their needs, even if that meant a long commute to work. For some that also enabled working in forests with which they have a whakapapa relationship within a crew that has mana whenua. The references within *adapting* suggested some operators were balancing the health costs and benefits of their work and making a decision that met both the needs of the family / whānau and their own.

To experience wellbeing, operators must access resources that are mostly within the control of the other actors in the logging field. Both the forest owner / manager and contractor deployed resources for their own benefit that had a secondary benefit of assisting operators to secure their place in the world. Forest owners / managers and their decisions impacted the infrastructural environment (skids and roads) in which the operators worked, and the nature and scope of the activities undertaken within the logging crew. By *enabling* contractors and operators through ensuring access to adequate infrastructure and supply chain resources (*providing adequate resources*), offering contract terms that balanced the financial risks that come with a logging contract (*reducing commitment risk*) and agreeing to crew day rates and production targets that recognised the importance of developing operator capacity and capability (*developing capacity and capability*), forest owners / managers created a workplace environment that enhanced the potential for operators to secure a position in the world that promoted wellbeing. Contractors and their decisions impacted the immediate conditions in which the operators pursued their identity at work: what machines they worked with, how they were organised, how well they worked together and the rewards (both monetary and emotional) they received for that work. In *resolving,* participants suggested that contractors who built healthy and productive cultures (*building a tight knit crew, demonstrating respect*), ensured they were able to recruit and retain staff (*recruiting operators, retaining operators*) and were adequately prepared to deal with the vagaries of the market (*being prepared*), actively assisted operators to get beyond the inherently stressful nature of logging. It is also important to recognise that some of the ways in which the forest owner / manager and contractor resources were deployed were negotiated (*negotiating*) between the various parties: in *negotiating contract terms* between the forest owner / manager and contractor; and in *building operator capacity* between the contractor and operators. Unlike the resources accessed through *enabling* and *resolving,* enhancing operator wellbeing may have been one of the primary goals for some of the resources made available through *negotiating*. Finally, any resource that impacts the wellbeing of operators also impacts the wellbeing of their family / whānau who actively engaged

with resource deployment through the process of *adapting.* Regardless of who had control of the resources denoted by *enabling, resolving* and *negotiating,* and in whose interests they were being deployed, all of them were being utilised by the participants in this study to secure a 'well-ful' position within the hierarchical world in which they live.

6.5 THE ROLE OF RESOURCES IN THE CONSTRUCTION OF STRESS AND WELLBEING

The category "*sustaining logger*" denotes a set of resources the participants used to secure their position in our hierarchical world. Their health outcomes (*affecting logger*) depended on which resources they were able to use. The terms 'resources' and 'affect' have been used, not just because they represent the conditions, actions / interactions and consequences captured within the data, but also because they reflect meanings that are supported within the stress literature. Resources are an essential part of the transactional framework of stress and its derivatives, the 'balance' models of stress (Dewe & Cooper, 2017). These are models that explain wellbeing as a transaction taking place between the environment and individuals that leads to some psycho-physiological affect (e.g., burnout, or alternatively, engagement). Resources are at the centre of the two appraisals that form the transactional framework of stress (Biggs, Brough, & Drummond, 2017). When someone is threatened or challenged by something happening within their environment, they respond on the basis of two appraisals (Lazarus, 2001, as cited in Dewe & Cooper, 2012). Both appraisals combine two sets of forces: the values, goals and beliefs the person brings into the transaction; and the demands and resources that characterise the environment (Biggs et al., 2017). For the first appraisal, the question 'what is at stake' (Lazarus, 2001, as cited in Dewe & Cooper, 2012) could be answered in terms of what resources could I gain or lose. For the second appraisal, the answer to the question 'what can I do about it' (Lazarus, 2001, as cited in Dewe & Cooper, 2012) could be answered in terms of what resources can I use to sustain my position. This introduces the notion that wellbeing is constructed in the balancing of demands and resources. The fit between an individual's personal, social, economic and environmental resources and the external demands they are facing determines

the direction of the wellbeing response and the resultant affect (Hobfoll, 2001). Furthermore, Hobfoll (2001, p. 340) notes that "… stress will occur where resources are threatened, lost, believed to be unstable, or where individuals and groups cannot see a path to the fostering and protection of their resources through their individual or joint efforts". That is reflected in "securing a place in a hierarchical world" within the categories of *threatening logger*, *sustaining logger* and *affecting logger* and their connecting relationships (see figure 5.1).

Since wellbeing was first theorised as a transaction between individuals and conditions in their environment, developments have focused on explaining the relationships between demands and resources and amongst resources. This has led to the development of the 'balance' models of wellbeing. The job demands - resources model (JD-R, Demerouti et al, 2001, as cited in Bakker & Demerouti, 2007) is the most popular framework in occupational health psychology for investigating the relationships between job characteristics and employee well-being (Lesener, Gusy, & Wolter, 2019). It was developed to explain the causes of burnout. Its popularity rests on the scope of its definitions for the environment characteristics represented by job demands and job resources (Bakker & Demerouti, 2007), and the tested validity of the model. For example, Lesener et al. (2019, pp. 92-93) using a meta-analysis of 74 longitudinal studies validated the two core assumptions: "(1) job characteristics lead to employee wellbeing; and (2) job resources foster wellbeing which in turn facilitates the acquirement and maintenance of job resources". The central precept of the model is that all occupational risk factors can be classified as either job demands or job resources (Bakker & Demerouti, 2007). Job demands and job resources were found to be the most important correlates of the two core dimensions of job burnout. Job demands were highly correlated with exhaustion and job resources were highly correlated with cynicism (Bakker & Demerouti, 2017). Job demands are described in a similar way to the description of psychosocial hazards in Table 2.1. That is, "those aspects of work design and the organisation and management of work and their social and environmental contexts, which have the potential for causing psychosocial or physical harm" (Cox et al., 2003, p. 195). Job resources refer to those "physical, psychological, social, or organisational

aspects of the job that are functional in achieving work goals, reduce job demands and the associated physiological and psychological costs, or stimulate personal growth, learning and development" (Bakker & Demerouti, 2007, p. 312). The two categories are associated with two different fundamental psychological processes that are the basis for job strain and job motivation (Bakker & Demerouti, 2007):

1. A health impairment process – job demands that exceed and exhaust the employee's mental and physical resources, and may therefore result in energy depletion (that is exhaustion) and subsequent health problems; and
2. A motivational process where resources have the potential to motivate and result in higher engagement and performance and lower cynicism. Resources may foster intrinsic motivational potential through employee learning and development, or the focus may be more extrinsic by assisting with goal achievement.

These processes interact to create several different outcomes that support the conclusions made about the role of resources in this study. Firstly, job resources may buffer the impact of job demands on job strain (Bakker & Demerouti, 2007) reflecting the relationship between *sustaining logger* and *affecting logger*. Secondly, personal resources such as those encapsulated in *having useful capabilities* (see section 6.4.2.3 Negotiating) can play a similar role as job resources as they are defined above. As with *Increasing operator capacity,* personal resources within the JD-R framework are used to denote "beliefs people hold regarding how much control they have over their environment" (Bakker & Demerouti, 2017, p. 275). Finally, those who experienced stress resulting from job demands overwhelming their job resources, perceive and create more job demands over time (Bakker & Demerouti, 2017). Bakker and Costa (2014, as cited in Bakker & Demerouti, 2017) referred to this process as self-undermining behaviour which is behaviour that sets up obstacles and threats that may further undermine job performance. An example would be the relationship between fatigue and conflict in *experiencing stress* (see section 6.3.2 Affecting logger: Experiencing

stress) where conflict increases the likelihood that workplace conditions will increase fatigue. The impact of resource loss and gain as theorised within the JD-R model concurs with the impacts referred to in the participants narrative within *securing a place in a hierarchical world.*

The JD-R model also provides support for conclusions reached in *securing a place in a hierarchical world* about the impact of resource control on the wellbeing of the operators. Job demands are defined within the model as those "physical, psychological, social or organisational aspects of the job that require sustained physical and / or psychological (cognitive and emotional) effort or skills" (Lesener et al., 2019, p. 312). Production or throughput pressure and the weather would be relevant examples from this study. So, while job demands fit most closely with the category *threatening logger* (see section 6.2 Threatening logger as a valued way of being), the top-down perspective of job design implied within the JD-R model means that it is largely assumed that organisations create the work environment by defining the tasks and providing the resources. (Bakker & Demerouti, 2017). In other words, there are resources on both sides of the JD-R equation. One driver of job demands, and the resulting health impairment process is, therefore, a lack of adequate resourcing and infrastructure as encapsulated in *securing a place in a hierarchical world.* However, researchers working with the application of the JD-R model have also noted that employees may proactively change what they do (referred to as job crafting by Wrzesniwski & Dutton, 2001, as cited in Bakker & Demerouti, 2017). As with *building influence* (see section 6.4.2.3 Negotiating), job crafting can include 'crafting' relationships that lead to higher levels of job and personal resources. While the definitions of resources within the JD-R model are more narrowly focused on the individual rather than the crew and operation (as used in *securing a place in a hierarchical world)*, there is considerable overlap between the two frameworks with respect to the role of resources in constructing the health and wellbeing of operators as they look to secure their position in the world.

A related but slightly different approach to describing the role of resources on wellbeing is encapsulated in an alternative 'balance' model of stress – the Conservation of Resources Theory

(CoR, Hobfoll, 1989). Proposed as a theory of motivation, this is also one of the most used theories in organisational behaviour (Halbesleben, Neveu, Paustian-Underdahl, & Westman, 2014). Like the JD-R model, in CoR theory, resources have a motivational role in the development of wellbeing. The central tenet of COR theory is that humans are motivated to accumulate, maintain and protect things they value (resources, Hobfoll, 1988, as cited in Hobfoll, 2011) . The way people act in response to that motivation is described by CoR theory through two principles and four corollaries that have been supported in studies of stress and trauma (see table 6.1, Halbesleben et al., 2014; Hobfoll, 2011). These principles and corollaries state that what guides individual behaviour and outcomes is that resource loss is disproportionately more salient than resource gain (Hobfoll, 1989) both in terms of the degree of loss and the speed with which it happens (Hobfoll, 2011). Individuals must invest resources in order to protect against resource loss, recover from losses and gain resources. Furthermore, resource gain increases in salience in the context of resource loss (Hobfoll, 1989) which means that when resource loss circumstances are high, resource gains become more important. When people's resources are overwhelmed, they enter a defensive mode to preserve the self with behaviour that is often defensive, aggressive and may become irrational (Hobfoll, 1989). This suggests the conflict referred to in *experiencing stress* (see section 6.3.2 Affecting logger: Experiencing stress) could be a response to the other stress experience, fatigue.

In CoR Theory, resources are defined more broadly than the way job resources are defined in the JD-R model. Hobfoll (2011) defines resources as objects (e.g., a logging machine), conditions (e.g., effective working relationships, seniority within a logging crew), personal resources (e.g., operating skills and traits such as those described in *having useful capabilities* – see section 6.4.2.3 Negotiating) and energy resources (e.g., physical capacity and credit). These are loosely described as having value with Halbesleben et al. (2014) suggesting that value varies among individuals as a function of their personal experiences and situations. This attachment of resources to the attainment of something valued is an aspect of CoR theory that attracts criticism. Freund and

Riediger (2001) believe the utility of resources is left unclear in the reference to value and argue that value can only be established through reference to the tasks or demands they help to achieve. This is similar to the treatment of resources in the JD-R Model, where job resources are essentially valued in terms of their contribution to the individuals ability to meet job demands. Halbesleben et al. (2014, p. 1337) agree that how resources are to be valued is unclear and, as a result, that "anything good can be considered a resource". They point out that confounding the resource with its outcome is problematic because there is evidence that good things can lead to bad outcomes (e.g., allocating more of the family's time to work to achieve higher weekly pay). Furthermore, Halbesleben et al. (2014) suggest that part of the problem with the Hobfoll (1989) definition is that it identifies and categorises resources (objects, conditions, personal capabilities and energies) without actually defining them. Both Freund and Riediger (2001) and Halbesleben et al. (2014) argue that a more useful definition would be anything that is an actual or perceived means of achieving one's goals. Including the perceived means of achieving a goal in the definition accommodates situations where individuals protect resources that, from an outsider's perspective, seem to be hindering goal achievement rather than facilitating it. For example, the actions taken by more experienced operators to protect their position of seniority within the crew even though they may hinder other objectives such as crew 'team-ship' and, ultimately, production. However, conceiving the value of resources in terms of goal achievement leaves out the role of the social environment in the construction of goals which is central to "*securing a place in a hierarchical world*". In this regard, Hobfoll's recognition of the role resources play in an individual's life is helpful:

> … people employ key resources in order to conduct the regulation of the self, their operation of social relations, and how they organise, behave, and fit in to the greater context of organisations and culture itself (Hobfoll, 2011, p. 117).

Within *securing a place in a hierarchical world*, resources have been defined in terms of the value they have towards the embodiment of the habitus of logger. This fits more closely with Hobfoll's explanation of the reasons people employ resources. Here it is argued that this is a more useful

approach because it recognises that both goals are set, and resources are accessed within a socio-cultural context and that is relevant to any attempts to intervene on behalf of the operator's wellbeing.

Both CoR Theory and the JD-R framework can be used to explain what has been interpreted from the participants' narrative about the social process encapsulated within *securing a place in a hierarchical world.* Within the JD-R model, stress would be explained as the outcome of job demands exceeding the skills and energy of the operators which can be buffered using the resources contained in *enabling*, *negotiating* and *resolving*. Explaining the social process that constructs operator wellbeing, using CoR theory, starts with recognising energy is the most important resource to someone working on an hourly wage. Protecting against its loss originally defined the sought after position of machine operator in a mixed motor manual logging crew. Now that most positions are mechanised, loggers use investments in skills and influence to protect against energy loss and defend their influence through subverting or appropriating the influence of others. This is embedded in the crew through the structure of the relationships between the three actors. A corollary of CoR (see table 6.1) is that those with the most resources are less vulnerable to resource loss and more capable of resource gain while those who lack resources are more vulnerable to resource loss and less capable of resource gain. That means the category *overcoming* is the 'natural' route to *being logger* given the nature of these relationships. The cases that provide us with the categories *enabling*, *negotiating* and *resolving* all point to some investment of resources by forest owners / managers and contractors to protect from the threat of resource loss (such as those presented by legislation) and gain resources (e.g., more operators). Operator wellbeing can be explained through their access to and use of resources that help construct the 'logger' identity.

Within *securing a place in a hierarchical world* the pathways to wellbeing are represented by the categories *threatening logger, sustaining logger* and *affecting logger.* That pathway provides a way in which to conceptualise wellbeing as the product of the resource's operators stand to lose when

threatened and can use as a means of coping. The value of those resources to operators are established through the set of dispositions they look to embody within the habitus of logger. Resources critical to the embodiment of those dispositions are what is at stake when an operator is threatened. Operators are threatened with their loss through three key conditions: *threatening achievement of targets or throughput; threatening family wellbeing;* and *threatening a sense of place within the crew.* As their primary resource is time, resolving those threats means using more of it to overcome those demands or challenges (*overcoming*). This is especially so for those events that threaten their source of income which they assume to be the threats to production. As both the 'balance' theories of stress (JD-R and CoR) conceptualise, when the demand for that resource overwhelms the energy capacity of the operator, stress is experienced (*experiencing stress*) as fatigue and conflict. CoR and JD-R would explain that conflict as a defensive behaviour aimed at protecting energy albeit in a way that undermines that intention. There are, however, resources that can resolve these threats in ways that promote the potential for operators to experience wellbeing in their efforts to embody their habitus (*enabling, resolving* and *negotiating*). However, these are, by and large, resources that can only be accessed if forest owners / managers and contractors deploy them in pursuit of their own interests. Operator stress, therefore, is embedded in the relationship they have with the forest owner / manager and contractor and the precarious nature of their relationship with the setting's resources. *Securing a place in a hierarchical world* explains operator wellbeing as resulting from their efforts to overcome that precarity. The next chapter will discuss and explain that precarity as the central relationship that connects the habitus of logger with the pathways to wellbeing.

7 DISCUSSION: SECURING A PLACE IN A HIERARCHICAL WORLD

In setting out the sub-categories and relationships within the core category *securing a place in a hierarchical world,* Chapters five and six have conceptualised operator wellbeing as a social

construction involving interaction between two core processes (see figure 5.1). The first process establishes 'logger' as a habitus – "systems of durable, transposable dispositions" that guide individuals in their adaptations to the social environment without reference to conscious deliberation (Bourdieu, 1990, p. 53). As something that is shared and shaped socially, habitus establishes 'logger' as a valued way of being for the operators (*being logger* and *becoming logger*). Work, therefore, is both a means to an end and an end in and of itself. In the second process, that valued way of being is threatened by events happening within the operators' social environment (*threatening logger*). Sustaining that valued way of being in the face of those threats requires the deployment of certain resources (*sustaining logger*). Depending on which resources are deployed, *sustaining logger* will have a health impact on the operator's wellbeing and stress (*affecting logger*), regardless of in whose interests those resources have been deployed. This means that each party (forest owner / manager, contractor and operator) has a significant interest in the resource deployment decisions the other parties make. The level of precarity each actor faces is a function of the resources that can be accessed from other actors. However, those resource deployment decisions are not just products of the relationship between the parties, they are also influenced by the social structures in which that relationship is located (Bourdieu, 1990). How those structures influence the resource deployment decisions of all three actors is, therefore, an essential property of the core category and is the subject of this chapter.

The purpose of this chapter is to consider the impact of the socio-cultural environment on each party's assessment of their interests and how they deploy their resources in pursuit of those interests to provide an ecological explanation of wellbeing as an outcome of *securing a place in a hierarchical world.* What the chapter will argue is that the socio-cultural context is hierarchical. Positions on that hierarchy are established by the nature and amount of the resources controlled by each actor (forest owner / manager, contractor and operator). If the goal is to pursue a higher social position, then actors are incentivised to conserve or invest their own resources while conscripting

the resources of those in social positions over whom they have power. The level of wellbeing experienced by operators, therefore, is not just constructed through what they value and how it is threatened and sustained but is also a result of being in a disadvantaged position relative to both other actors (forest owner / manager and contractor). This is a property of the core category that explains wellbeing as a product of the ecological system occupied by loggers and, as such, has significant implications for predicting behaviour and health outcomes.

The chapter will address the impact of the socio-cultural environment on resource deployment decisions by explaining 'logger' as a social position in a hierarchical world and the role of resources in establishing social position. It will then consider how the contest for social position and resources impacts the logging setting.

7.1 LOGGER AS A SOCIAL POSITION

Chapter five has explained 'logger' as the habitus of a specific masculinity and argued that masculinity is a relational practice: something that those who identify as masculine 'do' that is constructed within social interaction rather than something that they 'are' (Brandth & Haugen, 2000; Connell & Messerschmidt, 2005; Law et al., 1999; Lorber, 1994; West & Zimmerman, 2002). As such "masculinity is not a fixed entity embedded in the body or personality traits of individuals" and they "can differ according to the gender relations in a particular social setting" (Connell & Messerschmidt, 2005, p. 836). However, despite the active nature of masculinity (and gender in general), it is not something necessarily happening within our level of conscious thought. Lorber (1994, p. 13) argued that "gender is so much the routine ground of everyday activities … that in our society we assume it is bred into our genes". It is this active yet unconscious nature of masculinity that fits with habitus. As a set of dispositions, habitus is guiding the actions operators will take in adapting to events such as threats, demands and challenges but doing so at a level below conscious thought (Bourdieu, 1990). That means we cannot understand the behaviour of the operators (and

indeed, the other actors in the field – forest owners / managers and contractors) unless we understand the impact of gender relations on that behaviour.

As discussed in Chapter five, masculinities, and therefore, habitus, are more than just relations of difference they are also relations of power (West & Zimmerman, 2002). Gender identities are organised in a power structure relative to each other (Lorber, 1994). Connell and Messerschmidt (2005) suggest this structure is hierarchical, with all identities positioned relative to the currently most honoured way of being a man within that social setting. This hegemonic masculinity "is a pattern of practice … that allows dominance of a group over others (subordinated men, women, non-binary genders)" (Connell & Messerschmidt, 2005, p. 832). Dominance over other gender identities is achieved through how much of the perceived habitus of the hegemonic masculinity is appropriated (J. Lee et al., 2019). Those who cannot or do not want to meet the requirements of the hegemonic masculinity, may appropriate, emphasise or engage in some dimensions of that masculinity in their efforts to acquire some power within the hierarchy (Connell & Messerschmidt, 2005). In the case of the logger habitus, physical prowess, risk taking, and provider / protector may be practices appropriated from what the operators understand to be the habitus of the apex masculinity in the hierarchy. Those dispositions / practices reflect the importance of embodiment in masculine identity and the interaction between that embodiment and the social context in delineating courses of action in pursuit of dominance over others within that particular social setting (Connell & Messerschmidt, 2005). In identifying forest managers as 'powerful' and operators as 'tough', Brandth and Haugen (2000) argued that the models of masculinity within the Norwegian forest industry differed around their positions of power and how they embodied their masculinity. That analysis illustrated the "contested nature of work related spaces and identities" (Brandth & Haugen, 2000, p. 354). However, it also recognised that the two masculinities were mutually dependent with each gaining legitimacy from the other. That finding reflects the idea that masculinities embodied within any setting are defined in opposition to each other (Messerschmidt, 2019). While each of the masculinities described by Brandth and Haugen (2000) were constructed

around perceptions of control and 'battle', the operators described the battle as being against the natural elements of their environment while the forest managers battled the elements of the business environment. This 'push – pull' tension for power and control between masculinities makes 'manhood' a precarious entity that must be continuously re-asserted and proven. All actors within the logging setting need to demonstrate to themselves and each other that they meet the ideal they are pursuing. Because masculinity is socially attained and dependent on the views of others and their deference, manhood can be considered tenuous and conditional. Hence, the emphasis on securing a place within our hierarchical world in delineating the core category.

7.2 THE ROLE OF RESOURCES IN ESTABLISHING SOCIAL POSITION

Resources have become the focus of the 'balance' theories of motivation and stress (Job Demands – Job Resources model and Conservation of Resources Theory) because it is the only entity in the transactional framework of stress that can be directly observed and measured and, therefore, used to predict behaviour and outcomes (Hobfoll, 2001). They are still, however, products of the social environment. While they may reflect both the motivation and capabilities of the individual, their impact is a product of the value placed on them by the individual. Something that is constructed in the relationship between the individual and their social environment. In explaining the Theory of Conservation of Resources (CoR), Hobfoll (2001, pg 341) defined resources as a valued entity that was not "individually determined, but are both transcultural and products of any given culture". Furthermore, that value and indeed, the resource itself, may well be a product of systems within an individual's ecology (see figure 2.1) but not directly occupied by the individual. For example, in constructing a theoretical framework that explains work-home interface processes using CoR theory, Ten Brummelhuis and Bakker (2012) referred to macro resources found within the wider economic, cultural and social system in which a person's social settings are embedded. These were resources that "determined the extent to which individuals need to call upon resources that are more directly in their reach and the extent to which other resources can be used effectively (Ten Brummelhuis & Bakker, 2012, pg 548). Elements of the culture that change the context in which one operates are an

example of a macro resource. Gender habitus could be considered one of those cultural elements that changes context and impacts the use of resources within that context. As masculinity is embodied (Connell & Messerschmidt, 2005), resources are, therefore, an element of the construction of specific masculinities within the contest for dominance over other specific gender identities. In directing thoughts and behaviours, habitus also shapes taste which means those who share a habitus will apply similar meanings to the resources available within any given context (Bourdieu, 1990). That was reflected in the resources the participants saw as the material signs of success (e.g., houses, classic or muscle cars, SUV's, boats, motorbikes and jet skis - see section 6.4.1 Affecting logger: Experiencing wellbeing). Such resources are 'trophies' used to demonstrate to others their attainment of the ideal masculinity they are pursuing.

Resources as the subject of a contest for social position is at the core of Pierre Bourdieu's Theory of Capital. In this explanation of society, social position is determined by the acquisition of resources or, as he described them, capital. Capital is defined as "accumulated labour (in its materialised form or its 'incorporated' embodied form)" (Bourdieu, 1986, p. 241). Bourdieu described capital as having three forms: economic, social and cultural. Economic capital represented "material assets that are 'immediately and directly convertible into money and may be institutionalised in the form of property rights" (Bourdieu, 1986, p. 242). Social capital consisted of "the aggregate of the actual or potential resources which are linked to the possession of a durable network of more or less institutionalised relationships of mutual acquaintance and recognition" (Bourdieu, 1986, p. 247). Finally, cultural capital was identified through its three forms: objectified, which concerns the possession of cultural goods such as those described above as the signs of success within the logger habitus; institutionalised, which Bourdieu set apart as a specific form of objectification because, as in the case of educational qualifications it "confers entirely original properties on the cultural qualification which it is presumed to guarantee" (Bourdieu, 1986, p. 243); and embodied, as represented by the concept of habitus. Individuals can use that capital to appropriate the capital of others to improve their position on the social hierarchy operating within any structured setting.

Bourdieu (1986) suggested that capital is what makes the contest for social position something other than a simple game of chance with the game being played within structured social settings where events, actions, interactions and transactions occur (e.g., logging). As J. Lee et al. (2019, p. 1471) notes, "every social gent uses various strategies to maintain or improve their social position, or social class by the accumulation of capitals at stake". Capital (including the embodied cultural capital represented by habitus) is, therefore, at the centre of the creation and maintenance of the structured power imbalances that distinguish social classes within society (Bourdieu, 1984, as cited in J. Lee et al., 2019).

Bourdieu is arguing, therefore, that the contest for resources is central to the structure of our social world and that the resulting distribution of resources determines life outcomes. Hobfoll (2001, p. 340) appears to agree in stating that "we are all captive to our resources, their availability, and the extent to which they are shared and stable". Ten Brummelhuis and Bakker (2012) pointed to this relationship between resources and the structure of our world in their categorisation of macro resources noted above. However, this relationship between resources and social structures appears to go both ways. While Bourdieu argues that the distribution of capital represents the social structure of the world, Hobfoll (2001) has argued that people's resources exist in ecological conditions that either facilitate and enhance or limit and block the resource creation and sustenance required to achieve valued outcomes. Bourdieu would argue those ecological conditions are captured in the concept of the contested social position that is reflected in one of the corollaries of CoR Theory: those with greater resources are less vulnerable to resource loss and more capable of resource gain. Conversely, those individuals and organisations that lack resources are more vulnerable to resource loss and less capable of resource gain. Who has what resources is therefore, material to the state of wellbeing an individual experiences as a result of their pursuit of their valued way of being. That is reflected in the positive association between social position and health: an improvement or degrading of someone's social position is reflected in a similar change in their

health (Pinxten & Lievens, 2014). Health, as a life outcome, is therefore determined by social position and the implications that has on the distribution of resources.

7.3 LOGGING AS A CONTESTED SPACE: IMPLICATIONS FOR OPERATOR WELLBEING

The implication of resources being the subject of the contest for social position or dominance is that resource deployment decisions are not being made independently of the other actors. The contest for social position or dominance is essentially a contest for resources executed through the conservation of one's own resources and the appropriation of the resources of those in a sub-dominant position. What is important within the contest happening within logging, is the type and amount of capital the operators have relative to the other key actors in the field, that is, the forest owner / manager and contractor. Operators enter the contest with the cultural capital represented by their habitus and their social network. The role of operator represents a chance to appropriate the objectified cultural capital represented by work to generate some economic resources of their own. They are in this position because they lack the institutionalised cultural capital, represented by the educational qualifications, that allows forest managers to gain some control over the forest. That control enables the forest owner / manager to appropriate the economic capital of the contractors as represented by their machines. Operators are therefore, in the most precarious position, particularly as their relative scarcity is offset by their lack of organisation outside of the crew. This precarity is a property of *securing a place in a hierarchical world* and explains, through the distribution of resources, how the social processes depicted in figure 7.1 can result in diverse health outcomes.

It is important for the development of any interventions, however, that the precarious position of the operators is not seen as the 'problem' to be solved. The power dynamics within the setting are much more complex than that. Forest owners / managers and contractors are limited in their power to appropriate the capital of the operators through the need to have operators to operate the machines (the source of the mutual dependence between the actors referred to by Brandth &

Haugen, 2000) and regulatory controls such as the Health and Safety at Work Act 2015. As members of a dominated group, operator power will only increase to the extent the dominant group are not able to set them in competition with each other. While the dominant group achieves this through the way the work is contracted and the conditions in which operators are selected, trained and rewarded, operators are not active in their efforts to organise themselves. Such organisation (e.g., unionisation) does not fit with their self-reliant way of being and they come into the contest socialised to expect it. Acceptance of and adaptation to the reality of this dominance requires "apprehension of the established order as natural (orthodoxy)" by the operators Bourdieu (1991, p. 169). That acceptance and adaptation is reflected in the habitus of 'logger'. Operators would argue that their social position is enhanced by adaptations like working long hours because it provides them with greater economic resources (that is, wages) and enhanced cultural capital (that is, skills, experience and a reputation for being hard working). Social position is, therefore, shaping practice as much as it is being shaped by practice (Masquelier, 2019). The social action of operators is directed by the structuring role of doxa (popular belief or opinion) and regulated by their own habitus such that the operators actively construct their dominated position themselves (Masquelier, 2019). They are not passively complicit. Instead, they are actively engaged in the process, and as the machines are seen as extensions of their own physical prowess, the machines become the embodiment of that hierarchy. As long as the machines themselves occupy different positions within the crew, the operators are also in a contest with each other. In other words, the field of logging is a highly contested space with operators engaged in a contest for social position and dominance amongst themselves and with the other social actors. As that contest is happening at the level of habitus for all actors, it is happening at a level below conscious thought (Bourdieu, 1990) and is accepted by all as the nature of reality (Masquelier, 2019). If that 'reality' impacts negatively on operator wellbeing, as it has the potential to do, then changing that outcome requires changes in the interests and practices of all three actors otherwise, the situation will continue.

Operator wellbeing is happening, therefore, as a result of the efforts those operators make to secure their social position from a sub-dominant position in a hierarchical world. The level of power each actor has over the combined resources potentially available within the field is indicated by the relative sizes of each of the sub-categories of *sustaining logger* (that is, *enabling, resolving, overcoming and negotiating*) in Figure 7.1. The level of wellbeing experienced by an operator will reflect the outcome of the contest for social position or dominance over those resources. This is the third process of the core category *securing a place in a hierarchical world*. Operator wellbeing is being determined by the resource deployment decisions they and the other actors are making in an effort to enhance their respective positions within that contest.

8 CONCLUSION

This research was justified on the basis that there was little research on the psychosocial conditions facing machine operators in Aotearoa New Zealand's logging industry, something that had been highlighted by industry surveys, reviews and reports (e.g., Adams, Armstrong, & Cosman, 2014; Lovelock & Houghton, 2017; Nielsen, 2015a). The authors of these studies considered such research as a necessary pre-condition for change. This study aimed to build a comprehensive understanding of stress and its impacts in the logging industry by explaining the process of stress and wellbeing in operation for the participant operators. As relatively little was known about the area of study, it was argued that a substantive explanation was necessary. Wellbeing was considered as a process embedded in the research situation, and constructivist grounded theory was seen as an appropriate methodology for meeting the aims of the research. Data was collected from 27 participants working in the logging industries of three regions (Te Tainui Raukawa - Te Arawa Waka / Central North Island; Te Tai Rāwhiti / Poverty Bay-East Coast; and Murihiku / Otago-Southland) and analysed using constructivist grounded theory methods. This analysis identified the core category of *securing a place in a hierarchical world* as encapsulating the process evident in the properties and dimensions of five categories evident within the data - *becoming logger, threatening logger, sustaining logger, being logger and affecting logger* – and their inter-relationships.

Securing a place in a hierarchical world explained stress and wellbeing as an outcome of the actions / interactions that make up the operators' habitus. These practices were used to secure a sense of self and belonging within the various contextual and socio-cultural hierarchies in which they lived and worked. Securing that position in the world required the participant operators to confront and adapt to threats and challenges as they arose within their social environments. Those adaptations invariably required access to resources controlled by either themselves, the forest owner / manager or the contractor. If reliant solely on the resources they directly controlled, participant operators overcame obstacles by working longer hours which, if that became chronic, negatively impacted their wellbeing. If the required work was longer than what could be achieved within a healthy

timeframe, the operators needed access to resources controlled by either the forest owner / manager or the contractor. As the social environment was hierarchical, with resources a key element in the contest for position within those hierarchies, resources critical to operator wellbeing were controlled by the other actors (forest owner / manager, contractor). Those resources would only be deployed if that was to the advantage of the controlling actor. However, the relative positions of each of the actors were mutually dependent and that mutual dependency provided some balancing of the contest for social position. Where required, intervening to enhance operator wellbeing will require, therefore, some aligning of these mutual interests through a re-framing of the contest for social position between the three actors.

8.1 RELEVANCE AND CONTRIBUTION

In providing an explanation of the construction of wellbeing by machine operators in Aotearoa New Zealand's logging industry, this research has provided an inventory of the psychosocial hazards faced by logging machine operators working in Aotearoa and the resources that enable them to cope. In doing so, it provides detail on both the operation of the relevant psychosocial hazards listed in Table 2.1 within this context and the known resources used to eliminate or minimise those hazards. It also considers the demands operators place on themselves in pursuit of their valued way of being. However, in Chapter 3 it was argued that having the necessary confidence in any explanation meant recognising the role of the context and its macro-systems (political, social, cultural and economic) in shaping the meanings the participants applied to the process of wellbeing (Newton, 1995, as cited in Harkness et al., 2005). Grounded theory was specifically employed to provide a substantive explanation of wellbeing that was able to capture the impact of the ecological system on the participant operators through their everyday lived experience. As such, the explanation goes beyond just identifying the psychosocial hazards that exist within logging workplaces to explain how those conditions are promoted by the structures and institutions that encompass those workplaces and the lives of those who work in them. It identifies why those conditions both exist and persist in the face of evidence that they are harmful. Furthermore, the conditions and consequences experienced

by the participants have been captured in the words they use and their actions / interactions. That gives the explanation a level of authenticity that could not have been achieved using the standardised assessment instruments that have been used to understand psychosocial work conditions and their consequences. The research provides findings and interpretations that operators and those charged with their welfare can recognise and use. Understanding the psychosocial hazards and the role of the context in their development and perpetuation through the language of those who live with those hazards is required if interventions are to be pursued with any potential for success.

The findings have a number of implications for those looking to enhance operator wellbeing within the workplace. Firstly, the potential for operator wellbeing needs to be established when designing skids and specifying harvesting and trucking contractor capabilities. Operator wellbeing is essentially a function of the harvesting system (skids, roads, logging equipment configuration and trucks) having the capacity for daily uplift to meet target across the range of likely operating conditions within healthy daily work hours (maximum 10 – 11 hours) including travel. Where uplift cannot be met within those hours then the resources need to be in place to rotate operators through the impacted workstations (e.g., by sharing the early load outs amongst a group of operators).

Secondly, the findings suggest that those employing logging machine operators need to lead and manage their business in a way that ensures operator wellbeing. What that means is delineated within the findings. There is a need to invest in operator skills through training and mentoring so that multiple operators can work across a range of machines. Having multi-skilled operators enables job rotation, some flexibility over work hours because operator absence can be covered and reducing the tendency towards an informal hierarchy that arises from operators having limited skill sets. There also needs to be transparency around targets and input encouraged from operators on how to organise the crew to meet that target. Operators need to be paid well, and despite some resistance from operators towards fixed salaries, there is some evidence within the findings that

where that was facilitated by adequate harvesting system resources, salaries encouraged operators to limit their time on the job. Care and respect towards operators are demonstrated by providing them with the resources required to do the work, helping them through problems at home and being concerned about their work-home balance. Ensuring there are sufficient operators on site means being active in developing a network of potential recruits so that gaps in the roster can be filled quickly when they arise. That might include negotiating with the forest owner / manager to allow the inclusion of development positions within the operating configuration of the crew. Finally, contractors need to be prepared for the inevitable market downturns that might affect operator income whether that is being able to provide alternative work or providing financial management skills training. While these actions place a significant burden on the employer, the benefit to them is higher levels of operator retention and skills and production system resilience, all of which will improve business profitability, cashflow and certainty.

Finally, in developing intentions and interventions aimed at improving operator wellbeing, there needs to be some recognition that the status quo is facilitated by the existing power differentials between the forest owner / manager, contractor and operator. These differentials represent forces that will resist change more than being forces that will promote change. For example, given the place of work conditions in their habitus, no changes should be made to these conditions without consulting with the operators. Although working longer hours contributes to their experience of stress, working these hours is a practice that is reinforced by the benefits they receive in the form of increased weekly income, if paid through hourly wages, and an enhanced standing within the crew through a reputation for hard work. Aside from the use of production restrictions to weather a market downturn, any decision that reduces working hours and places these benefits at risk is likely to be met with resistance even if the argument in favour of that decision is promoting operator wellbeing. Decisions such as mandating a shorter working day that will impact the hours of work need to replace the benefits received for working those hours before they are likely to be accepted. Changing may require some re-framing of the power dynamics at play within the setting. The key

resources required to promote operator wellbeing are deployed by the forest owners / managers and contractors on behalf of their own respective interests. For change to happen successfully there needs to be some aligning of the interests of those actors with those of the operators.

8.2 LIMITATIONS

There are several limitations associated with the methodology and methods used to complete this study. The first is that the logistical and financial constraints on sampling meant sampling occurred in three main time blocks. These blocks were spread over 12 months and some initial coding was completed between sampling blocks and some gaps in the data were identified for follow up in the subsequent block. However, sampling in restricted time periods is not quite the concurrent sampling and analysis promoted by various authors (e.g., Birks & Mills, 2015; Charmaz, 2014; Corbin & Strauss, 2015) as being an essential grounded theory method. Proceeding with a more constrained sampling timeframe was a trade off with the necessity to interview kanōhi ki te kanōhi (face to face) to meet the ethical requirements for research involving Māori (see section 4.5.2 Ensuring culturally appropriate treatment of Māori). Although theoretical saturation of the codes was assessed as having been reached, that assessment may be confounded by this sampling practice.

A second limitation relates to the decision to recruit from a limited number of regions within Aotearoa. This limitation recognises that, in the meaning of the word 'representative' in operation within forestry science, and therefore, the forest industry, a small sample taken from 3 locations is unlikely to meet the criteria for being representative of all cases. While the selection criteria for those regions attempted to cover the variability in operator working conditions within the logging industry, as a substantive theory, *securing a place in a hierarchical world* can only be considered directly representative of those regions in which the participants worked. However, keeping in mind that the objective of the research was to provide an explanation that could be used as a basis for interventions that improve the wellbeing of the operator community, then the criteria for robustness is more usefully defined by its applicability (Corbin & Strauss, 2015). If something has

been learnt from that small sample that can be applied across all regions of the forest industry with a reasonable degree of confidence then the research can be considered robust despite its sample limitations. In other words, *securing a place in a hierarchical world* can be considered broad enough to have application outside the regions from which it was derived.

Transferability across industries and countries will be limited by the differences between those contexts and the context that has been sampled in this study. To put that another way, applying *securing a place in a hierarchical world* to male dominated, physically demanding work places other than logging or to forest industries in other countries will depend on the extent to which the operating environment has similar features to the logging industry in Aotearoa New Zealand. In particular, the context would need similar contractual arrangements (that is labour supplied through labour service contracts, paid for by piece rates), have the levels of surveillance (production and quality output) enabled by piece rate contracts and be part of a supply chain where tasks are divided amongst different labour service contracts. The importance of these features are highlighted by testimony from three participants who worked in industries considered to have a similar structure to logging (civil construction and agriculture). Agricultural contracting such as baleage and hay are paid on a piece rate basis (a rate per bale) but the operators exposure to this is limited to summer only. During the rest of the year the contract rate is based on machine hours. In civil construction, production pressure is most highly associated with fixed price contracts but within those contracts it can be difficult to establish and measure daily progress milestones reducing the surveillance pressure associated with the contract. What makes this study useful, however, for those working within those other contexts is that there is a level of detail in the analysis of these conditions that makes the analysis of transferability those contexts possible.

Finally, as a study that is rooted in a constructivist paradigm it is important to recognise that this is but one interpretation of the data. While the researcher's position relative to the participants was considered prior to starting the interviewing and analysis process (see section 3.5.3 Researcher

position relative to participants), the difference in that position relative to the life experience of the participants may have limited some of the more nuanced understandings of their work and home life experiences. However, the goal here was to provide findings that could be thought of as trustworthy and believable in "that they reflect [the] participants', researchers' and readers' experiences with [the] phenomena" (Corbin & Strauss, 2015, pg 346) and therefore provide a credible interpretation of the data even if it is only one of many possible interpretations.

8.3 POTENTIAL AREAS FOR FURTHER STUDY

This study was designed to provide sufficient knowledge upon which to base a programme of interventions without further research. However, it would be good practice to establish some quantitative means of measuring the effectiveness of that programme as part of the evaluation suite. That would mean using the inventory of psychosocial hazards, coping resources and wellbeing affects captured in *securing a place in a hierarchical world* as a starting point for the identification of appropriate psychosocial assessment instruments. The identified assessment could then be applied to a statistically representative sample to measure the extent of those conditions, resources and consequences. Such an approach would also facilitate longitudinal research aimed at testing specific interventions defined by the explanation of wellbeing provided by this study.

The study has also highlighted the importance of decisions made by other actors (e.g., forest owners / managers) within logging and the interactions the operators have with actors in adjacent settings (e.g., family / whānau). While the study includes data, codes and categories encapsulating the impacts of these decisions and interactions in the workplace, it does not enlighten us as to why these incidents happen. For that there needs to be the perspective of the person on the other side of the decision or interaction. Given the importance of the forest owner / manager and family / whānau on the wellbeing of the operators, both forest owner / manager decision making, and the work-home interaction provide opportunities for further research that will enhance understanding of operator wellbeing. In particular, understanding forest owner / manager doxa (popular beliefs and

opinions) would help with understanding what they conceive to be the interests that guide their decisions and their perceptions of how best they are met. Aligning forest owner / manager interests with those of the operators is a necessary condition for improving operator wellbeing. With regard to interactions between work and home, in answering the question "what is the most stressful event you have experienced?" the participant operators invariably spoke about some family / whānau crisis. Understanding the work-home interaction from the perspective of the significant other involved in the family unit would help with understanding how it is that the workplace conditions help or hinder family / whānau and how can best the workplace can support the operator and their family / whānau.

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APPENDICES

APPENDIX 1: PARTICIPANT SUMMARY

Participant Number	Region	Workstation	Nature of Employment
1	Murihiku / Otago-Southland	Floater	Contractor
2	Murihiku / Otago-Southland	Processor	Wages
3	Murihiku / Otago-Southland	Processor	Salary
4	Murihiku / Otago-Southland	Skidder	Contractor
5	Murihiku / Otago-Southland	Fleet and Load	Contractor
6	Tai Rāwhiti / Poverty Bay - East Coast	Tethered Harvester	Wages
7	Tainui Raukawa - Te Arawa Waka / Central North Island	Floater	Contractor
8	Tai Rāwhiti / Poverty Bay - East Coast	Tethered Harvester	Salary
9	Tai Rāwhiti / Poverty Bay - East Coast	Shovelling	Wages
10	Tai Rāwhiti / Poverty Bay - East Coast	Shovelling	Wages
11	Tai Rāwhiti / Poverty Bay - East Coast	Fleet and Load	Wages
12	Tai Rāwhiti / Poverty Bay - East Coast	Fleet and Load	Wages
13	Tai Rāwhiti / Poverty Bay - East Coast	Tethered Harvester	Wages
14	Tai Rāwhiti / Poverty Bay - East Coast	Fleet and Load	Wages
15	Tai Rāwhiti / Poverty Bay - East Coast	Processor	Wages
16	Tai Rāwhiti / Poverty Bay - East Coast	Hauler	Wages
17	Tainui Raukawa - Te Arawa Waka / Central North Island	Fleet and Load	Wages
18	Tainui Raukawa - Te Arawa Waka / Central North Island	Fleet and Load	Wages
19	Tainui Raukawa - Te Arawa Waka / Central North Island	Fleet and Load	Wages
20	Tainui Raukawa - Te Arawa Waka / Central North Island	Fleet and Load	Sub-Contractor
21	Tainui Raukawa - Te Arawa Waka / Central North Island	Skidder	Wages
22	Tainui Raukawa - Te Arawa Waka / Central North Island	Processor	Wages
23	Tainui Raukawa - Te Arawa Waka / Central North Island	Fleeting	Wages
24	Tainui Raukawa - Te Arawa Waka / Central North Island	Skidder	Wages
25	Tainui Raukawa - Te Arawa Waka / Central North Island	Skidder	Wages
26	Tainui Raukawa - Te Arawa Waka / Central North Island	Processor	Wages
27	Tainui Raukawa - Te Arawa Waka / Central North Island	Loader	

APPENDIX 2: INTERVIEW GUIDE

Primary Researchable Question: How do participants construct their experiences of stress and coping?

Opening Statement: I'm really stoked you are happy to help me with my research. Before we get started, I'm thinking you might like to know more about what it is I'm particularly interested in. Is that right?

- Explanation of research
- Confirmation of conditions of informed consent
- Confirm intention to understand their experiences in their words. That may require asking for more details or a bit of clarification at times.

Questions	Looking for narrative on …
1. How about we start with you telling me how it is you got into logging?	• History in logging • Transition into machine operation • Machine operation experience • What they operate now
2. So, what's it like being a machine operator within the industry?	Main point of this question is to test willingness to be open and authentic. • Good things • Bad things
3. How about we talk about some specific events, incidents or times in your career when things got a little hard or difficult. Would it be possible for you to tell me about a specific situation that was stressful? Repeat until there are three events	Looking for narrative on the following topics: • What was the situation or event and where it was happening? • What the situation meant? It's implications. • Who else was involved, the nature of their relationship and how they influenced the situation? • Was anything else going on in life that may have contributed and how? • What was the response? How did they get out of the situation? What may have influenced that response? Did anything prevent responding? • What changed afterwards?
Prompts: … affirmations, reflections, summarising • That's interesting, since you brought it up, could you tell me more about that? • Would you tell me what you mean by that? • Could you walk me through that? • What did you think was going on? • What did you do then? • What did they do then? • What did that mean for you?	

4. Closing:

- Going back to you story about [refer to an event noted above], what did you mean by [repeat words requiring clarification]
- You've said a few times [repeat words], yet you have also said [repeat contrary words], do you see those two things as the same or are they different in some way?
- Could I ask you to describe the most important lessons you have learnt going through stressful times?
- What do you think you do now that helps you manage stress?
- Who in your life has been helpful in managing stress?
- Having had the chance to reflect on a few incidents that were difficult at the time, do you have any additional thoughts or final points?
- Is there anything you would like to ask me?

Close by thanking participant and remind them that everything discussed is confidential, no one else will see their interview transcript and that I will send a copy of the transcript and that they will have the chance to consider whether they are happy for that transcript to go into the research study data.

APPENDIX 3 MEMO: ENFORCING CREW HIERARCHY

Memo – The Construction of Stress by Machine Operators in the Forest Industry of Aotearoa NZ

Enforcing crew hierarchy – First Cut

This memo and this category have been established as a place holder prior to the coding of more of the East Coast transcripts. I'm not going to capture the relevant codes within this category yet but the work done to establish the production pressure categories highlights the need to get clear about the meaning of any code as it develops to make clarifying the relationships between codes easier and to ensure data within the codes is consistent in its meaning.

At this point in time (9.3.2021), there are two codes that establish the properties and conditions of this category:
1. "being young or new": this code captures the experience of those young or new operators who have been given positions that under the traditional rites of passage they are perceived to have not earnt.

2. "changing rites of passage": this code captures the perceptions of those older or more experienced operators who are looking to maintain the traditional rites of passage.

There may be other codes that will relevant to this category. There may also be some re-coding required to ensure consistency of the incidents and their meaning amongst some other codes. That's because this category is seen as quite different from any category that may arise out of the codes recording crew member interactions (that is their ability to work together well). "Enforcing crew hierarchy" is a category derived from socio-cultural constructs such as hegemonic masculinity and hierarchy whereas crew culture is more about just getting on with each other.

Other codes that may be relevant to this category are:
1. fitting in with crew

2. being the butt of banter

3. having no input ... *update 13/4/21: need to be really clear about whether this should be in here or in a separate code about the lack of control over their situation and its impacts on wellbeing. Upate 24/5/2021: this code has been removed because it does not fit the property of enforcing masculine norms. It is really a consequence of that enforcement not the practice of enforcing.*

4. unwilling to help

5. drawing bosses attention to a problem ... this code is in this category because the person drawing the bosses attention to a problem had the power to do so as a result of his greater experience

6. losing sense of identity ... this was considered but it doesn't have the necessary condition of being about something within the crew. At this stage, the data in that code is about something going on within the family.

7. gossiping amongst crews

8. being a good fella matters

9. earning your stripes on the ground

10. being older or loyal matters ... *update 24.5.2021: this shouldn't be in this category. As defined below (see update 24.5.2021) Enforcing crew hierarchy is about enforcing masculine norms while this code, is about defining masculine norms. Removed.*

11. getting violent

This category represents something that has been playing on my mind since I did the East Coast interviews. Before proceeding with the category's development I think its necessary to code those interviews so that I can be clear about whether the category does capture a relationship between the two primary codes set out above and the other codes that might be relevant. I'm concerned that my own interest in socio-cultural hierarchies might be leading to a preconception about what the data means and the relationships between them.

Enforcing crew hierarchy - second cut

The big question is can I tell the difference between forms of hierarchy and operators working together well? Codes that may cross the boundaries between these two include:

1. being hampered by crew mates

2. being in conflict with crew mates

3. finding crew mates frustrating

4. standing up for crew mates

What that question has made me think about is going back over the data that is in those codes and seeing if there is a difference.

A key thing I have noticed is that operators working well together is about comparative skills as much as likability whereas enforcing hierarchy is about behaviour (usually negative) related to a sense of place within the crew relative to other crew members. When looked at the above four codes from the perspective of these two properties I noticed a number of things:

1. Data in being hampered by crew mates and finding crew mates frustrating fits one or other of the two properties but it is not consistent within the two codes. The data needs to be re-coded around these two properties: finding crew mates frustrating should fit with the operators working well together property and being hampered by crew mates should fit with enforcing crew hierarchy.

2. being in conflict with crew mates fits with enforcing crew hierarchy.

3. standing up for crew mates fits with enforcing crew hierarchy.

That clarification needs to be recorded in coding memos and being hampered by crew mates, being in conflict with crew mates and standing up for crew mates have been included in the category enforcing crew hierarchy.

Reviewing the codes set out above shows how the data is not just about the performance of identity within the informal crew structure but also how hierarchy is enforced by formal structure. Depending on the situation, the informal and the formal hierarchy's can act independently of each other e.g. the situations in "being the butt of the banter" is the informal hierarchy acting on its own, or can interact e.g. "unwilling to help" is the informal hierarchy acting on a situation with tacit support from the formal hierarchy.

That means three key concepts to be aware of in coding the remaining interviews:
1. operation of an informal hierarchy within the crew
2. a crew culture that is less about hierarchy and more about just getting on with each other and the job; and
3. operation of the formal hierarchy.

The category has been set up but this memo needs to have excerpts illustrating properties and dimensions (conditions) to be considered complete. That can happen once it has become clearer about how to handle the above three concepts, particularly how to handle the informal and formal hierarchy.

Update 12/05/2021: I'm unclear about how to develop this category further to get it the point where I am able to explain it sufficiently to be able to conceptualise the way it impacts the social process of stress: its impact as a stressor and its contribution to other psychosocial conditions. I'm thinking it might be worth doing a bit of reading within the literature to clarify some of the things that might be on here.

Update 24/05/2021

Enforcing Crew Hierarchy - Third Cut

I've captured the outcome of that reading in the memo 20210512 Thoughts on Work and Masculinity. The upshot for this code is as follows:

Re-organise "enforcing crew hierarchies" and separate out the data more appropriate for defining masculine norms. That means:

a. separating out data and codes by formal and informal hierarchies ... *there is so much interaction between the formal and informal hierachies that its not possible to separate them ... that's significant in and of itself.*

b. take out having no input (it might be useful to re-organise this around the nature of the hierarchy that excludes input)

This category is about enforcing masculine norms. The category identifying as a logger *(now being logger)* is about defining masculine norms.

That would suggest:
1. Earning your stripes on the ground should be in Identifying as a logger *(being logger)* because of the way it captures the traditional male norms for logging
2. Being ambitious should be in enforcing crew hierarchy because of the way it captures compliance with the male norms
3. Update 19.8.2021: bringing in young guys should in this category because of the reference to what having young or new people does to the older guys: the way it spurs them on to prove themselves again.

In summary:

1. Properties: this category captures the various ways in which masculine norms *(as set out in being logger)* are enforced within the formal and informal hierarchy within the crew. As 20210512 Thoughts on Work and Masculinity highlights crew members exist in a contest for power and dominance that will act as a stressor to the extent that a crew members dignity is negatively impacted. In other words, to the extent that the precarity of that crew members position on the hierarchy is reinforced. This category covers the way that that precarity is reinforced.

The behaviours that are used by crew members to reinforce the power hierarchies within a crew include:

1. Being hard on the young or the new:
Older and more experienced men are hard on younger men or new workers as a means of reinforcing their perceived place in the scheme of things. This happens regardless of any formal role in the crews hierarchy. It happens through older fellas telling younger fellas to do things that make life easier for themselves, doing things that would make it harder for the new guys, not listening to younger fellas, withholding information or ridiculing people for not knowing something.. For example:

It's just they've got 2IC, and they've got the foreman, and sort of a lot of the foremans now are all young fellows, and they sort of find it hard, because the old fellows don't respect them.

Yeah well, anything that got too hard for him, he's like, "No, we're just going to feed it." Just going to have to get the machine in there and feed it rather than him pick away and just do it like you would back in the day

And then, I was just a young guy so no one would listen to me.

Yeah, but that's forestry all over. I've found like when I first got into forestry, that was the hardest part, was the hardest thing to come to sort of overcome was the older guys or the guy not necessarily too much old. Like 10, 15 years older than yourself, but just being that you had no experienced, you mean nothing to anyone?

You get a lot of stick when you're the new sort of new comer or at least experience, if you like. I find it's one of those industries where you'll find you'll end up finding that people don't talk, they don't, they won't say about or ask questions or anything because when they do, they just get shot down, which was one of the, it was quite hard for me when I first started. Cause you'd ask someone, Oh, what, what is this? Or you know, why, why that, why that, what about this? And you'd get laughed at or... they Sort of expect you to know all of that.

A guy we just employed, a 50 year old, he come from a crew and he said to us like, "I can't believe how you guys run. At my crew it was a dog eat dog. We went through heaps of the apprentices. We thought it was fun. It was just, how fast can we get rid of this new boy? Let's try to break him." He said that everyone was just up for a game. Well, it was the entertainment, while this little kid's stressing.

And the guy that bunched the wood for the skidder didn't give two shits about the wood looked like bunched. It was make your own drags pretty much. All he was worried about was keeping up with the boss in the felling machine.

2. Not being willing to help those who are young, new or don't fit

But if you don't like him so much, you're just like, "Oh, I won't even deal with it." And then we make him be a wee bit more under the pump. You do that throughout the day, throughout the week, it all adds up

Yeah, because there were a couple of times there was someone in that position and the guy that was driving the bunching machine didn't like him, there was no way he was going out to help him unless the boss told him to.

Yeah. I haven't seen it real aggressive like that, but it definitely is there won't be any pressure for them to leave, but there'd be no helping them out.

3. Being the object of the banter and gossip

Yeah. And that's something I've find you got to do very early on if you're going to survive in this industry, it's harsh. It can be harsh, but a lot of the time it's friendly, it doesn't go far. It's a bit of talk, a bit of whatnot. But definitely, if you take it the wrong way, it can sort of get you down a little bit, and especially for the newer guys, because they don't know it's... A lot of the guys out there don't know it's just friendly banter. They might take it to heart a little bit more,

But that definitely happened. And when people I know in the industry found out, they kept giving me shit and all that sort of stuff, but yeah. And I've seen with mates that have tipped their machines over, fuck, they're given assholes.

It's almost like a bunch of girls. The gossip part of it is anyway. Jesus, the bloody smoko hut some days.

4. Power contests between crew members

So you had a buildup over time, of stuff that you just didn't like? P15: Yeah, he's a little bit older than me, but I'm not a spring chicken, I'm in my 40s. T: So do you think the age difference, the fact that he was older than you, gave him a sense that he was more- P15: Probably, and he didn't like being told what to do.

And these three young fellows are all... They were ganging... They called me the old bastard, you see. So... They'd come up out of the bush, and I put up with it, and I rung my missus at 10 o'clock, and these guys just made my life hard in the harvester, you see. Because I was cutting that much wood, and they were on their phones mucking around, and the wood was building up in front of them. Off me, was building up, and they weren't getting it shifted. And I said... I told them what to do, like how I wanted my wood bought in. And they kept making it awkward to bring it in. So I just cut with it all day. And I rung my missus, and I said, "Listen, I'm going to quit today."

Yeah. I didn't know, I was too old school for that sort of crap. Three months beforehand I had this boy, through the throat, up in the... I hopped out of the harvester, he kept doing the same shit. And he told me to shift something out of the way, I said, "I'll shift all right." So I jumped out of the

harvester and went and jumped in his skidder and gave him a bit of a deal up. Like we used to in the old days.

Yeah, I've done it before, fights and stupid shit on the skids, and... I've done that to one of my actually good mates. We had a good set to on the skid. And he would do something dumb, and I told him not to. I told him it's not going to work and blah, blah, blah. And it was snowing, and we're all cold, and it was taking ages. I told him not to put the block on the stump because it was going to come off, and he wouldn't listen. And I was like, "Yeah, you better make sure that block doesn't come off." I lifted the ropes up, and it just flipped the block off and went straight down into the gut. Oh, man, I lost it, because we had to go down and pick it up. And it's already past knock off. Things like that. Long story short, we had a big scrap, punching each other up. It was dumb, but you're frustrated.

5. Making an effort to fit in

Yeah, you got to earn your stripes. Yeah. Can't be talking shit that you don't know anything about.

Yeah. You can only give it a go, hey? T: Yeah. P16: Monday to Friday, turn up. You can be the useless-est person. T: If you always put the hours in. P16: You turn up every day, yeah, you'll be there on the following day.

And I was younger there, I was doing what I was told. Just tell me to do that, yeah OK I'll do that.

because when I took the job, I said to the boss, I was like, "Am I going to be upsetting anyone? A 20 year-old coming in and learning this digger, like am I not cutting anyone's lunch?" Sort of thing. Like, "Am I going to upset-"

To me, there's definitely two distinct groups of people. There's the ones that'll tell you how good they are, and then the ones that just say nothing, aye. I could fill my fucken fingers with names of people that'll ... you don't even ask them and they'll tell you how fucken good they are.

See, he's got his eyes on the machines, and young fellas always looking at the machines.

Yeah, yeah, I'll move up the ladder, hey?

Yeah, yeah hard luck. But if he's a good bugger you'll fix it. No dramas, no skin off your nose. You play it by the hour.

Dimensions: the range of conditions under that which the category arises, is maintained and changes, that are evident in the data are as follows:

1. There is a rigid formal hierarchy that constrains who has input into decision making. This is how this category is related to the sub-category having no input that is within being threatened or challenged.

e.g. from Having no input

And there's sort of not one boss now. There's a boss and there's a 2IC, and then ..

Back in the day there was just one boss, and then if you wanted to do something, you would've seen him.

But as we've said before, you don't really get that say all too often in the forestry that is you turn up and do what you're told to do basically, and go home again, unless you're a foreman or supervisor and whatnot.

Yeah. But definitely, sort of that, like you say, a nasty hierarchy of real strict. But more not strict, because there are strict foreman out there who... They run a tight ship, but they do it well, and it's a lot of communication and whatnot, and it makes the dream work. Just a nasty, this is how we're going to do it, and you have no say. That is really shitty. And

2. The rites of passage are changing, something that those in more powerful positions are resisting

e.g., from Changing rites of passage

I'll tell you another thing that gets me really frustrated is when... So when I started, I started with the old boys and I started when logging was different. It was all about get down there ... break your back, do it and don't complain about it. And that's where I started. And you had to put time and effort into getting in to even looking at a machine. And one thing that frustrates me now is because of there is lack of experience around, and all the old boys, they're gone, retired, passed away and all of that... And you see one guy who's never done a days … hasn't got a single bit of dirt under his nail, and he's in the machine

Yeah, I don't like the way the young ones are coming in without having the ground skills, turning up and expecting the respect for the job.

Yeah, yeah. That's what I've been with this crew. And you get a lot of young fellows in it. They're sort of not used to the old way of speaking. You give them the hard word they sort of ...

We're not all about that old-school mentality, especially with forestry, some of the stories I've heard in the past. You know, foreman's pulling them around the corner for a swifty to the chin and whatever, stuff like that.

Yeah. Yeah. So, yeah. That's the way to start, and that's probably what's lacking in today's industry is those foundations. They're risky, working on the ground and that, but that's where people learnt how stems move, and how shit works, you know?

Update: 26/7/2021
I've added expressing concern about capabilities of others has been added to enforcing crew hierarchy because it seems to be an extension of the same behaviours seen in the codes associated with this category.

Update: 19/8/2021
Having identified there is a difference between the norms of the logger identity (identifying as a logger / becoming logger) and the way they are performed within the logging crew (performing the logger identity) I now need to separate out anything that points to a threatening or challenging situation and may impact wellbeing. This would fit with the summary table defined on 12.8.2021.

Codes that should stay within this category:
1. being young or new

2. being a good fella matters

3. being ambitious

4. being the butt of the banter

5. bringing in young guys

6. fitting in with crew

7. getting violent

8. gossiping amongst crews

9. standing up for crew mates

10. being unwilling to help

11. giving the cold shoulder

12. risking embarrassment amongst fraternity

13. Update 20210920: accepting responsibility for mistakes (see code memo)

Codes that should go into a new category (being threatened or challenged):
1. having no input: the data points to having no input is a threat or a challenge to wellbeing and not about the conditions that create the outcome of having no input and in particular the way hierarchy is established and reinforced (see category memo for explanation)

2. changing rites of passage (being threatened or challenged): This was seen as a key code for this category but, having clarified that the category is about the ways in which the norms of identifying as a logger *(becoming logger)* it's now considered this data reflects something that is threatening because the ways in which someone achieves standing in a crew are changing. As noted in the memo 20210416 merging changing entry pathway with changing rites of passage, these changes are a threat to belonging and not an expression of the way belonging is achieved within the workplace.

3. being hampered by crew mates (having no input ... see that category memo for explanation)

4. being in conflict with crew mates (having no input ... see that category memo for explanation)

5. looking good to the boss (having no input ... see that category memo for explanation)

The category enforcing crew hierarchy is a sub-category of performing the logger identity at work.

Update: 20210324
Knowing the target has been included within this sub-category (see memo 20210302 update having targets re-named as knowing targets). The references show that who gets to know the target is a function of one's position in the crew. Its a form of social capital that brings power with it.

Linked Item
Codes\\Being Logger (Performing the logger identity at work)\Enforcing crew hierarchy

APPENDIX 4: CRITERIA FOR EVALUATING GROUNDED THEORIES

The following criteria have been proposed by Birks and Mills (2015, pp 147-148) as a means of evaluating the trustworthiness of a grounded theory study.

Domain	Criteria
Researcher Expertise	• Does the researcher demonstrate skills in scholarly writing? • Is there evidence that the researcher is familiar with grounded theory methods? • Has the researcher accessed and presented citations of relevant methodological resources? • Are limitations in the study design and research process acknowledged and addressed where possible?
Methodological Congruence	• Has the researcher articulated their philosophical position? • Is grounded theory an appropriate research strategy for the stated aims of the study? • Do the outcomes of the research achieve their stated aims? • Is a grounded theory presented as the end product of the research? • Are philosophical and methodological inconsistencies identified and addressed?
Procedural Precision	• Is there evidence that the research has employed memoing in support of the study? • Has the researcher indicated the mechanisms by which an audit trail was maintained? • Are procedures described for the management of data and resources?

Domain	Criteria
Procedural Precision (cont'd)	• Is there evidence that the researcher has applied the essential grounded theory methods appropriately in the context of the study described? • Does the researcher make logical connections between the data and abstractions? • Is there evidence that the theory is grounded in the data? • Is the final theory credible? • Are potential applications examined and explored?

APPENDIX 5: HUMAN ETHICS COMMITTEE APPROVAL

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

HUMAN ETHICS COMMITTEE

Secretary, Rebecca Robinson
Telephone: +64 03 369 4588, Extn 94588
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2019/112

1 October 2019

Trevor Best
School of Forestry
UNIVERSITY OF CANTERBURY

Dear Trevor

The Human Ethics Committee advises that your research proposal "Under Pressure: The Construction of Stress by Machine Operators in the Forest Industry of Aotearoa New Zealand" has been considered and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 24th September 2019; **and the following:**

- *Please forward a copy of the approval from First Union once received for the file.*

Best wishes for your project.

Dr Dean Sutherland
Chair
University of Canterbury Human Ethics Committee

First Union approval to advertise on the Forest Workers Network facebook page (see reference in HEC committee approval letter above)

LJ

Louisa Jones <Louisa.Jones@firstunion.org.nz>

To: Trevor Best

Mon 20/01/2020 2:47 PM

Happy new year,

Yes I would be keen to post something out to our FWN members about participating. Just send me copy and I will add it to a newsletter, also could post a link on our Facebook page. Sorry for late response, I have been super busy already 😉

Louisa Jones
Assistant General Secretary

APPENDIX 6 ETHICS: INFORMATION SHEET AND INFORMED CONSENT

1. Information Sheet

School of Forestry
Telephone: +64 3 369 3500 Email: trevor.best@pg.canterbury.ac.nz
10/07/2019

The Construction of Stress by Forestry Machine Operators in Aotearoa NZ

Information Sheet for Participating Forest Workers

My name is Trevor Best and I am working towards a PhD at the University of Canterbury. My area of interest is the health and wellbeing of people who work in the production forests of Aotearoa New Zealand. The purpose of this research is to understand what challenges / difficulties / situations create stress within the workforce, how that impacts and what do they do about it. The aim is to consider stress from all situations – work, home and community.

If you choose to take part in this study, your involvement in this project will require a face to face interview with me that will take approximately one hour at a time convenient to you. In that interview you will be asked questions about what sort of things generate stress for you and why you think that is. The interview will be recorded and then reproduced in written form.

As a follow-up to this interview, you will be sent the written copy of the interview to allow you to make changes if you require. At this point, you will be asked to confirm you are happy for your interview to be used in the analysis.

In the interview there is a risk you may re-call a distressing event as an example of something stressful that may cause further distress. If you feel you do with help with those feelings, please get help by:

- Texting or phoning the Telehealth line, 1737, where you will get access to Counsellors 24/7

Participation is voluntary, and you have the right to withdraw at any stage without penalty. You may ask for the recording of your interview and transcript to be returned to you or destroyed at any point. If you withdraw, I will remove information relating to you. However, once analysis starts after the review of the transcript, it will become increasingly difficult to remove the influence of your data on the results.

The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: your identity will not be made public without your prior consent. To ensure anonymity and confidentiality, there will be no direct reference to either you or anyone you mention in the project report or any identifying information (such as the machine you operate or the role you have in your crew) and your interview will be stored under a false name. All electronic copies of data will be securely stored on the University's servers and paper copies will be destroyed. Only myself and my Supervisor will have access to the data. The data will be destroyed after ten years (1 July 2030).

Please let me know you would like to receive a copy of the summary of the results of the project by ticking the appropriate box on the consent form.

The project is being carried out as a requirement for Doctorate in Philosophy by Trevor Best under the supervision of Professor Rien Visser who can be contacted at rien.visser@canterbury.ac.nz. He will be pleased to discuss any concerns you may have about participation in the project.

This project has been reviewed and approved by the University of Canterbury Human Ethics Committee, and participants should address any complaints to The Chair, Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

If you agree to participate in the study, you will be asked to sign the consent form prior to the interview.

2. Consent Form

School of Forestry
Telephone: +64 3 369 3500
Email: trevor.best@pg.canterbury.ac.nz

The Construction of Stress by Forestry Machine Operators in Aotearoa NZ

Consent Form for Participating Machine Operators

Include a statement regarding each of the following:

- ☐ I have been given a full explanation of this project and have had the opportunity to ask questions.
- ☐ I understand what is required of me if I agree to take part in the research.
- ☐ I understand that participation is voluntary and I may withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information I have provided should this remain practically achievable.
- ☐ I understand that any information or opinions I provide will be kept confidential to the researcher and their supervisor and that any published or reported results will not identify the participants, their location or their workplace.
- ☐ I understand that all data collected for the study will be kept in in password protected electronic form and will be destroyed after ten years.
- ☐ I understand the risks associated with taking part and how they will be managed.
- ☐ I understand that I can contact the researcher, Trevor Best (trevor.best@pg.canterbury.ac.nz) or supervisor, Prof. Rien Visser (rien.visser@canterbury.ac.nz) for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Human Ethics Committee, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz)
- ☐ I would like a summary of the results of the project.
- ☐ By signing below, I agree to participate in this research project.

Name:_____ Signed:_____ Date:_____

Email address *(for report of findings, if applicable)*:_____

APPENDIX 7 ETHICS: GUIDANCE NGĀI TAHU CONSULTATION AND ENGAGEMENT GROUP

Wednesday 31 July 2019

Tēnā koe Trevor Best

RE: Under pressure: The Construction of Stress by Machine Operators in the Forest Industry of Aotearoa New Zealand.

This letter is on behalf of the Ngāi Tahu Consultation and Engagement Group (NTCEG). I have considered your proposal and acknowledge it is a worthwhile and interesting project and you are clear about how you ought to take participants' (cultural) needs into account if and when applicable.

Given the scope of your project, no issues have been identified and further consultation with Māori is not required although feedback was given in regard to you providing confirmation of the consultation and a process for ensuring the findings are circulated far and wide. I understand you will report this as part of your HEC application process.

Thank you for engaging with the Māori consultation process. This will strengthen your research proposal, support the University's Strategy for Māori Development, and increase the likelihood of success with external engagement. It will also increase the likelihood that the outcomes of your research will be of benefit to Māori communities. We wish you all the best with your current project and look forward to hearing about future research plans.

The Ngāi Tahu Consultation and Engagement Group would appreciate a summary of your findings on completion of the current project. Please feel free to contact me if you have any questions.

Ngā mihi whakawhetai ki a koe

Henrietta Carroll (on behalf of the NTCEG)

Kaiarāhi Maori Research
Research & Innovation | Te Rōpū Rangahau
University of Canterbury | Te Whare Wānanga o Waitaha
Phone +64 3 369 0143, Private Bag 4800, Christchurch | Ōtautahi
henrietta.carroll@canterbury.ac.nz
http://www.research.canterbury.ac.nz

APPENDIX 8 CATEGORY SUMMARY

The tables below are a summary of the category structure that resulted from the initial and intermediate coding. It covers all categories above codes. The differing levels of sub-category in each category reflect the differing levels of abstraction required to derive a category from the codes.

Category: Becoming Logger

Sub-category	Sub-Category
Preferring physicality	Actively relaxing
	Identifying with place
	Loving logging's outdoors
	Loving logging's physicality
	Having pride in the machine
Loving challenge	Avoiding boredom
	Solving problems
	Being challenged
Relying on self	Being in control
	Choosing logging
	Supporting family
Belonging	Being hard
	Feeling confident in what you know
	Loving logging's culture
	Valuing skills

Category: Threatening Logger

Sub-category	Sub-category	Sub-Category
Threatening targets or throughput	Challenging machinery and operations	
	Challenging personal capabilities	
	Having threatening bottlenecks	
	Reacting to bad weather	
	Threatening crew relationships	
	Working machinery in a poor state	
	Working short staffed	
Threatening sense of place in a crew	Challenging crew boss or owner	Being grumpy
		Hourly pay
		Finding crew boss frustrating
	Changing rites of passage	
	Having no input	Being unable to control
		Being controlled
		Playing power games
Threatening family wellbeing	Fearing loss of income	Being exposed to market risk
		Worrying about money
	Fearing loss of personal capability	Facing safety risks
		Being exposed to substances abuse
	Getting somewhere to live	Having a long commute
		Having housing troubles
	Threatening family situations	Challenging family situations
		Experiencing family breakdown

Category: Sustaining Logger

Sub-category	Sub-category	Sub-Category
Enabling (by forest owner / manager)	Developing capacity and capability	Getting an opportunity to try operating
		Having achievable targets
	Providing adequate resources	Having access to trucks
		Having adequate skid capacity
	Reducing commitment risk	Having work certainty
		Respecting forest owners staff
Resolving (by contractor)	Being prepared	Responding to downturns
	Building a tight knit crew	Being a tight knit crew
		Being multi-skilled
		Being well paid
		Having no input
	Demonstrating respect	Being treated like family
		Feeling respect for the crew boss
		Helping out employees
	Recruiting operators	Being paid to train
		Being recruited
		Moving crews for better conditions
	Retaining operators	Being the right person for the job
		Using the experienced to mentor the new
		Working on newer machinery
Overcoming (by operators)	Working long hours to solve problems	Working long hours
		Overcoming bottlenecks
		Overcoming obstacles to meeting target
		Fixing problems by doing it yourself
		Working weekends

Category: Sustaining Logger (cont'd)

Sub-category	Sub-category	Sub-Category
Negotiating (amongst all parties)	Adapting at home	Adjusting sleep patterns
		Separating home and work
		Talking things through at home
	Adapting to time constraints	Adjusting workflow
		Making things better for the next guy
		Taking short cuts
	Building influence	Building relationship with supervisor
		Managing dispatch
	Building machine capacity	Adding capacity to overcome bottlenecks
		Having spare machinery
		Having staff available to float
	Enabling a sense of security	Having confidence in the safety of logging
		Having income security
	Enabling physical recovery	Having a break at Xmas
		Having a mid-year break
	Having useful capabilities	Going with the flow
		Empathy
		Asking for help

Category: Being Logger

Sub-category	Sub-category	Sub-category
Feeling the pressure to produce	Focusing on own job	
	Feeling the pressure of someone waiting	
	Seeking challenge	
	Under pressure to produce	
	Knowing how the money is made	
	Being responsible for meeting targets	
Enforcing crew hierarchy	Being older or loyal matters	
	Being young or new	
	Fitting in with crew	
	Being ambitious	
	Being a good fella matters	
	Being unwilling to help	
	Being the butt of the banter	
Proving yourself	Developing operating instincts	Choosing to learn on the job
		Progressively developing skills
	Earning your stripes on the ground	
	Feeling proud of your achievements	
	Starting by working for free	
Logging as a means to an end	Working long hours as means to an end	
	Being driven by money and mortgage	
	Being responsible to family	Being involved in family life
		Chasing the work

Category: Experiencing wellbeing

Sub-category	Sub-category	Sub-category
Taking action	Having time and motivation for exercise and pastimes	
	Having time to do things well at work	Having time to do things well
		Having time to get ahead
		Having time to plan
Enjoying work	Feeling up when throughput flows	
	Getting in the zone	
Securing	Having financial capacity	
	Having the signs of success	

Category: Experiencing stress

Sub-category	Sub-category
Being in conflict with crew mates	
Deteriorating physical health	
Experiencing boredom	
Experiencing fatigue outside work	Being aware of the consequences of long hours
	Losing motivation to exercise
	Deteriorating enjoyment of family
Gaining Weight	Desiring unhealthy foods
	Getting a digger figure
	Losing fitness
Getting fatigued operating	
Recognising consequences on family	
Quitting crew or logging	Leaving due to burnout
	Leaving due to family circumstances
	Leaving due to crew
	Leaving due to market downturn
Using alcohol or other substances	Losing job due to drug use
	Relaxing with help of alcohol and other drugs

APPENDIX 9 PARTICIPANT SUMMARY

Operator Stress and Wellbeing in the Logging Industry Participant Summary

Why was this research important?

Since 2012 the logging industry has gone through something of a revolution. As a result of mechanisation, the industry has been able to increase the volume harvested by about 50% (we harvested about 23 mill m3 in 2012, and 35 mill m3 in 2022) using 10% fewer logging workers (NZ FOA reports we had 8,300 in 'Logging' ten years ago, more recently that was 7,900). That means the industry is more reliant on its harvesting machine operators than it has ever been.

While moving forest workers into machines has significantly improved their physical safety, the greater concern now is mental health. Operating a high-value machine in a high production environment can obviously be a very stressful. The objective of this research was to improve our understanding of what causes machine operators stress, but also what creates a healthy and happy work environment.

Who contributed to this research?

A total of 27 operators were interviewed for this project. Three operated the harvester, 5 the prime mover, 5 processed and 14 were mainly fleeting and loading. They were from 18 different contracting crews and worked for 14 different forest owners.

What did we find out?

1. You love the work for similar reasons:
    a. The physically demanding nature of the work - being outdoors and operating big machines that can shift a lot of wood quickly
    b. The challenge - winning the battle against the elements (weather, terrain and wood) to make things happen
    c. What it allows you to do - providing a good life for your family

2. Operating machinery is challenging and mentally demanding which can lead to both stress and wellbeing

Well-being: Many operators thrive on working hard to meet a challenge (like a production target). When you can control the factors that allows you to be successful it leads to 'well-being'. When you are well, you have the energy to do everything you need to do and then recover day to day and week to week. You remain fit, do things you enjoy doing and be involved with the family and your community. You also have a strong sense of personal safety and financial success.

"Flow" is that state of mind that happens when you are so engaged in an activity that your sense of what is happening around you is lost. It is an effective antidote to both boredom and anxiety, and it requires a balance between the challenges being faced and the skills required to meet that challenge

Stress: Conversely, if the challenge is not reasonable, or the factors that allows you to be successful are outside of your control, this leads to stress. This can more readily lead to fatigue, unhealthy lifestyle choices (insufficient exercise, comfort eating, drinking and drugging), and conflict at work and home as energy levels are overwhelmed. For some of you it has resulted in you quitting the crew or leaving logging altogether.

3. What generates stress?

    a. Anything that impacts the crew's ability to achieve either their contractor's targeted daily uplift (loads per day) or your ability to maintain throughput (tonnes per hour).

    b. Anything that gets in the way of your ability to know what's going on or influence what's happening within the crew, particularly in the way it solves production problems. There are two obstacles to knowing what's going on or having a say in a crew. They are:

        i. The formal hierarchy of crew boss, foreman and second in charge; and

        ii. The informal hierarchy of experience and capability.

    The more controlling the hierarchy is, the greater the potential for stress as a result of that hierarchy.

c. Anything that threatens the ability to provide for family. The two most significant risks are hazardous working conditions and insecure income due to market down turns.

4. What generates wellbeing?

    a. Within the operators control:

        i. Adapting family life to cope with long working hours

        ii. Improving skills, both those useful for operating the machine and those that are useful for more personal reasons (e.g., financial skills, relationship skills)

    b. Controlled by either the forest manager or the contractor or both

        i. A harvesting supply chain (roads, skids, logging machines, trucks and receiving point – port, sawmills) that can deliver and receive the required number of loads within healthy work hours on a one or two shift basis

        ii. Increasing certainty over income and safety

        iii. Being part of a family at work. That means being a tight knit crew, knowing the target, being paid fairly and being included in decision making

5. What does this mean for improving wellbeing amongst operators?

    a. The harvesting supply chain needs to be designed by forest managers to deliver the required number of loads within healthy daily and weekly working hours. While most operators would jump at the chance to work 8-9 hours if income remained the same as that achieved over longer hours, it was noted that participants working in happier crews were working less than 10-11 hours per day including travel (less than 55 hours per week).

    b. Highly productive logging crews that are well led and have a great crew culture also improve operator wellbeing. For the participants, that meant having the right gear for the job in the right amounts, having operators who could operate more than one machine and cover for each other,

being transparent about production expectations, being paid well and being included in decision making processes especially where those decisions had an impact on their ability to do the job.

I hope you find that interesting and useful. There is a video version at https://www.youtube.com/watch?v=5Ki8B9A2TBo. If you have any questions or want to give me feedback on whether what you see here is on target or not, feel free to contact me at trevor.best@pg.canterbury.ac.nz.

Best wishes

Trevor Best and Prof. Rien Visser

School of Forestry

University of Canterbury.