

PSYCHOLOGICAL TRAUMA:
UNDERSTANDING RISK, BUILDING
RESILIENCE.

By

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ABSTRACT

This PhD aimed to ascertain the protective and vulnerability factors of psychological trauma and moral injury in front-line workers and their families during public health crises. Furthermore, to determine how resilience is developed and how this can mitigate the impact of psychological trauma and moral injury. This PhD further aimed to propose a conceptual model aimed at elucidating the psychological impact, and promotive factors of resilience in front-line workers and their families during public health crises. At present, the psychological impacts of working on the front-line during a public health crisis are not fully understood. As such, a systematic review of the literature was conducted.

The systematic review aimed to explore the existing literature on psychological trauma, moral injury and resilience in front-line workers during public health crises. In total, thirty-two papers met the inclusion criteria, which were subjected to a narrative analysis (Popay et al., 2006). The findings highlighted that front-line workers face a plethora of challenges during public health crises. This included, fear of contagion and transmission, changes to working conditions, increased stress, exposure to trauma and moral injury. However protective factors, such as social support in the workplace and self-compassion, promoted the development of resilience. As such, Study one investigated the lived experiences of front-line workers and their families during the COVID-19 pandemic.

Study one is comprised of two qualitative semi-structured interview studies. Part A had a sample of twenty-one family members of front-line workers, and part B a sample of front-line workers. Identical procedures were utilised in both studies and both parts were analysed using Grounded Theory (Glaser & Strauss, 1967; Glaser, 1978) and a thematic analysis (Braun & Clarke, 2006). The results highlighted several promotive and protective factors of psychological trauma, moral injury and resilience in front-line workers and their families. Seven themes emerged in part A these were: 1.) *Elevated stress, including aggravation of pre-*

existing challenges, 2.) Enhancing wellbeing by using time productively, 3.) Unhelpful coping emerging due to restrictions, 4.) Connecting with nature to improve wellbeing, 5.) Fear of transmission of the virus, 6.) Psychological cost of caring, 7.) Benefits and negatives of online communication. Ten themes emerged in part B and were: 1.) *Elevated stress in the workplace, 2.) Organisational support, 3.) Fear of transmission, 4.) Feeling betrayed and unsupported by leadership, 5.) Experiencing moral distress in the workplace, 6.) Promoting wellbeing through adopting internal and external coping strategies, 7.) Connecting with nature, 8.) Supporting families, 9.) Feeling resilient and/or able to take control of future actions, and 10.) Maladaptive coping adopted.* Overall, the findings indicated front-line workers and their families were psychologically impacted as a result of the COVID-19 pandemic.

Study two aimed to further explore the impact of the COVID-19 pandemic. It sought to ascertain the severity of psychological trauma and moral injury experienced in front-line workers and their families. Furthermore, it aimed to ascertain the factors that underpin resilience during public health crises. Lastly, it aimed to investigate if moral injury and psychological trauma were mediated by resilience. Using a cross-sectional quantitative design, a sample of 203 participants were recruited (Front-line workers $N = 98$, Families $N = 105$). The results indicated that front-line workers and their families experienced moderate levels of moral injury and psychological trauma during the COVID-19 pandemic. Moderate levels of resilience emerged that were positively predicted by subjective wellbeing. Furthermore, moral injury was found to have a causal effect on psychological trauma via resilience.

This research resulted in the development of a conceptual model called the Health Crisis Impact Model (HCIM). This model proposed a two-way inter-connected pathway that identifies the impact of stressors specific to public health crises on front-line workers and their families. In addition, it presents the protective factors of resilience and highlights how these can promote the development of resilience in individuals and families. The HCIM is

preliminary, requires testing and future validation to explore its utility in understanding the impact of future public health crises.

CONTENTS

CHAPTER ONE: SETTING THE SCENE.....	13
1.1 Rationale for research	13
1.2 Psychological impact of COVID-19 on front-line workers.	15
1.3 Theoretical underpinnings.....	19
1.4 Structure of this thesis.....	21
CHAPTER TWO: INTRODUCTION TO PSYCHOLOGICAL TRAUMA AND IMPACTS	23
2.1 Structure of this chapter	23
2.2 Defining psychological trauma and traumatic experience.	23
2.3 Individual responses to psychological trauma.	31
2.4 The development of psychological trauma in families	39
2.5 Recovery from psychological trauma	45
2.6 Concluding comments.....	47
CHAPTER THREE: IDENTIFYING THE RISKS AND CONSEQUENCES OF EXPOSURE TO TRAUMA AND MORAL INJURY DURING PUBLIC HEALTH CRISES	49
3.1 Structure of this chapter	49
3.2 Exposure to psychological trauma in front-line workers in the workplace	49
3.3 Trauma development in the workplace during infectious virus outbreaks	62
3.4 Encountering Moral injury in the workplace and during public health crisis.....	65
3.5 Shared trauma in front-line workers and their families.	69
3.6 Concluding comments.....	71
CHAPTER FOUR: UNDERSTANDING PROTECTIVE FACTORS OF TRAUMA ANDPROMOTIVE FACTORS OF RESILIENCE IN FRONT-LINE WORKERS AND THEIR FAMILIES	73
4.1 Structure of this chapter.	73
4.2 Defining resilience.	73
4.3 Promoting resilience in front-line workers.	78
4.4 Promotive factors and shared resilience in families.....	81
4.5 The impact of nature on individual and family resilience.....	82
4.6 Concluding comments.....	85
CHAPTER FIVE: ADDRESSING THE RESEARCH PROBLEM.....	86
5.1 Structure of this chapter.	86
5.2 Rationale for the research.....	86

5.3 Overall aims of this research.....	90
CHAPTER SIX: SYSTEMATIC REVIEW: TRAUMA, RESILIENCE AND MORAL INJURY IN FRONT-LINE WORKERS DURING PUBLIC HEALTH CRISES	95
6.1 Study one summary.....	95
6.2 Method	95
6.2.1 Search Strategy	96
6.2.2. Inclusion Criteria	97
6.2.3. Exclusion Criteria	98
6.2.4. Quality Appraisal.....	98
6.3.1. Search results.....	99
6.3.2. Main focus of the studies.....	102
6.3.3. Narrative synthesis.....	110
6.4. Discussion	122
6.5. Implications and recommendations.....	129
6.6. Limitations	130
CHAPTER SEVEN: LIVED EXPERIENCES OF FRONT-LINE WORKERS AND THEIR FAMILIES DURING THE COVID-19 PANDEMIC.....	132
7.1. Structure of this chapter	132
7.2. Study Two Part A: Families of front-line workers during the COVID-19 Pandemic.....	132
7.2.1 Aim	132
7.2.2 Research Questions.....	132
7.2.3. Participants	133
7.2.4. Procedure	135
7.2.5. Analysis	140
7.2.6. Definitions of trauma and resilience provided the participants.	141
7.2.6. Results.....	142
7.3. Study Two Part B: The lived experiences of front-line workers during the COVID-19 pandemic	156
7.3.1. Aim	156
7.3.2. Research Questions.....	156
7.3.3. Participants	157
7.3.4. Procedure	159
7.3.5 Analysis	164
7.3.6 Definitions of trauma and resilience provided the participants.	164
7.3.6 Results.....	165

7.4 Discussion	181
7.5 Statement of reflexivity.....	190
7.7 Overall limitations.....	193
7.8 Overall Implications and recommendations.....	195
CHAPTER EIGHT: TRAUMA, MORAL INJURY AND RESILIENCE: EXPLORING THE IMPACT OF THE COVID-19 PANDEMIC ON FRONT-LINE WORKERS AND THEIR FAMILIES.....	197
8.1 Structure of this chapter	197
8.2 Aims and hypotheses.....	197
8.3 Method	199
8.3.1 Participants.....	199
8.3.2 Procedure.....	200
8.3.4 Measures	201
8.4 Results	205
8.4.2 Analysis	207
8.4.2.1 Impact of the COVID-19 pandemic on frontline workers and families.	207
8.4.2.2 Comparison of PTSD, vicarious trauma and moral injury by gender, in families and front-line workers.....	212
8.4.2.3 Predictors and associations of resilience in front-line workers and families by gender.	214
8.4.2.4 Mediation analysis accounting for the relationship between moral injury, psychological trauma and/or vicarious trauma.	220
8.5 Discussion.....	224
8.6 Limitations	235
8.7 Concluding comments.....	237
CHAPTER NINE: GENERAL DISCUSSION.....	239
9.1 The impact of the COVID-19 pandemic on front-line workers.	239
9.2 The impact of the COVID-19 pandemic on the families of front-line workers...242	
9.3 Protective and vulnerability factors of psychological trauma.....	248
9.4 Conceptual model of trauma development during a public health crisis	251
9.5 Limitations	255
9.6 Directions for future research and final conclusion	256
REFERENCES	259
APPENDICES	332
APPENDIX ONE: Materials used in the systematic review.	332
Data extraction table	336

Full search string.....	340
APPENDIX TWO: Study materials from study two part A.....	341
Study two part A- Participant information sheet.....	341
Study two part A- Consent statement.....	346
Study two part A- Interview questions.....	347
Study two part A- Debrief.....	350
APPENDIX THREE: Study materials from study two part B.	352
Study two part B- Participant information sheet.....	352
Study two part B- Consent Sheet	356
Study two part B- Interview questions.....	357
Study two part B- Debrief.....	360
APPENDIX FOUR: Study materials from study three.	362
Study Three- Information sheet	362
Study Three- Consent statements.....	366
Study Three- Demographic information	367
Study Three- Questionnaire battery	371
Study Three- Debrief.....	387

LIST OF TABLES

Table One: Studied characteristics of all reviewed English language publications.....	103
Table Two: Demographic characteristics of participants in Study Two part A.....	134
Table Three: Interview schedule Study Two part A	137
Table Four: Demographic characteristics of participants in Study Two part B.....	158
Table Five: Interview schedule Study Two part B.....	160
Table Six: Descriptive statistics of all variables by sex, front-line worker, family and by PTSD symptom severity.....	209
Table Seven: Correlation coefficients for overall relationships between all measures.....	215
Table Eight: Correlation coefficients for relationships between all measures in female and male front-line workers.....	216
Table Nine: Correlation coefficients for relationships between all measures in female and male family members.....	217
Table Eight: Test for mediation of moral injury on psychological and vicarious trauma via resilience using bootstrap analysis with 95% confidence intervals.....	221

LIST OF FIGURES

Figure One: A flowchart to represent the steps used in the systematic review using the PRISMA guidelines.	100
Figure Two: Superordinate themes and Subordinate themes identified from the analysis in part A.....	156
Figure Three: Superordinate themes and subordinate themes identified from the analysis in part B.....	181
Figure Four: Estimated overall mediation analysis with unstandardized path coefficients...222	
Figure Five: Females estimated mediation analysis with unstandardized path coefficients. 233	
Figure Six: Males estimated mediation analysis with unstandardized path coefficients.....	234
Figure Seven: A conceptual model to explain the impact of the COVID-19 pandemic on front-line workers and their families.....	252

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CHAPTER ONE

SETTING THE SCENE

1.1 Rationale for research

The term ‘front-line worker’ has been used to describe any individual who was employed with a public facing role (Gov.uk, 2020). This included roles within the health and social care, public services, education and childcare, food and retail, and transport and utilities sectors. In response to rapidly increasing patient numbers, significant pressures have been placed on front-line workers to provide care and services with limited disease specific knowledge (van Bortel et al., 2016), with this magnified during COVID-19¹. For example, to reduce the transmission of COVID-19, social movement restrictions (lockdowns) were introduced (Brown & Kirk-Wade, 2021). These were legally enforced periods of time where social contact was significantly reduced and individuals had to remain at home (Brown & Kirk-Wade, 2021). However, front-line workers were exempt from the lockdowns to ensure healthcare was provided to infected patients and essential services needed for survival continued to be provided to communities (e.g., food) (Gov.uk, 2022), arguably causing notable strain (e.g., Olapegba et al., 2022).

Front-line workers are arguably at an increased risk of psychological stress and trauma in response to exposure to emotional and situational stressors in the workplace (McCain et al., 2017) more generally and not just during a public healthcare crisis. For example, healthcare workers are vulnerable to developing compassion fatigue, burnout and psychological trauma while providing care to patients (Kumar, 2016). It is possible that these pre-existing vulnerability factors of psychological trauma may be exacerbated during a public health crisis,

¹ On the 30th of January 2020, the World Health Organisation (WHO) declared the Coronavirus Disease (COVID-19) a pandemic. By September 2023, there were over 770 million confirmed cases of COVID-19 worldwide, with 6.95 million deaths (WHO, 2023). The virus, and resulting public health crisis, created significant strain on front-line services worldwide (Olapegba et al., 2022; Wright et al., 2021).

such as COVID-19. Furthermore, front-line workers may be exposed to experiences that may instigate moral transgressions² and moral distress and injury³ (Shay, 2011; Webb et al., 2023). However, in order to gain a full understanding of the impact of working on the front-line during public health crises it is important to consider the factors that may ameliorate the development of psychological trauma (Luthar et al., 2000).

Social support has been identified as a protective factor against psychological trauma and has been shown to promote the development of resilience (Vaughan & Wade, 2020). However, the ability to obtain social support during a public health crisis may be reduced as a consequence of the restrictions in social movement. It is therefore possible that front-line workers became dependent on their families to provide additional support (Das et al., 2021). As a result, families were required to enhance coping whilst counteracting the general stress that front-line workers may have experienced, as part of the standard job role (Das et al., 2021). Family support has been shown to mediate stress levels and reduce burnout in front-line workers during adversity (Tselebis et al., 2020). However, it is possible the role of providing support may negatively impact families.

Figley & Kiser (2013) highlighted that family members who attempt to counteract the distress of loved ones within family groups are at an increased risk of developing the distress vicariously. Furthermore, it is possible the distress may be shared in families through emotional contagion (Hatfield et al., 2014). During public health crises, for example, it was possible that the families of front-line workers were exposed to psychological trauma in response to caring for front-line workers. If families developed distress in response, this may have diminished the social support that could have been provided to front-line workers, impacting their ability to be

² Perceptions of causing harm which violates personal codes of conduct (Shay, 2011).

³ The emotional and cognitive impact following an experience where an individual feels compelled to make a decision that violates personal codes of conduct (Shay, 2011, Webb et al., 2023).

resilient and counteract psychological trauma and/or moral injury emerging (Figley & Kisser, 2013).

1.2 Psychological impact of COVID-19 on front-line workers.

Front-line workers have been reported to be at an increased risk of job-related stress prior to the commencement of the COVID-19 pandemic (Burke & Greenglass, 2002; Elshaer et al., 2018). For example, Elshaer et al., (2018), investigated the relationship between burnout and job stress in emergency department and critical care employees before the pandemic ($n = 82$). The results suggested that 80.5% ($n = 66$) of participants reported high levels of emotional exhaustion (Elshaer et al., 2018). In spite of this, 85.4% ($N = 70$) of participants also reported feeling satisfaction with their employment (Elshaer et al., 2018). This suggests that although the risk of negative workplace consequences (e.g., burnout) is high, positive workplace factors (e.g., personal accomplishment in the workplace) may assist in reducing or mitigating burnout (Burke & Greenglass, 2002; Elshaer et al., 2018). However, during the COVID-19 pandemic, it is possible increased pressures were placed on front-line workers that may have impacted levels of satisfaction.

The COVID-19 pandemic has been reported to have had considerable impacts on mental and physical health (BMA, 2023). Throughout the COVID-19 pandemic the British Medical Association (BMA) conducted quarterly trackers to gauge how the medical sector was coping with the physical and mental impacts of COVID-19 on front-line medical workers (BMA, 2023). On 19th April 2021, 50% ($N = 2121$) of those who completed this tracker reported suffering with a mental health issue (e.g., stress, depression) (BMA, 2023). Moreover, this level rose with the next COVID tracker on 26th November 2021, whereby 64% ($n = 2715$) self-reported difficulties with their mental health (BMA, 2023). It was further reported that poor mental health was exacerbated by feelings of isolation, moral distress, and feelings of

anger, which may have resulted in a reduction to perceptions of self-confidence and self-efficacy (Abo-Ali et al., 2021; BMA, 2023).

Self-efficacy and mental wellbeing were reported to be reduced in those working longer hours in medical settings during COVID-19 (Abo-Ali et al., 2021). The results of a cross-sectional study of healthcare workers ($n = 1046$) in Saudi Arabia reported 27.2% of participants held negative mental wellbeing and 36.6% held low levels of self-efficacy (Abo-Ali et al., 2021). Nevertheless, the reported scores of self-efficacy and mental wellbeing did fall within normal ranges (Self efficacy: 16.7 out of 31, and Mental Wellbeing: 25 out of 40). This suggested that not all those who provided care during COVID-19 have reported a reduction in self-efficacy or a reduction in mental wellbeing (Abo-Ali et al., 2021).

Sharour et al., (2021) reported differences in levels of self-efficacy in a sample of nurses ($M = 120$) during COVID-19. Here, those who had more years of service, higher academic qualifications, and higher positions reported higher self-efficacy (Sharour et al., 2021). Likewise, positive relationships were found between levels of self-efficacy on patient interactions and self-confidence (Sharour et al., 2021). This suggested levels of self-efficacy positively impacted front-line workers experiences during COVID-19 (Sharour et al., 2021). Therefore, it is important to also recognise any potential positive impacts that may have been experienced by front-line workers during COVID-19, despite the reported negative impacts surrounding providing care to COVID-19 patients.

Providing care to COVID-19 patients likely exposed front-line workers to immense and unprecedented pressures that they may not have experienced before (BMA, 2023; Nikita & Chaudhuri, 2022). For example, immense fear towards the danger of contracting and transmitting COVID-19, limited supplies of equipment (e.g., oxygen, ventilators) and limited supplies of Personal Protective Equipment (PPE) (BMA, 2023; Nikita & Chaudhuri, 2022). Moreover, for those working in close proximity to infected patients, these individuals may have

had less rest in response to emergency redeployment and higher workloads (e.g., increasing patient numbers) (BMA, 2023; Nikita & Chaudhuri, 2022). According to the British Medical Association these factors seriously impacted front-line workers both physically and psychologically during COVID-19 (BMA, 2023).

Giusti et al., (2023) examined the effects of psychological distress developed during COVID-19 and how this may have impacted previously existing levels of burnout in Doctors, Nurses and Nursing Assistants ($n= 388$). Participants were surveyed in September 2019 (before the COVID-19 pandemic) and again in December 2020 to January 2021 (Giusti et al., 2023). The results suggested that higher levels of PTSD (Non-COVID facing role: $M = 10.4$, COVID facing role: $M = 11.1$), and psychological distress (Non-COVID facing role: $M = 15.9$, COVID facing role: $M = 17.4$), developed in those who worked with COVID-19 patients (Giusti et al., 2023). Moreover, those who held low rates of emotional exhaustion and depersonalisation before COVID-19, experienced an increase in emotional exhaustion and depersonalisation during the pandemic (Giusti et al., 2023). PTSD and psychological distress were also positively associated with burnout during COVID-19 (Giusti et al., 2023). This suggested that the increased demand on front-line workers during the COVID-19 pandemic is likely to have psychologically impacted front-line workers.

Increased workloads and working longer hours have been reported to have increased the susceptibility to psychological stress, fatigue, and burnout in front-line workers during the COVID-19 pandemic (BMA, 2023; Nikita & Chaudhuri, 2022; Gilleen et al., 2021; Johnson et al., 2021; Rubin, 2020). For example, Taleb et al., (2024) examined the psychological impact of the COVID-19 pandemic on front-line hospital workers ($N = 730$). The results indicated that 49.3% reported severe or extreme levels of stress, anxiety, and depression (Taleb et al., 2024). Moreover, 49.6% ($N = 422$) reported high levels of burnout. Taleb et al., (2024) also reported high workloads, direct contact with COVID-19 positive patients and lower work experience

increased the risk of negative psychological consequences. Furthermore, Biber et al., (2023) examined the impact of COVID related stressors on a sample of ambulance front-line workers ($N = 2606$). Findings indicated that the biggest COVID-related stressor was not knowing when outbreaks would become under control, which was reported by 42.2% of participants ($n = 1100$) (Biber et al., 2023). In addition, 35% ($N = 912$) reported that the media coverage of COVID-19 increased levels of stress (Biber et al., 2023). This was alongside wearing PPE (34.8%, $M = 907$), concern regarding transmissions to family and friends (34.1%, $N = 889$); all reported to affect daily life (Biber et al., 2023). The psychological impacts reportedly experienced by front-line workers have also been suggested to impact psychological wellbeing (Gilleen et al., 2020; Kisley et al., 2020).

Poor levels of wellbeing have been reported in front-line workers during COVID-19 (Gilleen et al., 2021). Gilleen et al., (2021) investigated the risk and protective factors associated with poor wellbeing in front-line workers ($n = 2273$) in the first national COVID-19 lockdown in the UK (spring 2020). The results suggested 33.1% ($N = 919$) of participants met the threshold for high depression, 28.1% ($N = 778$) met the threshold for high anxiety, and 60.6% ($N = 1681$) reported experiencing a stressful or traumatic event that was directly related to COVID-19 (Gilleen et al., 2021). It is suggested that the levels of poor wellbeing reported by front-line workers may have developed in response to working long hours, increased loneliness, reduction in self-care and lack of rest. Furthermore, coping with multiple patient deaths on a daily basis, feelings of helplessness, inability to visit families and fear of transmission and contagion of COVID-19 may have also increased the susceptibility to psychological trauma (Gilleen et al., 2021; Giusti et al., 2023; Johnson et al., 2021; Rubin, 2020). The British Medical Association (BMA) reports coping with multiple patient deaths on a daily basis has resulted in increased feelings of anger and frustration in front-line workers and induced moral distress and/or injury (BMA, 2023). However, the aforementioned literature

focuses on the impact of working directly with COVID-19 positive patients and does not consider the impact of working on the front-line in other front-line sectors (e.g., Food and retail, public services, etc). Thus, continued investigation into the impact of working on the front-line during COVID-19 is of clear value.

1.3 Theoretical underpinnings

To date, there is limited literature available that provides a theoretical understanding of the impact of public health crises on front-line workers and their families. This is partially due to limited opportunities to investigate the impact of pandemics. Furthermore, the limited literature available conducted on epidemics is not driven by theory and is explorative in nature. For example, during the Middle East Respiratory Syndrome (MERS), Abolfotouh et al., (2017) investigated the levels of concern in hospital-based healthcare workers ($N = 1031$) in an effort to ascertain how staff concerns influence overall effectiveness during outbreaks.

Despite this, there are several theories that may explain the potential psychological impact of working on the front-line during public health crises. Theories relating to the development of psychological trauma may elucidate how trauma can develop during public health crisis, for example *Cognitive Appraisal Theory* (Lazarus, 1966; Lazarus & Folkman, 1984). Broadly, this theory asserts that an individual's appraisal of an event influences their interpretation and subsequent response (Lazarus, 1966; Lazarus & Folkman, 1984). This theory may be able to highlight *how* individuals evaluate their experiences and the subsequent psychological outcomes they experience while working on the front-line. However, front-line workers may be exposed to increased job placed demands, which may ultimately influence how they react to traumatic experiences, suggesting that factors beyond appraisal may be important.

During public health crises front-line workers may have experienced alterations to normal working conditions, for example increased workloads. The increase in patient numbers combined within limited knowledge about the COVID-19 virus, for example, may have increased pressures in the workplace. *The Jobs Demands-Resources Model* (Bakker et al., 2003; Demerouti et al., 2001) maintains that an increase in workplace demands (e.g., workloads, emotional labour) can augment the susceptibility to burnout, compassion fatigue and psychological trauma. It is possible this model may highlight the factors that may promote the development of psychological trauma and moral injury in the workplace and provide an understanding regarding how an increase in job-demands may impact front-line workers during public health crises.

The families of front-line workers, as noted, may also have been relied upon to provide additional social support to front-line workers throughout the COVID-19 pandemic. However, families may have experienced a negative psychological impact as a result of providing this additional care. Families typically share a strong emotional connection that can create susceptibilities to developing psychological trauma through emotional contagion (Figley & Kiser, 2013). *Emotional Contagion Theory* (Hatfield, 1992; Hatfield et al., 2014) refers to a subliminal transference of emotions that occurs within a group and results in emotions being shared and mimicked. Within families, it is possible the shared emotional bonds may influence the subliminal transference of emotions, resulting in the whole group sharing an emotional reaction (Figley & Kiser, 2013). During a public health crisis, for example COVID-19, if front-line workers experienced distress in the workplace, families may become emotionally contaminated as a result of providing care to their loved ones. Despite this, families may promote the development of resilience in front-line workers and promote recovery from psychological trauma (Southwick et al., 2014).

Families may also be able to promote resilience in front-line workers while providing social support (Southwick et al., 2014). Resilience refers to the ability to be resistant to stressful experiences and to overcome the negative psychological consequences of adversity (Rutter, 2006; van Breda, 2018). *The Resilience Process and Outcome Model* (Ungar, 2014; van Breda, 2018), is a further valuable consideration. This describes resilience as a dynamic transactional process that occurs across the lifespan. The theory asserts that resilience can develop during adversity if an individual possesses protective factors, which aid in elevating distress (Ungar, 2014; van Breda, 2018). It is certainly possible that factors, such as social support from families, may assist in reducing distress in front-line workers and promote resilience that can then be fostered. This model has value therefore in understanding how individuals cope and how they built resilience during, and in the aftermath of a public health crises, such as COVID-19. The aforementioned theories will be discussed in detail throughout the following chapters. Despite the noted research, the areas of moral injury, psychological trauma and resilience have been notably neglected in the epidemiology literature. Furthermore, the research to date has not captured the role of caregivers, such as the families of those working on the front-line, highlighting the value of completing research in this area.

1.4 Structure of this thesis

The introductory chapters within this thesis provide definitions and a critical overview of psychological trauma and moral injury in front-line workers and their families. They first examine the impact of public health crises on front-line workers and the role of families in providing support. The chapters then progress to examine the concept of resilience and the protective and vulnerability factors of psychological trauma and moral injury. Following this, the thesis will explore the development of psychological trauma and moral injury in front-line workers and their families during a public health crisis, namely COVID-19. Lastly, it will

highlight factors that can protect and/or mitigate against psychological trauma and moral injury, identifying those that promote the development of resilience during public health crises.

CHAPTER TWO

INTRODUCTION TO PSYCHOLOGICAL TRAUMA AND IMPACTS

2.1 Structure of this chapter

This chapter defines psychological trauma and outlines the events individuals can experience that can instigate trauma. It then outlines how individuals may respond to psychological trauma, with attention paid to emotions, appraisal, fear and neurological functioning. A critical overview of the role of families and how trauma can develop in families is then outlined, including how emotional contagion can promote the development of vicarious psychological trauma in families. This chapter concludes by outlining how individuals can recovery naturally from psychological trauma.

2.2 Defining psychological trauma and traumatic experience.

The word trauma is derived from the Greek for ‘physical wound’ and in modern medicine is considered to be a serious physical injury to the body (NIDMS, 2023). However, psychological trauma, which is the focus of this thesis, refers to the overwhelming emotional response to a stressful experience (APA, 2022; Perrotta, 2020; van der Kolk, 1987). Psychological trauma can result from an event, or series of events, which involves perceived or actual threat of emotional and/or physical harm (van der Kolk, 2014). Following exposure to a traumatic experience, an individual can develop psychological distress and exhibit anxiety and fear-based symptoms (Bisson et al., 2015; Huppertz et al., 2018). However, the reaction to a traumatic event can be varied (Bisson et al., 2015). Individuals can display anhedonic symptoms (i.e., reduced ability to experience pleasure), and/or dysphoric symptoms (i.e., profound sense of discomfort, distress or unhappiness), dissociative symptoms (i.e., disconnected or detached) and/or feelings of anger (APA, 2022; Briere & Scott, 2014;).

Moreover, individuals who develop psychological trauma can endure emotional and physical symptomologies, such as heart palpitations, sweating and nightmares, which are often triggered by reminders of the event (Herman, 1992a, 1992b). Additionally, if the symptoms of psychological trauma are sustained over time, they can induce adverse effects on an individual's ability to function in daily life, and can affect physical, emotional and social wellbeing (SAMHSA, 2014; Zepinic, 2019).

The Diagnostic and Statistical Manual of Mental disorders, text revision (DSM-5-TR) (APA, 2022) defines psychological trauma as a variable manifestation of clinical distress following exposure to one or more potentially traumatic experiences and considers it under the diagnostic category of Post-Traumatic Stress Disorder (PTSD) (APA, 2022; Wilkinson et al., 2017). PTSD can develop after directly experiencing or witnessing actual serious bodily harm, for example, death, serious injury or sexual violence (APA, 2022). Furthermore, PTSD can develop in response to learning that a family member or close friend has endured a violent or accidental life threatening traumatic event (APA, 2022). The DSM-5-TR (APA, 2022) maintains individuals who experience trauma are likely to exhibit intrusive memories of the event, prolonged distress, avoidance of stimuli associated with the event, negative alterations to emotions and cognitions and/or changes to arousal (APA, 2022). Nevertheless, psychological trauma is heterogeneous and can present differently in individuals and can be influenced by the characteristics of the individual (Bisson et al., 2015; Wilkinson et al., 2017). Therefore, psychological trauma can be understood as the consequence of experiencing extreme stress during a dangerous event and the continued effect on psychological wellbeing after the event has ended (Bisson et al., 2015; van der Kolk, 2015).

Traumatic events are often unexpected encounters that can either be directly experienced, witnessed, or developed after learning or sharing the experiences of a loved one (Bisson et al., 2015; Herman, 2015; Perrotta, 2019). Moreover, it can occur after exposure to

aversive details regarding another's traumatic experience (Herman, 1992b; van der Kolk, 2014; Zepinic, 2019). A traumatic event can refer to a single event (acute) or be the result of repeated exposure (chronic) (Dye, 2018). It can occur at any point throughout the lifespan and can be experienced by individuals from differing genders, ages, cultures, ethnicities, and socioeconomic backgrounds (Herman, 1992b; Zepinic, 2019). Moreover, it can arise in social groups, such as within families and communities (Figley & Kiser, 2013; Hopper, 2012; van der Kolk, et al., 1996; van der Kolk, 2014). However, it is important to consider the type of exposure to potentially stressful or traumatic events and how this may impact the type of negative psychological outcomes that might develop.

Events that typically occur in the workplace, such as large caseloads or insufficient managerial support are unlikely to have the potential to cause significant distress or impair functioning, and result in a traumatic reaction (APA, 2022). The DSM-5-TR (APA, 2022) asserts traumatic events require actual, threatened or a perception of imminent serious harm to the self or others. As such, it can be theorised that incidents of stress in the workplace for example, being unable to cope with large administrative caseloads may not have the severity of threat needed to instigate a traumatic reaction. This is due to the lack of physical harm that may occur and instead may result in psychological stress (HSE, 2024). Whereas it can be theorised that viewing patient/s suffering and/or dying, exposure to bullying, serious accidents or warfare may create sufficient traumatic distress to induce psychological trauma (APA, 2022). However, the individual characteristics of the person experiencing the event will impact the likelihood of trauma developing (Herman, 1992b). Therefore, highly stressful events are unlikely to instigate psychological trauma without threats of serious harm, however it is important to also recognise that psychological trauma may not develop in all potentially traumatic situations (van der Kolk, 2014).

Ultimately, traumatic events are often situations that involve actual or perceived threats of physical or psychological harm to the self or others, and evoke feelings of terror, threat, fear, helplessness, and a loss of control (Herman, 1992b; Kurtz, 2018; van der Kolk, 2003, 2014). These situations can include, physical violence, sexual assault/abuse, serious accidents, natural disasters, war, terrorism, or any experience the individual perceives as overwhelmingly stressful (Amstadter & Vernon, 2008; SAMHSA, 2014; van der Kolk, 2014). Alternatively, an event which occurs repeatedly (e.g., bullying) or chronic exposure to similar events over a long period of time (e.g., childhood abuse, domestic violence) can also instigate trauma (Cyr et al., 2013; SAMHSA, 2014). These events have the potential to produce an intense psychophysiological reaction and initiate the development of symptomologies associated with psychological trauma (APA, 2022; Kurtz, 2018), and can have a lasting influence on development (Matlin et al., 2019).

Exposure to trauma in early life can significantly impact development and the overall ability to cope with adversity (Dugal et al., 2016). Childhood trauma, defined as potential and/or actual physical or psychological harm to a child before the age of 18 (Cyr et al., 2013; van der Kolk, 2014), can also include impairments to development, maltreatment, and threats to survival (Dugal et al., 2016). Childhood trauma can be categorised into two aspects, omission (refusal or an incapacity from the caregivers to provide care) and commission (psychological, sexual, or physical acts of abuse) (Dugal et al., 2016; Finkelhor et al., 2009). Exposure to trauma in childhood is reportedly associated with childhood and adult psychopathology, for example, depression, anxiety and Attention Deficit and Hyperactive Disorder (ADHD), eating disorders and suicidality (Copeland et al., 2015; Cummings et al., 2012; Maniglio, 2009). Moreover, exposure to trauma can impact on emotional, social and cognitive competencies (De Bellis & Zisk, 2014; Dye, 2018). The impact of childhood trauma can also persist into adulthood. Individuals can develop maladaptive cognitions in reaction to

the trauma that can lead to self-blame, difficulties in interpersonal and psychological functioning (Matlin et al., 2019). Furthermore, trauma can increase the risk of future problems with illicit substances, co-occurring psychological and physical problems and can create vulnerabilities to re-victimisation later in life (Dye, 2018; Nemeroff, 2016; Pereda et al., 2014). However, it is not the severity or the duration of the event that has the potential to induce a traumatic response, rather it is the salient characteristics of the individual enduring the event (Huppertz et al., 2018).

Enduring a traumatic experience can also *create* vulnerabilities to developing psychological trauma. However, psychological trauma is heterogeneous and is dependent on the unique characteristics of the individual (Zepinic, 2019). It is estimated that one in every two individuals has experienced a potentially traumatic event, which has posttraumatic effects (Huppertz et al., 2018). Nevertheless, estimating the likelihood of trauma occurring can only be considered on an individual basis, as only a proportion of those who encounter traumatic situations develop the symptomologies associated with psychological trauma (Amstadter & Vernon, 2008; Kurtz, 2018). It is possible this is due to the biopsychosocial factors an individual possesses, whereby, the appraisal of the event will be influenced by their perceptions, cognitions and past experiences (Kurtz, 2018). Additionally, the appraisal of the traumatic event will be affected by the individual's sociocultural background, childhood and the community the individual identifies with (Huppertz et al., 2018; van der Kolk et al., 1999). The *Cognitive Appraisal Theory* was developed to explain how cognitive process can influence the subjective interpretation of stimuli in the environment (Lazarus, 1966; Lazarus & Folkman, 1984).

The Cognitive Appraisal Theory (Lazarus, 1966; Lazarus & Folkman, 1984) states stress is perceived as the imbalance between the demands placed on an individual and their resources available to cope with an event (Lazarus & Folkman, 1984). According to this theory,

the cognitive appraisal of the event directly influences the extent to which the experience is perceived as stressful. The appraisal of the event is influenced by the perception of the severity of danger, the availability of personal resources and a person's ability to cope (Forkman et al., 1986a; Forkman et al., 1986b; Lazarus, 1991). The cognitive appraisal process incorporates three stages, primary, secondary and reappraisal (Lazarus, 1991). Primary appraisal refers to the initial evaluation of the event as positive, threatening, or neutral (Lazarus, 1991; Lazarus & Folkman, 1984). If the event is appraised as threatening a second appraisal will occur to assess the degree of potential harm (Lazarus, 1991). Secondary appraisal evaluates the individual's resources and ability to cope with the event (Lazarus, 1991). It evaluates the event as harmful, threatening or challenging and interacts with the primary appraisal to determine the emotional reaction to the event (Lazarus, 1991; Lazarus & Folkman, 1984). Events can be appraised as harmful or threatening if the resources required to cope are unavailable, and if actual damage and/or possible damage is likely to occur and are deemed as stressful (Lazarus, 1991). Challenge appraisal can occur if the event is perceived as demanding but can be overcome and can result in the individual benefiting from the event (Lazarus, 1991).

The focus on the subjective cognitive appraisal of events, as suggested by the Cognitive Appraisal Theory (Lazarus, 1966; Lazarus & Folkman, 1984), highlights how individuals can experience similar events and elicit a range of different emotional responses. Furthermore, it is beneficial in explaining how the cognitive appraisal of traumatic events can result in the differences in reported emotional reactions to similar traumatic events (Amstadter & Vernon, 2008; Kurtz, 2018; van der Kolk, 2014). However, the Cognitive Appraisal Theory (Lazarus, 1966; Lazarus & Folkman, 1984) fails to consider the role of emotions on the cognitive appraisal of traumatic events and considers emotions instead as an adaptive response (Moors et al., 2013, Moors, 2014). Furthermore, this theory does not elucidate *whether* any emotions will develop in response to cognitive appraisals, and if emotions do occur *which* appraisals

contribute to *which* emotion (Roseman, 2013). Thus, creating difficulties in understanding which appraisal may contribute towards emotions and how these emotions can be activated during traumatic events (Roseman, 2013).

Contemporary appraisal theories (e.g., *Cognitive Appraisal of Emotions* (Moor, 2013, 2014) and the *Emotional System Model*⁴ (Roseman, 2013)) now define emotions as a *continuous* process of interaction between the individual and the environment (Moors, 2017). For example, The Emotional System Model (Roseman, 2013) aims to highlight how different emotions can develop following exposure to environmental stimuli. It asserts that emotions act as syndromes, which are composed of differing response components: phenomenological (feelings and thoughts characteristic of the emotion), expressive (facial, voice and body language), emotion-motivational (desired goal when experiencing the emotion), physiological (neurological and muscular responses) and behavioural (readiness to engage in particular actions) (Roseman, 2013). The responses are interrelated and interconnected into distinctive strategies for coping with different situations. The emotion-motivational component provides goal orientated behaviours and directs actions to fit with an emotional strategy (Roseman, 2013). For example, when encountering psychological trauma, fear may comprise of a strategy that directs the individual to move away from the stimuli to protect the self. In fear, the goal may be to reduce the possibility of harm and thus motivate certain actions (e.g., running away or freezing to appear less threatening). Pursuing the goal of moving away from the stimuli is consistent with the emotions strategy of moving away from the threat. The physiological component enables the biological response within the emotional strategy. Activity in the anterior insula may organise a variety of fear responses, such as shaking and an increase in heart rate (Sherin & Nemeroff, 2011). The behavioural component contributes specific default

⁴ The Emotional systems model was previously known as the Appraisal-Emotion Relationship Theory (Roseman, 1984, Roseman et al., 1990, 1996, 2001).

actions (e.g., running away) which assist in coping. The expressive component enables the individual to communicate the emotions (Roseman, 2013). The phenomenological component represents the consciousness and cues the revival of past experiences and associated information of the emotion, which assists the individual to cope by drawing upon past experience.

The Emotional System Model (Roseman, 2013) provides an understanding towards how individuals may utilise emotional components to cope during traumatic events. It can explain the emotions which may occur during traumatic experiences. However, it does not have the scope to explain how the body and mind can become overwhelmed by the experience, or why the emotions can remain after the event has ended (Reisenzein, 2019). An alternative theory which may explain how emotions can remain after a traumatic event is the *Cognitive Appraisal Theory of Emotion* (Moors, 2013, 2014). Similar to the Emotional System Model (Roseman, 2013), the Cognitive Appraisal Theory of Emotion (Moors, 2013, 2014) proposes that emotions can be derived and differentiated by appraisal of an event or stimulus (Moors, 2013, 2014). Furthermore, the appraisal of an individual's ability to cope can influence the emotional reaction to an event (Moors, 2013, 2014). However, it also recognises that emotions can initiate appraisals, which then lead to changes in behavioural and physiological responses (Moors, 2013, 2014; Roseman & Smith, 2001). For example, an individual may hear a loud bang and experience fear, this is then followed by a cognitive appraisal and subsequent action (Moors, 2020).

The emotional influence highlights how some individuals are adversely affected during traumatic events, in contrast to others who may not be affected (Moors, 2013, 2014). The Cognitive Appraisal Theory of Emotion (Moors, 2013, 2014) has been vigorously tested and the results of a recent study support the role of cognitive appraisal in emotions (Conte et al., 2023). In a set of three experimental studies with a sample of university students ($N_I = 219$),

undergraduate students ($N_2 = 211$) and French citizens ($N_3 = 270$), found both primary and secondary appraisal influenced emotional intensity. Moreover, primary appraisal held stronger mediation on emotional intensity (Conte et al., 2023). This can also explain how individuals can have traumatic memories triggered by emotional cues within the environment (Raisenzin, 2019). However, the likelihood of the traumatic reaction persisting over time is, arguably, entirely dependent on the characteristics of the individual (Baranyi et al., 2008; Huppertz et al., 2018; Sharma, 2019). Therefore, the likelihood of a traumatic reaction occurring after experiencing a trauma-inducing event is entirely reliant on the experiences, cognitions, and emotional psychopathology of the individual enduring the event (Herman, 2015; van der Kolk, 2014; Zepinic, 2019).

2.3 Individual responses to psychological trauma.

The possibility of trauma developing after exposure to a highly stressful event is dependent on an individual's ability to cope with adversity (Raisenzin, 2019; Sherin & Nemeroff, 2022). A proportion of survivors of trauma are able to recover with time, exhibit minimal symptoms, develop coping strategies and manage effectively with life (Baranyi et al., 2008; Huppertz et al., 2018; Kurtz, 2018). Nevertheless, a range of problems can still develop (Raisenzin, 2019). During a traumatic event an individual can experience fear, helplessness and vulnerability (Kurtz, 2018). These emotions, combined with high levels of stress, can overwhelm the body's natural response to stress (Sherin & Nemeroff, 2011). The body operates several complex nervous systems in order to maintain healthy neurological functioning. This includes the autonomic nervous system, which performs a significant role in the bodies response to stress (Bracha, 2004; Sherin & Nemeroff, 2011). The autonomic nervous system is reported to have two primary systems, the sympathetic nervous system and the parasympathetic nervous system (Sherin & Nemeroff, 2011). The parasympathetic nervous

system is responsible for operating life sustaining processes, such as digestion (Sherin & Nemeroff, 2022). The sympathetic nervous system is associated with the flight-fight response and incorporates a variety of cardiovascular activations in response to danger. These include accelerated heart rate, reduced metabolic speed and peripheral vasoconstriction (enlarged pupils) (Bracha, 2004; Sherin & Nemeroff, 2022). During stressful or traumatic experiences, the sympathetic nervous system elevates the heart rate, decreases metabolism and increases adrenaline. This initiates behaviours, such as flight, freeze or fight to counteract or minimise the potential harm (Corr, 2008; Heym et al., 2008; Sherin & Nemeroff, 2022). However, Schauer & Elbert (2010) assert six stages are crucial as an adaptive strategy during highly stressful encounters.

The *Six Stages of Response to Trauma*, or the Six 'F's' of Trauma (Schauer & Elbert, 2010) maintains individuals endure an adaptive process when encountering traumatic events. Individuals will initially 'freeze' in order to appraise the level of danger, however this stage is short in duration (Schauer & Elbert, 2010). The second and third stage involve the 'flight' and 'fight', in which the sympathetic nervous system will enable the individual to 'flee' danger, if possible, or 'fight' to protect against harm (Schauer & Elbert, 2010). If the individual is unable to escape from harm, the individual will experience 'fright' in the fourth stage (Schauer & Elbert, 2010). During the fourth stage, the individual will experience panic and may feel nauseous, dizzy and/or lightheaded. Schauer & Elbert (2010) assert throughout this stage that the autonomic nervous system becomes overwhelmed. It begins to activate the sympathetic nervous system and the parasympathetic nervous system simultaneously, resulting in the initial symptoms of dissociation and a feeling of being detached from the traumatic event. If the threat of trauma remains, the individual will progress into the fifth stage, 'flag', and endure feelings of helplessness and despair (Schauer & Elbert, 2010). Dissociation dominates this stage due to the parasympathetic nervous system shutting down (Bichescu-Burian, 2012). This results in,

lowered blood pressure, difficulty with cognition, blurred vision and slurred speech (Bichescu-Burian, 2012). In some cases, it can develop into the final stage, 'faint'. The 'faint' response is reported to occur in response to vasovagal syncope (sudden drop in blood pressure and heart rate), whereby the body is unable to cope with the extreme emotional distress (Schauer & Elbert, 2010). Fainting enables increased blood flow to the brain. In addition, the appearance of death in response to danger can serve as an evolutionary act of survival (Schauer & Elbert, 2010).

In spite of this, initial reactions to trauma can vary due to self-regulation, in which individuals may attempt to regulate emotions and/or draw upon past experience in an effort to cope (Kurtz, 2018). In addition, Six Stages of Response to Trauma, as suggested by Schauer & Elbert (2010) does not consider 'fawn' whereby, individuals can attempt to gain approval from an aggressor. For example, in childhood abuse the victim may attempt to please the abuser in an effort to mitigate harm (De Bellis & Zisk, 2014). Furthermore, this theory may not be applicable to neurodiverse individuals. Autistic individuals have been reported to display altered levels of autonomic nervous system activity in response to distress (Kushki et al., 2013; Rumball et al., 2020; Sokhadze et al., 2017). In a study by Kushki et al., (2013) children with a diagnosis of autism ($n=12$) reportedly displayed elevated heart rates and blunted phasic electrodermal activity in baseline, and anxiety conditions in comparison to typically developing children ($n=17$). Furthermore, the children with a diagnosis of autism did not display lowered skin temperatures in the anxiety conditions. This may indicate individuals with autism may respond atypically to distress (Kushki et al., 2013; Sokhadze et al., 2017). Nevertheless, the Six Stages of Response to Trauma (Schauer & Elbert, 2010) provides an understanding of how trauma can affect neurological functioning.

Fear is a further primitive emotion important to consider. This enables humans to allow their body to anticipate, recognise and avoid harmful situations (Blanchard et al., 2001). Fear

is reported to be represented in memory as specific structures (Cassidy & Mohr, 2001; Maddox et al., 2019). These structures depict a set of behaviours, cognitions, physiological and/or behavioural responses which can be activated to reduce the possibility of harm from a feared stimulus (Lang, 1977; Lang 1979; Maddox et al., 2019). Individuals innately possess fear structures to avoid harm. For example, an individual may be startled in response to a loud bang. Fear structures can also be learnt and adapted through experience (Maddox et al., 2019). However, individuals may not adequately hold sufficient structures to cope with traumatic experiences (Foa & Rothbaum, 1998). Foa and Rothbaum's *Biological Processing Theory* (1998) asserts the fear structures of psychological trauma are distinctive in contrast to ordinary fear structures. The fear structures of trauma contain extreme responses, resist modification and do not accurately represent reality (Foa & Rothbaum, 1998). Moreover, the fear structures can include dysfunctional cognitions, which alter the individual's perception of the world (Foa & Roiggs, 1993; Foa & Rothbaum, 1998). For example, a war veteran may accurately associate weapons as dangerous, however returning from a warzone they may associate *all* loud noises with weapons. Harmless stimuli can, therefore, be perceived as dangerous and trigger the physiological reaction associated with the trauma fear structure (Foa et al., 2006).

The reaction to the stimuli in the environment may also occur as a conditioned response (Maddox et al., 2019). *Pavlovian Conditioning of Trauma* has been reported to generate neuroanatomical and molecular adaptations, which can create threat encoding and initiate lasting behavioural changes after exposure to trauma (Fanselow, 1980; Fanselow & LeDoux, 1999; Fanselow & Pennington, 2018; Gray & McNaughton, 2000; Maddox et al., 2019). The trauma is encoded by cellular and molecular process within the neuronal synapse (Maddox et al., 2019). This creates changes in synaptic plasticity at the neuronal and circuit level and supports the persistence of the trauma memory (Schafe et al., 2005). Likewise, the changes alter the regulation of the amygdala, hippocampus, cortical and thalamic regions of the brain (Fox et al.,

2015). When individuals encounter cues which are associated with a trauma, it triggers the memory and the associated behaviours (Maddox et al., 2019). This may account for the dysfunctional cognitions that can arise in response to trauma. It also provides an understanding of how psychological trauma can be maintained (Maddox et al., 2019; Rauch & Foa, 2006), however, this does not adequately explain how individual with repressed memories. Furthermore, it does not explain the avoidant behaviours that can adopted to avoid dangerous stimuli. Nevertheless, the Biological Processing Theory (Foa & Rothbaum, 1998) and Pavlovian Conditioning of Trauma (Fanselow, 1980; Fanselow & LeDoux, 1999; Fanselow & Pennington, 2018; Gray & McNaughton, 2000; Maddox et al., 2019), does assist in understanding how fear can influence the psychological and behavioural response to trauma. However, neither adequately explain the traumatic stress, which can develop following exposure to trauma.

Individuals who are exposed to traumatic events can develop psychological consequences, such as traumatic stress (Vujanovic et al., 2011). Traumatic stress is a normal reaction following a traumatic event (Ford & Courtois, 2020, van der Kolk, 2014). However, once the initial response subsides, individuals can experience a range of traumatic stress. This can include, alterations to cognitions, intense emotions (e.g., irritability, anxiety, sadness, shame), problems regulating emotions, sensitivity to the environment (e.g., loud noises, or environmental cues that can stimulate the memory of the event), difficulties with interpersonal relationships and stress-related physical symptoms (e.g., headaches, chest pains, nausea) (Amstadter & Vernon, 2008; Ehring & Quack, 2010; Ford & Courtois, 2020). In an effort to cope, individuals may adopt a range of maladaptive practices, such as self-medicating (drug or alcohol consumption), engagement in high-risk behaviours, compulsive behaviours (over working, or gambling) and/or compulsive eating (Cloitre et al., 1997; Ford & Courtois, 2020; Mclean et al., 2006; Vujanovic et al., 2011). These behaviours may be adopted to counteract

and/or tolerate negative emotions (Brere & Rickards, 2007). Alternatively, the individual may repress, deny or attempt to numb negative emotions (Malta et al., 2009; Tull et al., 2007a; Tull et al., 2007b). However, it is possible the difficulties in emotional regulation and coping occur as a result of changes to healthy neurological functioning following traumatic stress (Soloman & Heide, 2005).

Traumatic stress can have profound and lasting effects on neurological functioning and induce adverse alterations to the biology of the brain (Soloman & Heide, 2005). Trauma biology is complex as it incorporates multifaceted neurological systems, which maintain homeostasis (self-regulating process to maintain internal stability) (Ford & Courtois, 2020; Vujanovic et al., 2011). However, traumatic stress has been reported to induce lasting changes to neurophysiological systems (Bremner, 2006; Rauch et al., 2003; Villarreal & King, 2001). Neurophysiological alterations can include modifications to the functioning of the limbic system⁵, hypothalamic-pituitary-adrenal axis (HPA)⁶ and the neurotransmitters responsible for regulating arousal (Bremner et al., 1995; Charney et al., 1993; Charney, 2004; Francati et al., 2007; Quirk & Gehlet, 2003). Moreover, changes to brain structures have been reported and include a reduction in hippocampal and anterior cingulate volumes and medial prefrontal cingulate volume (Bremner, 2006). Increased amygdala functioning, and increased cortisol and norepinephrine responses to stress have also been reported in individuals with PTSD (Bremner, 2006), with differences in overall brain density, which have also been found in survivors of trauma, in comparison to individuals who have not endured trauma (Rauch et al., 2003; Villarreal & King, 2001). Therefore, changes to healthy brain functioning after exposure to trauma can alter stress responses, executive functioning, regulation of attention and create dissociations between behavioural, biochemical, and emotional responses. These changes can

⁵ Assists in behavioural and emotional responses.

⁶ Responsible for adjusting and maintaining cortisol levels.

influence how traumatised individuals remember, and appraise their social environments (Aupperle et al., 2011; Leskin & White, 2007; McCabe et al., 2010).

Exposure to trauma can induce a variety of consequences on healthy neurological functioning and create lasting changes to the brain (Bremner, 2006). Moreover, changes to neurological functioning have been reported to influence how memories are stored and retrieved (Eyerman, 2019; Goodman et al., 2018). Ordinarily, a complex system is utilised to comprehend and store memories (Eyerman, 2019). The pre-frontal cortex (logical processing) and the limbic system (emotional processing) operate concurrently to absorb the biopsychosocial elements of an event (Eyerman, 2019). However, in those who sustain psychological trauma, the memories of the event may not be stored appropriately (Goodman et al., 2018). *The Adaptive Information Processing Theory* (Shapiro, 1995) suggests memories associated with a traumatic event are only partially stored. In response to the increase of stress during trauma exposure, the neuroendocrine system activates the hypothalamic-pituitary-adrenal axis to trigger the release of adrenaline and cortisol neurotransmitters (Goodman et al., 2019; van der Kolk, 2015). In order to comprehend and store the stimulus of the event, the hippocampus splits the stimulus into two parts and sends the signal to the pre-frontal cortex and the limbic system (Shapiro, 2017). The limbic system processes the emotions associated with the event. However, the pre-frontal cortex becomes overwhelmed and does not fully process the signal associated with the event (Goodman et al., 2019). As a result, the signal that contains the information regarding the facts, causation, duration and/or chronology of the event is not processed within the pre-frontal cortex and remains in a raw state (Shapiro, 2017). In contrast, the emotions associated with the event are processed within the limbic system and stored (Shapiro, 1995; Shapiro, 2017). This creates a fragmented storage of the event, where only partial information is accessible. The crucial aspects of the memory are then absent, and the memory is not fully processed into the long-term memory store (Shapiro, 1995, 2017).

There is growing evidence in support of this Adaptive Information Processing Theory (Hill, 2020; Shapiro, 1995). Numerous studies have demonstrated the effectiveness in different populations, for example, first responders (Luber, 2015), survivors of mass trauma (Jarero & Artigas, 2012), and refugees (Acarturk et al., 2015). However, it is difficult to ascertain on a neurobiological level what aspects of the memory are dysfunctionally stored and the consequence this may have on the associated symptoms of trauma (Hase et al., 2017). Nevertheless, the Adaptive Information Processing Theory (Shapiro, 1995) provides a memory-based pathology towards understanding psychological trauma, that can also offer a framework for understanding trauma responses.

The Adaptive Information Processing theory (Shapiro, 1995) provides a memory-based model that highlights how individuals process and store traumatic memories. However, van der Kolk (2014) asserts psychological trauma encompasses more than memory. They note how the trauma re-emerges as a reaction, creating the perception of reliving the event in real time. Individuals who have experienced trauma can endure the perception of reliving the traumatic event/s, and experience persistent and intrusive memories, dreams/nightmares and flashbacks (van der Kolk, 2014). A 'flashback' describes the overwhelming sensation of re-experiencing the traumatic event in the present time (Huppertz et al., 2018; Kurtz, 2018). During a 'flashback' the individual has the perception of reliving the traumatic event (Elher et al., 2010; Huppertz et al., 2018). This induces a reaction that resembles the psychological and physiological response of the original traumatic event (Elhers et al., 2010; Herman, 1992). The duration of flashbacks can vary in length and severity and are dependent on the individual reaction to the event and the memory storage (Kurtz, 2018; Zepinic, 2019).

Flashbacks are often triggered by environmental cues, which can include, social, sensory, auditory and/or psychological stimuli (van der Kolk, 2014). The reaction to the flashback often mimics and/or prompts a panic reminiscent of the traumatic event (Corrigan et

al., 2010). Triggers can be vague but can resemble elements of the traumatic event (Ehlers et al., 2010). Flashbacks and triggers may occur as a direct result of inaccurate memory storage of the event, as suggested by the Adaptive Information Processing Theory (Shapiro, 1995, 2017). In contrast, it may be activated by environmental or emotional triggers as proposed by van der Kolk (2014). Furthermore, it can be triggered in response to fear, as suggested by Foa and Rothbaum's Biological Processing Theory (1998) or in response to Pavlovian Conditioning (Fanselow, 1980, Maddox et al., 2019). Thus, explanations require more than one model of understanding, with no single theory being sufficient. These theories also fail to consider the wider social context. Continued research is required to ascertain how flashbacks and psychological trauma impact individuals who are exposed to trauma, and how individuals cope with the psychological consequences.

It is also important to understand the influence of social groups, such as families, on the development of psychological trauma. Groups can influence how individuals act, mature and cope with adversity (Ascan et al., 2014). Furthermore, the quality of the relationship within a family unit can influence emotional and psychological development and may impact how individuals perceive and react to psychological trauma (Figley & Keiser, 2013). Therefore, it is important to consider the influence of social groups, such as families may have on the development of psychological trauma, which is a central aspect of this thesis.

2.4 The development of psychological trauma in families

Families are social living systems intended to nurture, support, and provide predictable patterns of behaviour to inform interpersonal relationships (Figley, 2013). Families typically involve a group of individuals who are related by marriage, birth, or adoption (Figley, 2013). However, connection through marriage or blood does not imply individuals will be an active member of the family group. For example, a family member (e.g., a sibling or parent) may not

provide emotional support during times of distress and may not perceive themselves as part of the group. Family groups can also contain members who are not connected through marriage or birth, such as friends.

Friendships are typically developed through shared interests, mutual respect and/or shared ideologies (Rozzer et al., 2015; Procidano & Heller, 1983). Moreover, friendships can result in strong emotional bonds (Rozzer et al., 2015; Procidano & Heller, 1983). The support provided by friends may be as beneficial as that provided by families and may result in similar levels of emotional support when compared to families (Rozzer et al., 2015). For example, Horwitz et al., (2015) examined the impact of family support and friend support on levels of psychological distress in a sample of twins ($N = 998$). The findings indicated lower psychological distress was negatively connected with friend support ($r = -.21, p < .001$), and family support ($r = -.22, p < .001$). This suggests that similar positive impacts on psychological health can occur from both friends and family (Horwitz et al., 2015). The strength of the relationship between family members can be viewed through the lens of willingness to be an active member of the group. Whereby membership is dependent on the strength of the emotional connection of those within the group and is supplemented by support provided by all members (Figley, 2013).

Early research conducted in psychological trauma primarily focused on the development of trauma in individuals and overlooked the impact of psychological trauma on groups (Figley & Kiser, 2013). From birth, the family unit acts as an integral aspect of an individual's life and influences how individuals perceive and/or react to the social world (Koerner, & Schrodtt, 2014; Kunkel et al., 2006). Individuals typically live within family groups, consisting of individuals who are connected by genetics, marriage, adoption or mutual co-operation (Figley & Kiser, 2013; Koerner, & Schrodtt, 2014; Kunkel et al., 2006). Stereotypically, family groups consist of parents and children who reside within the same home

(Kunkel et al., 2006). However, family groups can also extend to individuals who may not inhabit the same household but are connected through a genetic or emotional bonds (e.g., friends, grandparents) (Erdem & Safi, 2018; Gardener & Kosmitzki, 2005). Families are often the first social group an individual belongs to, and from a young age the family group typically provides emotional, social and instrumental support (Koerner, & Schrod, 2014). Within families, the younger members typically learn and develop behaviours, morals, emotional expressions and coping strategies through observing older family members and/or engaging with others in a social environment (Bandura, 1986; Figley, 1998; Matsakis, 2013).

Family Learning Theory (Bandura, 1986, Huff, 1969) suggests individuals within a family group observe, develop and mimic the behaviours demonstrated by other group members. Moreover, the learnt behaviours shape and influence how the family unit interacts with and perceives the social world (Abbassi & Aslinia, 2010; Matsakis, 2013). It is possible that the family learning arising from an early age may account towards why family groups often share similar ideologies, behaviours, morals and emotional coping styles (Laosa, 2013; Majoribanks, 2017). Despite this, a family is a collective group of individuals, each with unique perspectives, cognitions and experiences (Figley & Kiser, 2013). Consequently, each member is unlikely to consistently share the same ideologies, principles and morals as the collective group (Feinberg et al., 2020; McManus et al., 2020). Nevertheless, as suggested by Family Learning Theory (Bandura, 1986) individuals may learn to display pre-defined family appropriate behaviour's while interacting with the family group; despite holding potentially different ideologies or perspectives (Feinbery et al., 2020). Despite this, Family Learning Theory (Bandura, 1986, Huff, 1969) does not adequately explain *how* the emotional and empathetic bond develops within families and the subsequent influence this may have upon the behaviours of each member and their potential response to adversity.

A strong emotional and empathetic bond typically exists within family groups (Figley & Kiser, 2013). This bond subconsciously connects all the members of the group and can influence how the group interacts (Manczak et al., 2016). The bond is developed early in life by establishing healthy attachments to primary caregivers (Bowlby, 1979). Furthermore, it is nurtured throughout life and is built through receiving and providing affection, trust, and a perception of safety and security (Figley, & Burnette, 2017; Manczak et al., 2016). The emotional bond is sustained by mutual co-operation, social support and provides a sense of belonging to a family group, which influences each member to support and care for one another (Figley & Keiser, 2013). However, the emotional bond can be influenced by the subliminal transference of emotional states between individuals within the group (Manczak et al., 2016). Individuals are instinctively inclined to mimic the emotional expressions displayed by others within social interactions (Hatfield et al., 1994; Herrando & Constantinides, 2021). For example, if an individual views another smiling, the natural reaction is to smile in return to align with their emotions (Herrando & Constantinides, 2021; Smith & Rose, 2020). This transference of emotions between individuals is referred to as Emotional Contagion (Hatfield et al., 1994).

Emotional Contagion (Hatfield et al., 1994) is rooted in the literature on empathy, whereby, individuals react and attune to the affective states displayed by others (Decety & Ickles, 2009). Furthermore, it incorporates sympathy, imitation and compassion which influence the likelihood of emotional contagion occurring (Singer & Lamm, 2009). However, emotional arousal (Mehrabian & Russell, 1974; Prochazkova & Kret, 2017) and cognitive appraisal (Moors, 2009; Moors et al., 2013; van Kleef, & Cotes, 2022) can influence the level of arousal, pleasure and subconscious cognitions which are transferred (Herrando & Constantinides, 2021). *Emotional Contagion Theory* (Hatfield, 1992; 1994; 2014) provides an insight into how emotions can be transferred between humans and asserts the contagion of

emotions can be effective in communication. It asserts emotions can be transferred through facial expressions, indirect contact and by observing others interact (Herrando & Constantinides, 2021). Moreover, it states individuals are biologically attuned to the body language and facial expressions of others when engaging in social interactions, which triggers behavioural and emotional synchronicity. It can be triggered neurologically and/or physiologically by mimicking the facial expressions of others during social interactions and can result in the transference of emotions (Herrando & Constantinides, 2021).

The psychological state of the individual viewing the facial expressions of others can influence and affect the processing of emotional information (Herrando & Constantinides, 2021). For example, in a study by Goodin et al., (2019) individuals with a diagnosis of depression ($n=13$) were unable to differentiate between negative and positive emotional content, which limited the contagion of emotions. In contrast, negative affective states have been shown to have a stronger influence on the contagion of emotions in contrast to positive affective states (Deng & Hu, 2018; Pinilla et al., 2020). Suggesting that the degree of emotional contagion may be influenced by the emotional state of the individual viewing the emotional states of others (Herrando & Constantinides, 2021). Therefore, it is possible facial mimicry is influenced by individual affective states, social contexts and is directed by nonverbal cues and behaviours during social interactions. Furthermore, Emotional Contagion may occur in two ways (Herrando & Constantinides, 2021), firstly, mimicry may develop after exposure to positive emotions. Secondly, social and emotional appraisal may influence the development of emotions surrounding negative emotions (Herrando & Constantinides, 2021; Mui et al., 2018; Smith & Rose, 2020).

Within families, Emotional Contagion (Hatfield, 1992; 1994; 2014) may contribute towards the development of the emotional bond, whereby, family members transfer and become attuned to the emotional states of others within the group (Herrando & Constantinides,

2021). There is growing empirical evidence in support of this theory. For example, in a sample of school children and their families ($N=183$) investigating the transference of dental fear from fathers to the family groups. The results suggested the dental fear exhibited by fathers emotionally contaminated the family members. Therefore, emotional contagion may underpin and influence how family members support one another through positive and negative experiences (Hatfield et al., 2014). However, the emotional bond may also create vulnerabilities to the family group during times of distress (Figley & Keiser, 2013).

During times of distress, the emotional bond within families can create vulnerabilities to developing stress, distress and psychological trauma (Bengtson et al., 2004). Families who have experienced stress, distress or potentially traumatic experiences will attempt to cope as a group (Figley, 2002; Smith et al., 2014). If one member of the family unit experiences a traumatic experience and develops psychological trauma, the whole family can be susceptible to developing trauma vicariously (Figley, 2002; Goff & Smith, 2005). Vicarious trauma was originally conceptualised as a reaction to the emotional demands placed on therapists and social workers after exposure to trauma survivor's testimonies (Figley, 1995). However, in contemporary research vicarious trauma is considered as the psychological impact on anyone who is indirectly exposed to a traumatic event (Branson, 2019; Smith et al., 2014). This can occur through being told about a trauma survivors' cognitive appraisal of the experience, or by witnessing the distress of trauma survivors (Michalopoulos & Aparicio, 2011). Moreover, the likelihood of vicarious trauma developing is dependent on the level of empathetic engagement an individual has with the trauma survivor, whereby, higher levels of empathy can increase the likelihood of vicarious trauma developing (Michalopoulos & Aparicio, 2011; Smith et al., 2014).

Individuals who develop vicarious trauma often display similar symptoms to those displayed by the original survivor, including traumatic stress, prolonged trauma, and PTSD

(Birnbaum 2008; Figley & Kiser, 2013). In families it is possible vicarious trauma can develop in response to emotional contagion, which can be influenced by the strong emotional and empathetic bond (Figley & Kiser, 2013). Family members *can* innately detect the distress and will attempt to eliminate the stressor or obtain effective coping methods in an effort to ease the distress (Baum, 2014; Figley & Kiser, 2013). Thus, the family group, *as a unit*, attempts to cope with the psychological trauma. However, the members can be emotionally contaminated by the trauma, resulting in the whole group enduring the trauma response vicariously (Figley & Kiser, 2013). The literature investigating vicarious trauma, emotional contagion and families is, however, limited and fails to adequately capture the subtle interactions and interplay between different family members. Each member within the familial group is different and has unique experiences, personalities and cognitive appraisals (Matsakis, 2013). Therefore, each member of a family unit will respond differently when encountering similar stressful experiences (Figley & Kiser, 2012). Thus, if trauma develops vicariously all members of the family are likely to display similar symptoms as the traumatised individual (Figley & Kiser, 2013). Families can recover from distress as a unit and the social support provided by family members can certainly protect individuals from future psychological harm (Matsakis, 2013). Protective factors of psychological trauma in families will be covered in more detail in later chapters.

2.5 Recovery from psychological trauma

Some individuals who endure traumatic experiences are able to maintain normal functioning, recover from the distress, and return to normal life (Dutton & Ashworth, 2015; Kurtz, 2018). However, for those who do not recover, the psychological distress can develop into trauma related disorders (Elwood et al., 2007). Nevertheless, psychological trauma is heterogeneous and due to the subjective interpretation of trauma, not all individuals who experience trauma develop psychological trauma (Horwitz, 2018). Moreover, individuals who

do endure traumatic stress may not present with all the symptomologies traditionally expected for a diagnosis of a disorder and may recover naturally (Mauritz et al., 2013). ‘Natural healing’ refers to the ability to recover from harm without medical intervention (Dutton & Ashworth, 2015), and can include psychological trauma (van der Kolk, 2014). This suggests factors must be present which disrupt or counteract the negative consequences of traumatic stress whilst promoting healing (van der Kolk, 2015). Research to date has focused on identifying and providing care to those who have sustained more enduring trauma. However, there is limited research available that captures the factors underpinning ‘natural healing’. The literature available suggests pre-existing internal factors may assist in counteracting the distress. Individuals who have pre-existing positive emotions are better equipped to have positive perceptions of themselves and higher levels of positive self-belief (Bonanno, 2008; Dutton & Ashworth, 2015). Prior to a traumatic experience, these positive perceptions may enable individuals to counteract the negative emotions associated with the experience, whilst overcoming fear (Dutton & Ashworth, 2015). Moreover, for those who have higher levels of perceived social support and engage in wellbeing practices may assist themselves in counteracting distress (Benight & Bandura, 2004). For example, contemporary research reported engaging and/or connecting with nature can promote natural recovery from psychological trauma (Buckley & Westaway, 2022). Despite this acknowledgement, the factors that promote natural recovery from psychological trauma are not fully understood within the literature base (van Emmerik et al., 2002). Therefore, research is required to interpret the aetiology of trauma and how psychological trauma can be mitigated and/or reduced whilst highlighting areas that protect and promote natural healing.

2.6 Concluding comments.

As noted, trauma is a complex response to adverse events. It is a subjective emotional response to any experience or event that can involve actual or perceived threat of danger to life or physical harm (Herman, 1992; McNally, 2003; van der Kolk, 2015; Zepinic, 2019). Furthermore, the development, severity and longevity of the sustained trauma is subjective to the individual (Huppertz et al., 2018; Weathers & Keane, 2007), and can develop in response to an individual's appraisal of the event(s), as proposed by the Cognitive Appraisal of Emotions Theory (Moors, 2013, 2014). The impact of psychological trauma may create maladaptive problems in memory storage, as suggested by The Adaptive Information Processing Theory (Shapiro, 1995). Nevertheless, the likelihood of a traumatic reaction occurring appears reliant on individual characteristics.

Throughout this thesis a family group will be defined as group of individuals who are connected by marriage, birth, adoption and/or friendship (e.g., spouse, parent, child, close friend), and hold a strong emotional bond to each other (Figley, 2013). The role of the family is also important, emotions can be shared and mimicked by family members, as noted by Emotional Contagion Theory (Hatfield et al., 1994, 2014). This instigates susceptibilities in the family group to developing trauma vicariously while attempting to alleviate the distress of loved ones, resulting in all family members displaying similar symptoms (Figley & Kiser, 2013). However, the literature investigating Emotional contagion, vicarious trauma and families is limited. Similarly, additional research is required to highlight the vulnerability factors associated with psychological trauma in individuals and their families, the factors protecting against the development of trauma and/or those promoting natural healing (van der Kolk, 2015; Zepinic, 2019).

In an aim to capture the contents of the literature presented, psychological trauma will be referred to as an individually determined subjective emotional response to any experience or

event that can involve actual or perceived threat of physical or psychological harm, and/or danger to life (Kurtz, 2018; van der Kolk, 2015). This includes that which occurs after experiencing, witnessing, or being exposed to a disclosure regarding a significant event(s). This would include a public health crisis such as the COVID-19 pandemic (Huppertz et al., 2018; Weathers & Keane, 2007; Zepinic, 2019). The following chapter will next present how psychological trauma can develop in those working on the front-line and in their families, during a public health crisis.

CHAPTER THREE

IDENTIFYING THE RISKS AND CONSEQUENCES OF EXPOSURE TO TRAUMA AND MORAL INJURY DURING PUBLIC HEALTH CRISES

3.1 Structure of this chapter

This chapter outlines how the individuals working in front-line roles are exposed to psychological trauma within the remit of normal daily activities. As such, attention will be paid to the factors that can create vulnerabilities to the development of psychological distress, compassion fatigue, burnout, vicarious trauma, and psychological trauma. It then outlines the factors that can promote pandemic induced stressors, and how these factors can amplify any pre-existing vulnerabilities to psychological trauma. The concept of moral injury is then presented, whilst providing an overview of how moral injury can develop in response to ethically difficult experiences. Lastly, this chapter provides a critical overview of the role of family and how families can provide social support during public health crises. It suggests how vicarious trauma can develop in family members of front-line workers through social connection and contagion.

3.2 Exposure to psychological trauma in front-line workers in the workplace

Individuals employed as front-line workers within public serving sectors are faced with a plethora of challenges, which can expose them to emotional and situational stressors in their daily workload (Bültman et al., 2002; Virgili, 2015). Front-line workers are employees who provide essential services to the public during everyday life and within emergency situations, for example, public health crises. These can include but are not limited to anyone employed within public healthcare, social care, public safety and security and educational sectors (Gov, 2020). Front-line healthcare employees typically tolerate working long hours, time pressures,

excessive workloads and limited access to resources, which can induce stress (Boran et al., 2012; Firth-Cozens & Payne, 2000; Sorenson et al., 2016; van Mol et al., 2015). Moreover, healthcare professionals frequently endure emotionally demanding challenges within their roles. They are placed under increased demands to provide care to the severely ill, to observe the continuous suffering of patients, endure medical futility (treatment may not improve the patients' medical condition) and rely on family members to communicate the needs and wishes of patients (Curtis et al., 2012; Todaro-Franceschi, 2013; van Mol et al., 2015). These factors can influence the levels of stress experienced by healthcare professionals and initiate psychological complications when the work-place demands exceed an individual's ability to cope (Boran et al., 2012; Cushway et al., 1996). They can further create difficulties in how they manage such stress (Boran et al., 2012; Sutherland & Cooper, 1990).

Common problems associated with high levels of stress in healthcare environments can include over dependence on stimulating drinks (e.g., caffeinated beverages), and frequent physical health related problems, such as, headaches, difficulty concentrating and reduced immune system response (Boran et al., 2012). *The Job Demands-Resources Model* (Bakker et al., 2003a; Demerouti et al., 2001) asserts that high job demands combined with low positive resources in the workplace, can result in increased levels of stress and burnout (Bakker & Demerouti, 2007). Job demands denotes the social, psychological and organisational aspects of a role that require physical, cognitive or emotional skills to appraise (Bakker & Demerouti, 2007). Job demands can include heavy workloads, time pressures, shift work and performing demanding duties in hazardous conditions (e.g., working with clients with challenging behaviours, wearing uncomfortable equipment) (Xanthopoulou et al., 2007). If demands in the workplace are increased (e.g., longer working hours, increased workloads) without sufficient workplace resources (e.g., organisational support, financial incentives), this can result in an increase to workplace stress (Bakker et al., 2003a; Demerouti et al., 2001). However, job

resources can buffer against the negative aspects of job roles (Baker et al., 2004). Job resources refer to organisational, social, psychological or physical aspects of the role which may reduce the negative cost associated with the job demands. This can include, training opportunities, management support and workplace autonomy (Bakker & Demerouti, 2007). Therefore, the Job Demands-Resources Model (Bakker et al., 2003a; Demerouti et al., 2001) maintains a balance between job demands and job resources is essential to counteract stress and burnout in the workplace (Bakker & Demerouti, 2007).

Job demands have been shown to have a profound effect on burnout and lead to reduced organisational performance (Baker et al., 2003b; 2004). Furthermore, excess demands with low resources can result in increased job stress, high work pressure and emotionally demanding interactions with clients (Bakker & Demerouti, 2007). It has been established in the literature that healthcare professionals experience increased job demands, which amplifies the degree of stress exposure (Cushway et al., 1996; Firth-Cozens & Payne, 2000; Sorenson et al., 2016; van Mol et al., 2015). However, if healthcare organisations provide positive resources in the form of pay incentives, training and career opportunities, it may counteract the negative aspects of job demands. Furthermore, it may promote positive adaptations in the workplace, which could reduce the negative cost of highly demanding roles (Bakker & Demerouti, 2017).

The Job Demands-Resources Model (Bakker et al., 2003a; Demerouti et al., 2001) is well substantiated and empirically tested in the literature (Baker et al., 2017; Broeck et al., 2016; Skaalvik et al., 2018; Zito et al., 2018). For example, a survey-based study of healthcare workers ($N = 489$) supported the assumptions of the Job Demands-Resources Model (Kaiser et al., 2020). The findings suggested moderate positive associations between job demands and burnout, and job resources were positively associated with engagement (Kaiser et al., 2020). Furthermore, a recent survey study with mental health crisis line volunteers ($N = 543$) also supported the general assumptions of the Job Demands-Resources Model (Willems et al.,

2021), with the findings indicating a relationship between job demands, job resources, distress and engagement (Willems et al., 2021).

The Job Demands-Resources Model (Bakker et al., 2003a; Demerouti et al., 2001) is arguably restrictive. It provides limited insights into psychological mechanisms which underpin the relationship between job demands and job resources, and does not fully explain why *particular* demands interact with *particular* resources (Schaufeli & Taris, 2013). In addition, it is unable to capture the complexities of all workplaces, the influence of personal characteristics on job roles and the influence of teamwork (Schaufeli & Taris, 2013). Thus, the Job Demands-Resources Model (Bakker et al., 2003a; Demerouti et al., 2001) may be unable to fully explain the working conditions and potential problems which may arise while working on the front-line during a public health crisis.

Schaufeli (2017) maintains that this theory is applicable in all workplaces and can be used to monitor workplace behaviours and may help to prevent burnout. As such, if healthcare organisations provide positive resources in the form of pay incentives, training and career opportunities, it may counteract the negative aspects of job demands, as suggested by the Job Demands-Resources Model (Bakker et al., 2003a; Demerouti et al., 2001). Furthermore, it may promote positive adaptations in the workplace that may reduce the negative cost of highly demanding roles. However, not all workplace stressors are necessarily negative, as stress can motivate individuals to improve skills and achieve (Bakker et al., 2009).

Stress in the workplace can induce negative consequences, but it can also influence and motivate behaviours to counteract distress (Bauer et al., 2014). *The Conservation of Resources Theory* (Hobfoll, 1989, 1998, 2011) postulates that psychological stress reactions are derived from survival stress responses, which motivate individuals to take action to conserve or acquire resources (e.g., items of value to an individual) (Hobfoll, 2011a, 2011b; Westman et al., 2004). This theory states stress occurs as a reaction to (a) the threat of resource loss, (b) actual resource

loss, or (c) the ability to obtain new resources is low following investment of skill, time and knowledge (Hobfoll & Freedy, 2017). Resources can vary, but are typically considered as attributes an individual values, such as, health, wellbeing, family and a meaningful life (Hobfoll et al., 2018). When applied to organisational behaviour, loss of resources in the workplace has been identified as a contributing factor towards emotional exhaustion, stress and low job satisfaction (Prapanjaroensin et al., 2017; Wheeler, Halbesleben & Whitman, 2013). Furthermore, burnout may develop in response to a continuous process of low-level job resources (Buchwald & Hobfoll, 2004). However, the threat of loss can motivate individuals to engage in proactive behaviours to avoid the loss, or obtain new resources (Prapanjaroensin et al., 2017).

Stress can motivate individuals to engage in future proactive behaviours to cope with the loss of resources and protect against future loss (Alvaro et al., 2010). The promotion of acquiring additional resources, influenced by the high levels of stress, could enable an individual to counteract the distress, as aforementioned by the Job Demands-Resources Model (Bakker et al., 2003a). If a workplace does not have adequate positive resources available, it can increase the risk of developing the negative cost of highly demanding roles (Prapanjaroensin et al., 2017).

The Conservation of Resources Theory (Hobfoll, 2001) has been rigorously tested and is shown to be beneficial in highlighting how burnout can develop in individuals working in healthcare settings (Bushwald & Hobfoll, 2004; Hobfoll et al., 2016; Prapanjaroensin et al., 2017; Sarwar et al, 2020). For example, in a cross-sectional study of Nurses in Israel ($N = 186$), the findings suggested that Nurses who perceived high levels of resource gains reported lower levels of burnout (Ein-Gal et al., 2014). Moreover, the findings also indicated a strong positive correlation with resource loss and burnout (Ein-Gal, et al., 2014). These results support the Conservation of Resources Theory, as the acquisition of resources was beneficial in reducing

stress in the workplace (Hobfoll, 2001). Furthermore, a survey study of Nurses in Pakistan ($N = 217$) investigated the role of stress as a mediating variable on the perception of workplace support using the Conservation of Resources Theory (Hobfoll, 2001). The findings indicated a positive link between workplace ostracism (perception of isolation from peers and management), emotional exhaustion and anxiety (Sarwar et al., 2020). The findings also suggested Nurses who perceived ostracism in the workplace held a perception of reduced social support (Sarwar et al., 2020). This influenced Nurses to protect themselves from further resource loss by engaging in counterproductive behaviours, that in this study, manifested as service sabotage behaviours⁷ (e.g., neglecting to comply with company policy) (Sarwar et al., 2020). This further supports the Conservation of Resources Theory (Hobfoll, 2001) by demonstrating the possible negative impact of resource loss.

Despite this, the Conservation of Resources Theory (Hobfoll, 2001), does not consider the stress that an individual may endure outside of the workplace, and how this may influence levels of motivation to obtain and/or maintain resources. Moreover, gaining resources in the workplace may take time and as a result may impact the levels of motivation. Furthermore, the Conservation of Resources Theory (Hobfoll, 2001), does not adequately account for the full range of psychological distress which can occur after prolonged exposure to stress.

A growing body of literature suggests psychological distress can develop after exposure to *continuously* high and demanding workplace stress (Boran et al., 2012; Bukhari et al., 2016). Psychological distress denotes the non-specific physical and mental symptoms associated with the normal fluctuations of mood, fatigue, difficulty eating, fear, sadness and avoidance (Kisely et al., 2020). The presence of psychological distress in individuals working on the front-line can indicate the early onset of major depressive disorders and increase susceptibilities to developing psychological trauma (Chua et al., 2004; Grace et al., 2005; Kisley et al., 2020).

⁷ Service sabotage behaviours refers to an employee's misbehaviour, that is intentionally conducted to negatively affect a service (Harris & Ogbonna, 2006).

Professionals working within medical settings can be emotionally affected by observing patients enduring invasive treatment, experiencing continuous suffering, having to make ethical decisions and poor prognosis (Kisley et al., 2020). This can increase the risk of sustaining distress (Kisley et al., 2020). Despite this, healthcare professionals are required to suppress emotional reactions and expressions, which can become labour intensive and result in emotional burnout (Fiksenbaum et al., 2006; Grandey, 2000).

The act of repressing emotions in the workplace is defined as Emotional Labour (Hochschild, 1982). Emotional Labour refers to the regulations of emotions through minimising the display of emotions by surface acting (masking emotions) and/or deep acting (altering emotions to appear genuine to clients) (Hochschild, 1982). *Emotional Labour Theory* (Hochschild, 1982) asserts individuals who repress emotions are at risk of emotional exhaustion, increased stress, job dissatisfaction and burnout. Furthermore, if an individual consistently utilises effortful emotional management, it can result in true emotional responses being lost, which may impair appropriate emotional functioning (Dunn et al., 2009; Grandey, 2017).

In health and social settings, Emotional Labour may involve the suppression of emotions in order to portray a suitable work-related emotion. Grandey's (2000) *Model of Emotional Labour* builds on Emotional Labour Theory (Hochschild, 1982), suggesting the process of individuals regulating emotional responses to situational stressors in the workplace can directly influence emotional labour. As such, surface acting can result in individuals sustaining psychological damage, which can instigate problems with emotional management and contribute toward Emotional Labour (Grandey, 2000; Hochschild, 1982).

Emotional Labour has been investigated in a wide range of settings (e.g., healthcare, public services, call centres) (Hafeez et al., 2023; Karimi et al., 2013; Kruml & Geddes, 2000). For example, in a cross-sectional quantitative study in Australia a group of community nurses

($N = 312$), the findings suggested that higher levels of perceived Emotional Labour contributed to higher levels of job stress and lower levels of wellbeing (Karimi et al., 2014). Thus, supporting the Model of Emotional Labour (Grandey, 2000) and Emotional Labour Theory (Hochschild, 1982). Frequent exposure to emotion-inducing events, combined with a professional expectation to suppress emotional reactions, can increase the susceptibility of Emotional Labour developing (Grandey, 2000). The severity of the Emotional Labour that can be developed is directly influenced by personal factors (e.g., emotional intelligence, emotional expressivity) and work-specific environmental factors (e.g., low job autonomy, poor social support) (Grandey, 2000; Kruml & Geddes, 2000). Additionally, the individuals' perceptions, life experiences and social support network can influence the degree of Emotional Labour endured (Grandey, 2000; Grandey & Melloy, 2017). Nevertheless, increased or prolonged exposure to Emotional Labour can result in a decline in individual wellbeing, including decreased job satisfaction and burnout (Grandey & Melloy, 2017).

Organisational wellbeing can also be impacted, affecting the amount of effort provided and overall performance by employees (Grandey, 2000; Grandey & Melloy, 2017). For example, in a study of customer facing hospitality employees ($N = 309$) Emotional Labour was positively associated with service sabotage (e.g., treating customers impersonally) and was mediated by burnout. This study also suggested a link exists between Conservation of Resources Theory (Hobfoll, 2001) and Emotional Labour. Suggesting burnout and subsequent service sabotage behaviours may have developed in response to limited positive resources (Lee & Ok, 2014). However, the effects of Emotional Labour can be counteracted by the organisation if managerial support is frequently provided and individual wellbeing is promoted (Boran et al., 2012). Nevertheless, pressures in the workplace significantly increase the vulnerability to Emotional Labour, stress, compassion fatigue and burnout in healthcare

workers (Boran et al., 2012; Ching et al., 2018; Gabassi et al., 2002; Pandey & Singh, 2016; Siau et al., 2018).

Repeated exposure to events requiring high levels of empathy have been identified as an acute factor in the development of compassion stress, burnout, psychological stress and compassion fatigue (van Mol et al., 2015). *Compassion fatigue* denotes the emotional cost of providing care to distressed clients (Bride et al., 2007). It can arise in direct response to caregivers being exposed to repeated workplace interactions that require high levels of empathetic engagement with distressed clients (Figley, 2002; Cavanagh et al., 2020). Alternately, it can develop as a consequence of repeated exposure to suffering patients, and/or as a result of knowledge of a patient's traumatic experiences (Nimmo & Huggard, 2013; Rossi et al., 2012). This can create disengagement from the caregiver, culminating in an inability to feel compassion and empathy for those within their care, alongside inducing Emotional Labour and potentially diminished the level of care being provided (Bride et al., 2007). However, some healthcare professionals do not experience Compassion fatigue, suggesting there may be positive attributes of exposure to psychological trauma and providing care to vulnerable individuals, namely compassion satisfaction (Stamm, 2002). It is possible these events may not be perceived as traumatic and may initiate positive emotional responses while providing care.

Compassion Satisfaction refers to the positive emotional impact of providing emotional care and can provide pride and enjoyment (Drury et al., 2014; Smart et al., 2014). Stamm (2002) maintains that a balance occurs between Compassion satisfaction and Compassion fatigue in healthcare workers. As such, an individual can experience Compassion fatigue and Compassion satisfaction simultaneously (Stamm, 2002). The relationship between them is not fully understood, however the presence of Compassion fatigue can overwhelm an individual's ability to express satisfaction and impair the ability to provide effective care (Bride et al., 2007; Stamm & Figley, 2009). Compassion fatigue has also been referred to as vicarious trauma after

similarities the in development and symptomologies occurring after exposure to distressing events (Rauvola, Vega & Lavigne, 2019).

Vicarious trauma can be defined as the exposure to psychological trauma by an empathetic connection to the traumatic experiences of others (Pearlman & Saakvitne, 1995; Rauvola, Vega & Lavigne, 2019). It can provoke negative reactions in response to the trauma, which can induce a range of negative psychological consequences (Molnar et al., 2017). Vicarious traumatization can be an occupational challenge for those employed in public facing roles, whereby individuals are frequently exposed to victims of trauma, either by witnessing the event, and/or the aftermath, or by being told details regarding the traumatic event (Hallinan et al., 2019). For example, in a sample of Police Officers ($N= 747$) in the US, the findings highlighted the frequency of exposure to Vicarious trauma, where 98% had reported being exposed to a dead body and 95% reported viewing a badly beaten body (Weiss et al., 2010).

It is important to note the distinction between psychological and Vicarious trauma. Vicarious trauma does not provide a threat of physical harm or directly endanger life, it does however, provide a direct threat of psychological harm (Hallinan et al., 2019). The reaction to Vicarious trauma can develop in similarity to psychological trauma; this can be reflected in alterations to cognitions, as suggested by the *Shattered Assumptions Theory* of trauma reaction (Janoff-Bulman, 2010; McCann & Pearlman, 1990). The Shattered Assumptions Theory (Janoff-Bulman, 2010) suggests experiencing a traumatic event alters the perceptions an individual holds of the world. During and after a traumatic event the information associated with the event cannot be easily assimilated (Janoff-Bulman, 2010). This can alter the individual's pre-existing perceptions of the world, from caring to hostile, and initiate feelings of vulnerability and incompetence and increase the vulnerabilities to trauma development (Hallinan et al., 2019; Janoff-Bulman, 2010). However, exposure to traumatic events does not always create negative consequences, since factors such as resilience are able to counteract the

distress (Rutter, 2006). Furthermore, the Shattered Assumptions Theory (Janoff-Bulman, 2010) does not account for those who are able to gain positive adaptations following exposure to traumatic events, for example, *post traumatic growth* (Calhoun & Tedeschi, 1995).

Post traumatic growth refers to a positive psychological change that can occur following exposure to trauma (Calhoun & Tedeschi, 2014; Tedeschi et al., 1998). There is limited empirical evidence to support that experiencing adversity can reliably lead to improvements in psychological functioning following exposure to trauma (Jayawickreme & Blackie, 2014; Jayawickreme et al., 2021; Mangelsdorf et al., 2019). This is partially due to challenges in studying this concept. For example, when using retrospective assessments of self-perceived growth, it may be difficult to ascertain if the perception of growth reflects actual change (Jayawickreme et al., 2021). As a result, this thesis will focus on resilience which will be captured in the following chapters.

Repeated and cumulative exposure to Vicarious trauma has been reported to cause challenges, such as issues with substance abuse (Chopko, Palmieri, & Adams, 2013; Menard & Arter, 2013), depression (Chiu et al., 2011), burnout (Jenkins & Baird, 2002) and suicidal ideation (Carpenter et al., 2015). Vicarious trauma can also induce a spectrum of consequences with negative, neutral and/or positive outcomes (Palm et al., 2012). Neutral reactions, such as detaching from the distress can develop if the individual has effective coping skills, which are able to reduce the distress (Doherty et al., 2010). Likewise, positive reactions can develop if the individual is able to gain positive meaning from the experience and develop vicarious post-traumatic growth (Gomez, 2012; Splevins et al., 2010).

It is, therefore possible Vicarious trauma can develop following exposure to events endured by victims of trauma. However, it is further dependent on the perceptions and cognitions of the individual witnessing the event (Darroch & Dempsey, 2016; Janoff-Bulman, 2010). Whereby, the individual may be influenced by their emotional appraisal of the event, as

suggested by the Cognitive Appraisal of Theory of Emotions (Moors et al., 2013, 2014). Despite this, continued exposure to Vicarious trauma can induce psychological distress, burnout and Compassion fatigue (Palm et al., 2012).

Compassion fatigue can initiate similar symptomologies to Vicarious trauma, whereby, individuals can develop feelings of exhaustion, frustration and depression (Cocker & Joss, 2016). Moreover, it can induce negative feelings driven by hyper-vigilance, fear, avoidance and intrusion (Cocker & Joss, 2016; Figley & Kieber, 1995). Although there are similarities between Compassion fatigue and Vicarious trauma, it remains important to recognise that compassion fatigue develops after persistent prolonged exposure to Emotional labour without effective emotional coping skills being in place (Cocker & Joss, 2016). Whereas Vicarious trauma can develop after exposure to details concerning a traumatic event and present with symptoms in line with PTSD (Cocker & Joss, 2016; Boscarino et al., 2004). Moreover, Compassion fatigue has been identified to occur concurrently, alongside Vicarious trauma after continued exposure to events where professionals are required to display empathetic responses and provide continued care to patients (Carbonell & Figley, 1996; Gentry, 2011).

Vicarious trauma and Compassion fatigue are thus identified vulnerabilities to psychological trauma (De Hert, 2020). *Burnout* has also been reported to develop after exposure to Compassion fatigue, stress, Emotional Labour and Vicarious trauma (De Hert, 2020; Kaschka et al., 2011). *Burnout* is defined as emotional exhaustion, a perception of low personal accomplishment and depersonalisation (Freudenberger, 1982a; Maslach et al., 1976; Maslach & Jackson, 1981). It can lead to decreased effectiveness in the workplace. Freudenberger (1982a) introduced a 12-step model to elucidate the development of burnout, later simplified to a 5-step model.

The Five Stages of Burnout (Freudenberger, 1982; De Hert, 2020) suggest risks to burnout develop after an individual is unable to utilise positive coping strategies to counteract

stress (Freudenberger; 1982; De Hert, 2020). In the initial enthusiasm stage (first stage), the individual may have excessive ambition, which motivates them to provide high quality work. This can lead to personal neglect and a reduction in positive coping strategies (Hert, 2020; Kaschka et al., 2011). This can initiate the second stage, wherein individuals begin to perceive more difficult working conditions and the balance between social and work commitments becomes affected. Common stress symptoms begin to appear and affect the individual physically and emotionally. As stress systems increase, this can develop into the third stage and advance into chronic stress, and induce frustration (De Hert, 2020). If chronic stress remains persistent, burnout can occur in the fourth stage, provoking feelings of inner emptiness, induce addictive behaviours and physical exhaustion (De Hert, 2020; Kaschka et al., 2011). Finally, in the fifth stage habitual burnout can occur. If habitual burnout is endured the individual may undergo chronic mental and physical fatigue, which will affect a healthcare workers ability to provide effective medical care (Albendin-Garcia et al., 2021; De Hert, 2020; Kaschka et al., 2011).

Stress, Emotional labour, Compassion fatigue and Burnout are all identified as factors in the development of psychological trauma in front-line workers who provide medical care (Bellal et al., 2014; Cocker & Joss, 2016; Mealer et al., 2009). Emergency healthcare workers who are frequently exposed to workplace stressors (e.g., heavy workloads), death and traumatised patients, can experience long term emotional reactions, including self-blame, anxiety, frustration, depression and feelings of helplessness (Gillespie et al., 2013). This can further risk the development of PTSD (Mealer et al., 2009; Gillespie et al., 2013).

During public health crises increased pressures are likely to be placed on front-line workers. These may include, increased patient numbers, longer working hours and limited resources. The increased pressures may exacerbate the identified workplace stressors and increase the susceptibility to psychological trauma (Muller et al., 2020). A recent systematic

review and meta-analysis provides an indication of the prevalence of PTSD, anxiety and depression in healthcare workers ($N = 97,333$) utilising 65 studies across 21 countries (Li et al., 2021). The findings indicated high prevalence estimates of moderate PTSD (21.5%), depression (21.7%) and anxiety (22.1%) during the COVID-19 pandemic (Li et al., 2021). These results are consistent with previous reviews on the impact of the COVID-19 pandemic, which calls to attention the psychological impact of a public health crisis on healthcare workers (Luo et al., 2020; Muller et al., 2020; Shaukat & Razzak, 2020). Furthermore, the results are consistent with reviews identifying the psychological and occupational consequences of working in health-related roles (Garden et al., 2018; Koutsimani et al., 2019; Salvagioni et al., 2017) Thus, healthcare workers are at increased risk within the remit of their normal roles and the pre-existing risks may be amplified during public health crises, such as the COVID-19 pandemic.

3.3 Trauma development in the workplace during infectious virus outbreaks

Infectious virus outbreaks refer to the sudden rise in cases of a specific virus or disease in a geographical area. Epidemics are rare but are typically contained within a specific geographical area and develop when the number of infected individuals rises above the normal level for the population of a specific geographical area (WHO, 2023). Documented epidemics from the late 20th century up to the present day include Ebola virus disease, Severe Acute Respiratory Syndrome (SARS), H1N1 (Swine Flu), Middle East Respiratory Syndrome (MERS) and Pollio; with confirmed cases in North and South America, Africa, Asia, Middle East and Europe. If the infectious virus spreads outside of the contained area or becomes international, it can progress into a pandemic, as was observed for COVID-19. Pandemics are extremely rare and pose significant threats to human life due to the high transmission of the virus (WHO, 2022). Previous pandemics have included, the Black Death (1346-1353), Spanish

Flu (1918-1920), and the Coronavirus disease (COVID-19) (2019-2022) (WHO, 2023). Front-line workers who provide care to infected patients during public health crises can endure several unique challenges (e.g, staffing shortages due to infection, lack of PPE) outside the remit of their normal work environment. This can amplify the pre-existing risks of developing trauma (van Bortel et al., 2016).

Healthcare professionals can endure fear of infection, psychological distress, exposure to trauma, depression, anxiety and PTSD whilst trying to manage personal safety (Greenberg et al., 2020). These are arguably unique contributions outside the remit of their normal work environment. Van Bortel et al. (2016) stated, “working long hours, overwhelming patient numbers, limited safety equipment and a feeling of inability to provide adequate care for, or heal, those infected can also result in frustration, anger or feelings of helplessness for health workers” (p. 211). The epidemiology literature further indicates that individuals who work in close proximity to infected patients during public health crises are acutely vulnerable to infection, which can result in increased levels of fear regarding contagion and transmission (Hyun, Kim & Lee, 2018). The fear experienced occurs in response to a concern for personal safety, although, it has been reported to present more intensely towards the perception of transmitting the virus to colleagues and family members (Almutairi et al., 2017; Cheung & Ho 2004; Ho et al., 2005). Fear can also be experienced by individuals regarding patient safety and mortality rates, which has been shown to result in distress, anxiety, and dissociation (Khalid et al., 2016).

It is possible health care workers may have endured significant levels of fear while providing care during the COVID-19 pandemic, and in response to little information available surrounding the pathogen. Nevertheless, a diverse range of emotions have been reported during past public health crises. In healthcare workers, for example high levels of altruism associated with professionalism have been documented during the MERS epidemic (Almutairi et al.,

2017). It is possible the altruism, namely feelings of obligation and growth in skills when providing healthcare, during public health crises, may mitigate the fear experienced and influence the associated psychological consequences (Khalid et al., 2016; Kim, 2018). However, research in this area is limited. Nevertheless, significant psychological consequences have been reported in direct response to providing care during public health crises (Garden et al., 2018; Koutsimani et al., 2019; Li et al., 2021; Salvagioni et al., 2017).

The high mortality rate associated with a highly infectious disease, during public health outbreaks, poses a significant threat to the psychological wellbeing of those providing care, such as front-line workers (Hyun, Kimm & Lee, 2021). Front-line workers can endure poor wellbeing, emotional distress and constant guilt, discomfort due to personal protective equipment, social stigma and dissociative experiences (Abolfotouh et al., 2017; Arribas-García et al., 2020). Amplified stress can occur in response to elevated patient numbers, which can become increasingly difficult to manage if staffing levels decrease due to contagion (Fiksenbaum et al., 2007). Moreover, if managerial support is limited or there are inadequate and insufficient guidelines and policies surrounding transmission control, this can significantly impact the severity of stress (Kim et al., 2017; Kim, 2018). The additional stress may amplify the job demands on front-line workers and may result in Emotional labour, Burnout and Compassion Fatigue as suggested by the Job Demands-Resources Model (Bakker et al., 2003a; Demerouti et al., 2001) and The Conservation of Resources Theory (Hobfoll, 1989, 1998, 2011). Furthermore, these factors may amplify the risk of developing trauma in front-line workers during public health crises.

As noted earlier, the increased stress and added pressures significantly impact on pre-existing vulnerabilities to psychological distress, burnout, trauma development, moral injury, and serve to obstruct resilience from being developed (Chan & Huak, 2004). Providing care on the front line during public health crises may exceed a front-line workers ability to overcome

adverse events and result in increased stress (Almutairi et al., 2018). This may also be facilitated by the specific nature of exposure and the risk of moral injury⁸.

3.4 Encountering Moral injury in the workplace and during public health crisis.

The literature surrounding moral injury in healthcare workers is limited. Nevertheless, it is accepted that *Moral injury* can develop in those who provide medical care during public health crises (Abdolmaleki et al., 2018; Murraray & Goodsman, 2018; Murraray, 2019). The understanding of Moral injury can be found in the literature on PTSD in military veterans. Shay (1995), for example, recognised that certain military personnel displayed psychological difficulties after combat, yet did not display symptoms indicative of PTSD, rather acquired an emotional ‘wound’. Shay (1995) labelled the ‘wound’ moral injury and maintained it occurred in individuals who held legitimate authority and endured high stake events in which, there was a betrayal of what they considered as morally right (Shay, 1995). However, Litz et al., (2009) maintain the concept of moral injury is based on the personal perception of the individual and can develop in those who do not have positions of authority. Meador (2018) further asserted that moral injury can develop in those who do not know how to respond when faced with events, which are perceived as morally uncertain.

Regardless, moral injury does not consistently develop after exposure to events which may raise *ethical concerns* (Shay, 2011). Shay (2001) maintains *Moral distress* is a precursor to Moral injury. Moral distress refers to the emotional consequence of enduring or witnessing an event, in which an individual acts in a manner that contradicts their own professional or personal code of morals (Meador, 2018; Shay, 2011). Moral distress can generate feelings of unease and distress (Cartolovni et al., 2021). If the moral distress occurs frequently or is

⁸ To fully ascertain the challenges faced by front-line workers during public health crises, a systematic review of the literature was conducted and is presented in Chapter six. Therefore, this area will not be expanded on further in this chapter.

sustained over time it can develop into moral injury (Cartolovni et al., 2021; Webb et al., 2023; Williamson et al., 2018). Moral distress can occur in response to organisational constraints (e.g., limited staffing, resources) or limited authority, power or agency (Cartolovni et al., 2021; Webb et al., 2023). These situations can induce feelings of unease and a perception of moral transgression (Webb et al., 2023). If moral distress is sustained and induces impairments to psychological functioning and/or remains over times it can then develop into Moral injury (Shay, 2011). Therefore, moral injury can be defined as an emotional and cognitive response to any event where an individual who possesses authority or responsibility feels compelled to make a decision which goes against their own personal code of morals (Webb et al., 2023; Williamson et al., 2018, 2021).

Morally injurious events are experiences, in which individuals are exposed to events that violate their moral code of conduct (Cartolovni et al., 2021). Such events can include acts of omission (e.g., failing to prevent a massacre, failing to treat a patient), perpetration of violence to another, and/or can develop after experiencing ‘betrayal’ from leaders (e.g., organisational constraints on medical provisions) (Cartolovni et al., 2021; Farnsworth et al., 2017). Litz et al., (2009) defined morally injurious events as, “perpetrating, failing to prevent, or bearing witness to acts that transgress deeply held moral beliefs and expectations” (Litz et al., 2009, p. 700). Unlike PTSD, which occurs following exposure to events that are threat based, morally injurious events do not necessarily contain threat or danger of physical harm (Farnsworth et al., 2017; Williamson, 2021). Moral injury challenges existing belief systems and can influence how an individual perceives the social world, inducing feelings of guilt and shame, which share similarity to the emotions linked to psychological trauma (Williamson, 2021). However, the link between moral injury and PTSD is not fully understood.

The emerging literature suggests the occurrence of PTSD may develop as a manifestation of moral injury (Cartolovni et al., 2021; Farnsworth et al., 2017; Williamson et

al., 2018). Despite this, moral injury is not considered a mental disorder, but it can induce strong emotional responses which can produce negative cognitions regarding the self or others (e.g., I am worthless) and can induce negative emotions, such as guilt and shame (Williamson et al., 2018; Williamson et al., 2021). The negative emotions and cognitions can increase the susceptibility to developing significant psychological harm after exposure to morally injurious events (Williamson, 2021). Moral injury can also increase the vulnerability to developing psychological distress, depression, anxiety and PTSD (Williamson et al., 2018). Exposure to morally injurious events may have harmful social, biological, psychological, religious and spiritual impacts and induce profound moral disorientation (Cartolovni et al., 2021). *Moral disorientation* refers to the feelings of inability to make moral judgements following the loss of moral beliefs (Molendijk, 2018).

The limited available literature surrounding moral injury in healthcare workers suggests such injury can develop in those who provide medical care during public health crises (Abdolmaleki et al., 2018; Murraray & Goodsman, 2018; Murraray, 2019). Healthcare professionals are consistently exposed to workplace pressures, while also attempting to adhere to the professional principal of ‘do no harm’ (Riedel et al., 2022). Healthcare professionals are faced with a several issues that can affect decision making. This can include, in particular, if resources, such as life-saving equipment or medicines are limited (Cartolovni et al., 2021). Moreover, individuals may find difficulty balancing professional obligations with individual welfare needs. These events may compound difficult decisions surrounding patient care and induce ethical and moral conundrums (Cartolovni et al., 2021; Lamiani et al., 2017; Williamson et al., 2020).

The concept of moral injury in healthcare professionals has encountered criticism, as it shares similarities with other concepts, such as burnout (Asken, 2019). Burnout has been used to describe the consequence of continued distress endured by healthcare workers and

shares similar symptomologies to moral injury, for example, anxiety, depression and dissociation (Dean, Talbot & Dean, 2019). However, the definition of burnout suggests the problem initiates in the individuals' inability to utilise positive coping and develop resilience. Whereas, moral injury may develop in response to environmental factors, such as if healthcare professional encounter factors that restrict their ability to provide effective care (Cartolovni et al., 2021; Dean, Talbot & Dean, 2019). Despite obvious commonalities between burnout and moral injury, the causes differ, thereby suggesting moral injury and burnout are different concepts but may also develop and be experienced concurrently. To date, research into the area has been dominated by considering military personnel. Thus, ascertaining the development of such injury during public health crises is of clear value.

Nevertheless, there is emerging literature arising from the COVID-19 pandemic that suggests individuals are facing a plethora of stressors, which can cause moral distress (Riedel et al., 2022; Williams, Brundage & Williams, 2020). Front-line workers faced constraints surrounding personal protective equipment (PPE) and ventilators, which may increase susceptibility to moral distress (Williams, Brundage & Williams, 2020). Additionally, healthcare workers were expected to experience moral stressors such as increased patient volumes, staff shortages and changes to processes (Riedel et al., 2022). The risk of exposure to perceived, unethical behaviours is also acknowledged, in relation to patient treatment and care, and perceived irregularities surrounding normal practice within the organisation (Ramos et al., 2017; Riedel et al., 2022).

Repetitive and prolonged exposure to COVID-19, alongside the increased demands placed on front-line workers, exposed individuals to a risk of moral distress (Williams, Brundage & Williams, 2020). This exposure may augment the pre-existing vulnerabilities factors (i.e., emotional labour, compassion fatigue, burnout), towards the development of psychological trauma in front-line workers during the COVID-19 pandemic (Abolfotouh et al.,

2017; Arribas-García et al., 2020). However, as noted earlier, social support has been identified as a protective factor against the development of psychological trauma. Conversely, social contact was significantly reduced during the COVID-19 pandemic, and potentially leading to more reliance on family members to mitigate moral distress and trauma.

3.5 Shared trauma in front-line workers and their families.

Family support has been shown to mediate stress levels and reduce burnout in front-line workers during adversity (Tselebis et al., 2008; Tselebis et al., 2020). Nevertheless, this supporting role may expose family members to trauma, risk of infection and quarantine whilst providing social support to front-line workers. Due to the shared emotional bond, affective empathy and social contagion, family members of front-line workers can develop trauma vicariously resulting in familial trauma, whereby families share trauma responses (Kiser et al., 1998).

Emotional Contagion Theory (Hatfield et al., 2014), as noted in Chapter two describes how emotional convergence can occur between individuals as a form of social contagion, whereby emotions become explicitly or implicitly shared between individuals within a social group. This can of course, include family groups. Social interactions naturally prime individuals to engage in behavioural synchronicity, wherein postures and facial expressions become mimicked (Herrando & Constantinides, 2021; Smith & Rose, 2020;). When applied to family units, it is possible the emotions experienced and displayed by one member can be transmitted to the other family members. The likelihood of this occurring is amplified by pre-existing emotional bonds (Figley, 2013), and arguably magnified in families (Panksepp & Lahvis, 2011).

Family members will certainly attune to the pain, stress or suffering of their loved ones and can develop or share the symptomology of the distress felt by the affected family member (Liu & Doan, 2020). As noted earlier, front-line workers are susceptible to distress and trauma. The different restrictions introduced to combat virus transmission, such as quarantine, social distancing and lockdowns, are thought likely to have prevented front-line workers from engaging in activities previously utilised to effectively cope with distress (Lebrague, 2021). Thus, raising the risk of becoming dependent on families to provide additional support, to provide care, enhance active coping and support resilience (Das et al., 2021; Firew et al., 2020; Labrague, 2021). It is certainly possible that families were then required to enhance resilience, whilst also counteracting the stress front-line workers may experience (Das et al., 2021).

Front-line workers may disclose their experiences endured to their family members in an effort alleviate distress and gain support, thereby, contributing to family members vicariously developing distress in response (Alexander & Walker, 1996; Regehr, 2005; Tekin et al., 2022). Emotional distress in families may therefore arise in response to emotional contagion, as suggested by Emotional Contagion Theory (Hatfield et al., 2014), and may be amplified if the family does not have suitable coping strategies against stress (Tenkin et al., 2022). However, if families provide support to one another and the caregivers ensure children are protected from harm, by teaching effective coping styles, this can aid in the mitigation of psychological trauma (Figley & Kiser, 2013).

The possibility of Vicarious trauma being sustained by the family members of front-line workers has not been ascertained in the literature on public health crises to date. This is surprising considering the clear expectation of shared trauma, particularly when wider social support access was limited via the process of lockdowns. It is essential that research on public health crises strive to capture the lived experiences of families and to understand the role and effects of families providing social support. Gaining an appreciation of how front-line workers

were supported will clearly be crucial in understanding how resilience can be developed during public health crises.

3.6 Concluding comments.

Individuals working in public facing roles are therefore faced with several risks to their physical and psychological safety and can experience several emotional and situational stressors (Boran et al., 2012). Front-line workers are seemingly exposed to *continuously* high and *demanding* workplace stress which creates vulnerabilities to developing emotional labour, compassion fatigue, and burnout, as highlighted by the Jobs Demands-Resources Model (Baker et al., 2003a; Demerouti et al., 2001) and the Conservation of Resources Theory (Hobfoll, 2001). The epidemiology literature available is predominantly focused, however, on emergency medical care workers, who are already exposed to significant stress in the workplace. These workers are at an increased vulnerability to developing psychological trauma, burnout and compassion fatigue during public health crises (Bukhari et al., 2016).

During public health crises, specific pandemic induced stressors, such as fear of transmission and contagion, alongside limited PPE is argued in this chapter to amplify the levels of stress endured and to exacerbate the pre-existing risk of psychological trauma developing (Almutairi et al., 2017). The research picture is further complicated by factors as moral distress and injury which may influence and/or amplify the levels of stress experienced. The literature surrounding moral injury and/or distress in healthcare professionals is clearly limited. However, the literature noted here in the current chapter clearly proposes that moral injury can develop in individuals who are exposed to experiences, where they feel compelled to make decisions that violate their morals (Williamson et al., 2018, 2021). The role and development of moral injury in front-line workers during public health crises has not, however, been ascertained in the literature as of yet, nor has to date yet captured the impact and/or the

factors that can protect against it. Thus, developing understanding in these areas is of clear value.

The families of front-line workers, as indicated, may also be exposed to the emotional reactions of front-line workers, resulting in shared trauma (Figley & Kiser, 2013; Tekin et al., 2022). However, if families support each other this may mitigate the development and/or severity of trauma. To try and capture this, the following chapter will focus on protective factors for psychological trauma, such as resilience and how protective factors can potentially mitigate the severity and development of trauma in front-line workers and their families during public health crises.

CHAPTER FOUR

UNDERSTANDING PROTECTIVE FACTORS OF TRAUMA AND PROMOTIVE FACTORS OF RESILIENCE IN FRONT-LINE WORKERS AND THEIR FAMILIES

4.1 Structure of this chapter.

This chapter will focus on the factors that can protect against the development of psychological trauma, focusing on resilience. First, this chapter will define resilience and outline how this can mitigate against the severity and/or development of psychological trauma. Second, it will provide an overview of promotive factors of resilience in front-line workers and their families. Lastly, this chapter provides an overview of the impact of spending time in nature and how this this can promote subjective well-being and promote resilience in front-line workers and their families.

4.2 Defining resilience.

Resilience refers to the ability to be resistant to adverse experiences and/or to overcome the psychological consequences of stress or adversity (Cicchetti et al., 1993; Luthar & Cicchetti, 2004; Masten, 2006; Rutter, 2006). The concept of resilience is a multifaceted phenomenon founded in psychopathology and child developmental literature (Luther et al., 2000; Raghavan et al., 2020). The early literature focused on the identification of maladaptive behaviours in individuals with schizophrenia and their children (Garmezy, 1970). These individuals were identified to possess a history of social relationships, competence in work and the capacity to fulfil obligations and responsibilities (Garmezy, 1970; Werner et al., 1971). However, these attributes did not fit the descriptive atypical pattern of schizophrenia as it was understood at the time (Bleuler, 1978; Garmezy, 1970; Zigler & Glick, 1986). This was followed by studies investigating the children of mothers with schizophrenia, that established

that the children thrived and displayed positive adaptations, despite the adverse conditions they experienced (Werner et al., 1971; Werner & Smith, 1972). These studies were the first to identify resilience and initiated further investigation into the protective factors against adversity (Luthar, 1999). This included exploring the influence of multiple adverse conditions, such as maltreatment, poverty, socioeconomic disadvantage and disastrous life events (Beeghly & Cicchetti, 1994; Luthar, 1999; Rutter, 1979). Furthermore, the influence of the family unit, the individual characteristics of the child, and the wider social environment were also identified to contribute to the development of resilience, initiating the development of *Resilience Theory* (Rutter, 1987; Werner & Smith, 1982, 1992).

Resilience Theory provides a strength-based framework to highlight the development of resilience in children after exposure to adversity (Rutter, 1987; Werner & Smith, 1982, 1992;). This theory maintains that positive promotive factors can reduce and/or overcome the negative aspects of trauma exposure (Rutter, 1987; Werner & Smith, 1982, 1992). Whereby, positive contextual individual, social and environmental factors disrupt and/or interfere with the potential adverse developmental trajectories and enabled a child to overcome the negative effects of risk exposure (Rutter 1987; Werner & Smith, 1982, 1992). Examples of positive promotive factors include positive assets which reside within the individual (e.g., self-efficacy and self-esteem) and resources which occur external to the individual (e.g., social support) (Fergus & Zimmerman, 2005). These promotive factors provide children with the contextual and individual attributes required to counteract the negative effects of exposure to adversity and promote future coping (Zimmerman, 2013). Resilience Theory has been expanded and now considers the trajectories of anyone who may experience adversity (Fergus & Zimmerman, 2005; Joyce et al., 2017; Rutter, 2006).

Resilience has previously been defined as a static process that promotes positive adaptations (Luthar et al., 2000). Whereby, ‘static’ refers to a fixed stable trajectory of health

adjustment following exposure to adversity (Southwick et al., 2014; Theron, 2016). However, defining resilience as a process suggests the ability to be resilient is a fixed outcome of adversity (Rutter, 2011). Likewise, reflecting on resilience as a process fails to consider those who do not display resilience after encountering highly stressful events (van Breda, 2018). More contemporary literature suggests resilience is a *dynamic* transactional process that occurs across the lifespan (Rutter, 2011).

The Resilience Process and Outcome Model (Ungar, 2018; van Breda, 2018) maintains resilience is a dynamic process of successfully adapting to challenging life experiences. It suggests the development of resilience incorporates three core components, Exposure to adversity, Mediating process and Resilience as a potential outcome (Ungar, 2018). Exposure to adversity refers to the difficult or challenging life experience which typically incorporates increased stress (Ungar, 2018). The Mediation phase refers to process of utilising cognitive, emotional and/or behavioural flexibility to cope (Ungar, 2018). This model maintains the ‘process of resilience’ occurs during the mediation phase. Whereby, the ability to be resilient can occur if protective factors unique to the individual mediate against the risk factors (Ungar, 2018). Adopting a multilevelled approach to resilience can provide an understanding of the relationship between the individual and the social environment (Southwick et al., 2014). However, the main issue with process driven definitions and models is that they fail to infer meaning surrounding why resilience develops or highlights which factors can promote its development. Moreover, it does not elucidate how the ability to be resilient can assist the individual in the future.

It is important to recognise that the ability to be resilient is different from the ability to recover from adverse and/or traumatic experiences (Bonanno, 2004). Recovery represents a trajectory in which normal functioning is temporarily obstructed by psychopathological symptomologies associated with experiencing a traumatic event (e.g., symptoms of PTSD).

Full recovery can be rapid, occurring over a few months, or can take up to two years (Bonanno, 2004), whereas resiliency is the acquisition of protective factors, or the ability to maintain stable levels of physical and psychological functioning (Bonanno, 2004; Bonanno & Diminich, 2021). In addition, resilience is more than the absence of psychopathology, it is not considered a trait or social competence concept, and does not refer to positive mental health (Joyce et al., 2017; Smith et al., 2008; Strumpfer, 2003; van Breda, 2018). Resilient individuals may experience disruptions to healthy functioning, for instance, a loss of sleep, but will still be able to display positive emotions and engage in generative experiences (Bonanno, Papa & O'Neil, 2001).

Richardson et al., (1990) stated individuals who are able to maintain or surpass previous levels of functioning, after adversity, display *resilient reintegration*, in response to the growth-enhancing elements of the experience. The *Fortigenic Resiliency Model* (Strumpfer, 1995) asserts resilience represents an interactive pattern of psychological activity, which promotes goal-directed behaviours. It suggests resilience is the overarching element that dictates such behaviours (Strumpfer, 1995). Whereby, an interactive link between interpersonal (e.g., social engagement, career satisfaction) and intrapersonal (e.g., emotions, cognitions) factors initiate a neuro-physiological connection that contributes to overall fortigenesis (psychological strength) and provides meaning to experiences (Strumpfer, 2003, 2006). However, the Fortigenic Resiliency Model (Strumpfer, 1995), regards resilience as an innate factor outcome and fails to consider the individuals who may not adapt following adversity, or those who experience the negative symptoms associated with trauma (van Breda, 2018). Nevertheless, resilience is distinct to the individual, in response to their experiences, cognitions and perceptions of the experiences encountered (Rutter, 2011; Southwick, et al., 2011; Southwick, 2014).

Resilience is often argued to be a stable trajectory of healthy functioning before and after an event. Considering resilience through this lens underestimates the heterogeneity of long-term outcomes (Bonanno & Diminich, 2013). Bonanno & Diminich (2013) state the ability to be resilient can, a fact, present differently across the lifespan and suggests two differing types of resiliencies can occur. Firstly, ‘emergent resilience’ representing the response to persistent adversity, which gradually improves over time, despite longer periods of uneven outcomes (Bonanno & Diminich, 2013). Secondly, ‘minimal-impact resilience’, characterised as a mild decline in functioning, with positive adjustments after exposure (Bonanno & Diminich, 2013). Furthermore, Bonanno & Diminich (2013) assert individuals can display consistent patterns of health adjustment after adversity.

The Minimal-Impact Resilience Trajectory (Bonanno & Diminich, 2013) asserts individuals who present with consistently low levels of distress before and after exposure to traumatic events, are likely to exhibit a healthy pattern of adjustment in the future. If distress develops after adversity, the distress is likely to be mild and typically will not significantly impact the ability to return to normal functioning (Bonanno & Diminich, 2013). This theory is beneficial as it highlights how some individuals do not experience significant problems after trauma exposure. However, it does not provide meaning towards *why* individuals are able to overcome adversity (Southwick et al., 2014). It equally fails to adequately account for an individual’s perception of the experience, personality factors or post traumatic growth (Southwick et al., 2014; Southwick et al., 2015).

The concept of resilience is arguably interrelated with the constructs of post traumatic growth and hardiness (Almedom, 2005; Maddi, 2004; Rutter, 1985; Tedeschi, Park & Calhoun, 1998). These concepts have featured within the social psychology literature and have aimed to provide an understanding of the negative consequences of traumatic events (Almedom, 2005). *Post Traumatic Growth* refers to a positive psychological change that can develop after

experiencing highly challenging and stressful life events (Calhoun & Tedeschi, 1995). However, Post Traumatic Growth is different from resilience (Collier, 2016), and occurs after individuals have experienced and developed psychological trauma, endured psychological difficulties and fostered personal growth (Calhoun & Tedeschi, 1995; Collier, 2016). In contrast, *Hardiness* has been shown to *influence* the development of resilience (Maddi, 2012).

Hardiness is a personality characteristic linked to performance and health (Delahajj et al., 2010). It includes three elements: commitment, control and challenge (Kobasa, 1979). Hardy individuals perceive themselves to exert more control over their experiences and often observe challenging experiences as an opportunity for personal growth (Delahajj et al., 2010, Kobasa, 1979; Oral & Karakurt, 2022). The perception of increased control can promote self-efficacy and performance in any aspect of the individual's life (Hystad et al., 2009; Nezlek et al., 2018). Moreover, increased levels of hardiness can buffer against the stress response associated with a traumatic experience, mitigate against the development of a traumatic response and foster the development of resilience (Bonanno, 2004; Delahajj et al., 2010; Nezlek et al., 2018). Nevertheless, control is an important factor within hardiness (Southwick et al., 2015) as individuals can perceive a loss of control during traumatic experiences (Figley, 1998; van Breda, 2018). The reduction in control may impact individual levels of hardiness and affect the likelihood of resilience as a result (Nezlek et al., 2018). However, resilience also incorporates other aspects, such as self-reflection and social interaction. Therefore, the loss of control may not impact the overall levels of resilience, which may be obtained (Southwick et al., 2014).

4.3 Promoting resilience in front-line workers.

Front-line workers can encounter factors which can reduce or impact the ability to be resilient in the workplace, such as increased stress and exposure to psychological trauma (van

Bortel, 2016). However, there are a number of identified promotive factors of resilience such as organisational support, subjective wellbeing, social support (e.g., peers, family) and compassion satisfaction (Ruiz-Fernandez et al., 2021). In the workplace, organisational support is beneficial in fostering resilience (Labrague et al., 2020). *The Stress and Coping Perspective Theory* (Lazarus & Folkman, 1984) maintains social support buffers against the potential harm of stressful encounters. The supportive actions of others within the group (e.g., reassurance, advice and emotional advice and support) can act as a buffer that protects against current and/or future psychological distress and enhance coping abilities (Lakey & Cohen, 2000; Lazarus & Folkman, 1984).

In the workplace, social and organisational support has been reported to significantly reduce the identified vulnerability factors of trauma (Labrague et al., 2020; Mao et al., 2021). For example, a field experiment (6-week intervention that aimed to reduce burnout), aimed at increasing perceived organisational support was conducted utilising Emergency Call personal ($N = 536$) (Linos et al., 2022). The results suggested increased levels of social support affirmed belonging in the workplace and resulted in a reduction in burnout, an identified risk factor of trauma (Linos et al., 2022). In a similar study in the Philippines during the COVID-19 pandemic reported that Nurses ($N = 325$) who held higher levels of personal resilience, and perceived higher levels of organisational and social support, were less likely to report COVID-19 related anxiety (Labrague & De Los Santos, 2020). Thus, providing support to *The Stress and Coping Perspective Theory* (Lazarus & Folkman, 1984). Moreover, suggesting that promoting coping in the workplace through providing social support is beneficial in developing resilience and reducing the risk factors associated with trauma. However, during public health crises the identified workplace factors, for example perception of competence may influence levels of resilience (Good et al., 2023).

A front-line worker's perception of their competence in the workplace can impact their subjective wellbeing, emotional processing and regulation and self-compassion (Mackie et al., 2013; Neff et al., 2020). Self-compassion has been reported to buffer against mental distress in the workplace (Franco & Christie, 2021; McDonald et al., 2021). Furthermore, it has been associated with a reduction in burnout and compassion fatigue in front-line workers during the COVID-19 pandemic and has been linked with resilience. For example, in a sample of front-line health care workers ($N = 506$) in Spain during the of the COVID-19 (Ruiz-Fernandez et al., 2021), the results indicated that high levels of burnout, compassion fatigue and compassion satisfaction developed in those caring for severely ill patients (Ruiz-Fernandez et al., 2021). Despite the emotional and psychological exhaustion found, the results indicated that front-line workers expressed satisfaction by helping others, which influenced their levels of self-compassion and fostered resilience (Ruiz-Fernandez et al., 2021). Thus, providing evidence in support of the Stress and Coping Perspective Theory (Lazarus & Folkman, 1984) and Resilience Process and Outcome Model (Ungar, 2018), However, self-compassion has been reported to be lower in front-line workers during public health crises (Kotera et al., 2021), which may influence their levels of resilience. Nevertheless, resilience can be impacted by engagement in subjective wellbeing.

Subjective wellbeing is a multifaceted construct, which describes how individuals perceive their own emotional responses, levels of satisfaction and overall quality of life (Diener et al., 2018; Toole et al., 2018). Subjective wellbeing incorporates several dimensions of wellness, including personal growth, purpose in life, self-acceptance and is associated with resilience (Ryff & Keyes, 1995; Toole et al., 2018). In the workplace, Subjective wellbeing may be promoted through job satisfaction. For example, in a sample of employees in South Korea ($N = 550$) the results of a structured equation model suggested that workers who held higher levels of perceived organisational support and were satisfied with their careers, held a

greater sense of subjective wellbeing (Joo & Lee, 2017). Thus, suggesting the promotive influence of organisational support and subjective wellbeing on resilience in the workplace. However, it is also important to consider a front-line worker's private life and how this may contribute to overall subjective wellbeing.

There are numerous factors which can influence subjective wellbeing, such as mindfulness (being conscious or aware in the present), self-care, goal setting, self-compassion, engagement in social interactions, and hobbies (Heintzelman et al., 2019). Front-line workers who practice self-care (e.g., exercise) and engage in activities which promote subjective wellbeing are better able to counteract the negative aspects of trauma exposure and foster resilience (Fullana et al., 2020). Furthermore, time spent with family may provide front-line workers with feelings of purpose and support (Faullana et al., 2020; Langstedt & Hunt, 2022).

4.4 Promotive factors and shared resilience in families.

As a group, families are able to collaboratively cope and aid recovery following exposure to traumatic events (Figley et al., 2013; Loman et al., 2010). The family will provide increased protection and will facilitate a therapeutic and safe environment to discuss the traumatic experience (Figley & Kiser, 2013; Hill et al., 2006). This enables the survivor to gain a coordinated perspective of the event and acquire collaborative problem-solving and co-regulation of the emotional experience (Berg et al., 1998; Bohanek et al., 2006; Figley & Kiser, 2013; Hill et al., 2003). Furthermore, as suggested by Emotional Contagion Theory (Hatfield et al., 1994) the display of positive and supportive emotions can be internally adopted and mimicked by the survivor, aiding in recovery and mitigating the development of trauma (Herrando & Constantinides, 2021). This can foster the development of shared resilience and/or vicarious resilience in families.

Vicarious resilience refers to the positive impact of exposure to another resiliency following trauma (Hernandez et al., 2007). In families, vicarious resilience can develop in response to the unit collectively recovering from trauma or after witnessing one member of the family recover from trauma (Walsh, 2016). *Family Resilience Theory* (Walsh, 1996, 2021) maintains resilience in families develops as part of a dynamic process following exposure to serious crises or persistent life challenges. It requires flexibility and adaption to overcome the experience, but promotes greater levels of confidence, resourcefulness and the ability to counteract future problems (Walsh, 1996, 2021).

The empirical literature on shared resilience in families during public health crises is limited. However, it can be speculated that families may provide front-line workers with social support, which may buffer against the negative aspects of working on the front-line during a public health crisis, as suggested by the Stress and Coping Perspective Theory (Lazarus & Folkman, 1984). It can further be speculated that the family group may develop shared resilience in response to a collective effort to overcome adversity, as suggested by the Family Resilience Theory (Walsh, 1996), or through the influence of Emotional Contagion (Hatfield et al., 1994) or developed vicariously (Walsh, 2016, 2021). Therefore, research that ascertains how families develop resilience and foster resilience in front-line workers during public health crises is of clear value.

4.5 The impact of nature on individual and family resilience.

Following the results found within Chapter Seven, which explored the lived experiences of front-line workers and their families, nature was found to impact levels of resilience. As such, the following literature has been introduced to provide a theoretical basis that will provide understanding for the information that is presented in later chapters.

Connecting and having contact with nature has been associated with improvements in subjective wellbeing, specifically in eudaimonic and hedonic wellbeing (Capaldi et al., 2015). Eudaimonic wellbeing refers to subjective experiences of living life, whereas hedonic wellbeing refers to self-actualisation and self-growth (Ryan & Deci, 2001). It is important to recognise the difference between the two different nature-related concepts when ascertaining how connecting with nature and nature relatedness promotes wellbeing and resilience (Capaldi et al., 2015). Connecting with nature involves interacting with the natural world, for example, being immersed in a natural environment (e.g., forest) (Capaldi et al., 2015; Tam, 2013). However, nature connectiveness is an individual's subjective sense of connection with the natural world (Capaldi et al., 2015; Tam, 2013). Short-term improvements in mood can be obtained from spending brief periods in nature. Additionally, frequent and repeated time spent in the natural world can promote positive emotional states, well-being and foster resilience (Capaldi et al., 2015; McManhan & Estes, 2015). Moreover, a reduction in stress can also be gained (Berman et al., 2012; McManhan & Estes, 2015).

Stress-Reduction Theory (Ulrich et al., 1991) asserts nature acts as a non-threatening environment which enables the individual to release tension and can decrease perceived stress levels and arousal. Compared with industrial human-made environments, nature provides a multitude of elements that promote stress-reducing psychophysiological responses, such as running water, and greenery which can buffer against stress and promote stress recovery (Capaldi et al., 2015, Ulrich, 1979, 1981, 1991; Ulrich et al., 1991). Spending time in nature can induce physiologically positive adaptations in the body, notably, a reduction in cortisol levels and pulse rate, and improved immune function can be attained (Buyung-Ali et al., 2010; Tsunetsugu et al., 2010).

In support of this theory, empirical studies have identified positive effects in individuals who are physically present in nature. For example, an experimental study using individuals

($N = 40$) reported recovery from psychological stress was quicker in those exposed to natural sounds (e.g., running water), in contrast to those exposed to urban sounds (e.g., traffic) (Alvarsson et al., 2010). Furthermore, in a qualitative interview sample of school age children, parents and teachers ($N = 35$) in the US, natural areas were reported to promote stress reduction and promote protective factors of resilience (Chawla et al., 2014). Thus, highlighting the advantages of spending time in nature on psychological and physiological wellbeing.

In addition, *Attention Restoration Theory* (Kaplan & Kaplan, 1989) maintains nature is beneficial in restoring healthy cognitive functioning. This theory asserts natural environments are restorative and provide an opportunity to be immersed in rich stimuli that is effortlessly absorbed without the need to monitor behaviour (Kaplan & Kaplan, 1989). Several studies have reported improvements in concentration, emotional functioning and directed attention after contact with nature (Berman et al., 2008; Berto et al., 2005; van der Berg et al., 2003). For example, a set of experimental studies utilising undergraduate students ($N = 32$) reported the participants exposed to restorative environments (nature) following sustained attention tests displayed improvements in performance (Berto, 2005), thus, supporting the Attention Restoration Theory (Kaplan & Kaplan, 1989). Therefore, individuals can gain a positive impact on subjective well-being and promote resilience after spending time in an environment which contains natural life (Capaldi et al., 2015).

The influence of nature on the subjective wellbeing and resilience of front-line workers and families during a public health crisis has not been ascertained in the literature to date. It could be speculated that families who spend time in nature together may individually benefit from nature, which may be emotionally shared within the group as a result of emotional contagion, as suggested by Emotional Contagion Theory (Hatfield et al., 2014). Thus, improving the wellbeing of the family group and promoting shared resilience.

4.6 Concluding comments.

Consequently, there are several of identified factors that can promote the development of resilience in front-line workers in the workplace, such as organisational support, subjective wellbeing and self-compassion (Ruiz-Fernandez et al., 2021). Furthermore, resilience may be promoted by the social support provided by families and may result in the family group vicariously fostering resilience in response (Figley & Kiser, 2013; Walsh, 2021). The theories noted in this chapter provide an understanding of resiliency in front-line workers and their families. In particular, the Resilience Process and Outcome Model (Ungar, 2018) is beneficial in explaining how a ‘process of resilience’ mitigates the risk factors of trauma and promotes resilience. Furthermore, The Stress and Coping Perspective Theory (Lazarus & Folkman, 1984) is noted here as useful in highlighting how factors, such as social support in the workplace, promote the development of resilience. Nevertheless, these theories are arguably unable to fully elucidate the factors that contribute to the development of resilience during public health crises. Moreover, they are unable to fully account for the increased levels of risk factors front-line workers may endure, and the impact this may have on their levels of resilience.

In an aim to capture the contents of the literature presented, resilience will be referred to throughout this thesis as the ability to be resistant, mitigate against or the absence of distress following exposure to potentially traumatic experiences (Cicchetti et al., 1993; Luthar & Cicchetti, 2004; Masten, 2006; Rutter, 2006). Thus, gaining an understanding of the levels of resilience in front-line workers and their families during public health crises is of clear value, providing the base for the ensuing chapter.

CHAPTER FIVE

ADDRESSING THE RESEARCH PROBLEM

5.1 Structure of this chapter.

This chapter outlines the aims and predictions of the studies conducted in this thesis. It summarises how the proposed studies are influenced by the existing literature and the limited information available regarding exposure to psychological trauma and moral injury during public health crises. It provides a rationale for the methodology chosen, the order of studies and the implication of this thesis.

5.2 Rationale for the research.

Throughout the COVID-19 pandemic the term ‘front-line worker’ in the United Kingdom (UK), referred to any individual who was employed (voluntary or paid) in a public facing role, and who was unable to work from home (Gov.uk, 2020). These roles occurred in critical sectors, which provide goods and services to the public of the UK. This included the healthcare sector (e.g. doctors, nurses, midwives, paramedics, and medical staff), social care sector (e.g. social workers, care workers), public services (e.g. government, police, ministry of defence, prison and probation staff, funeral services, religious staff, journalists/broadcasters), education and childcare sector (e.g. teachers and childcare providers), food and retail sector (e.g. production and distribution and/or sale of foods and goods), transport, utilities and communication sectors (e.g. telecommunications, information technologies and oil, gas and water services), and any other staff required to maintain each sector (Gov.uk, 2020). The available literature has predominantly focused on health care workers, as noted in earlier chapters. However, in order to gain a full understanding of the impact of COVID-19 the studies in this thesis will incorporate all sectors.

During the COVID-19 pandemic these individuals were permitted childcare provisions and were exempt from lockdown procedures to ensure these essential services continued to be provided (gov.uk, 2020). Due to rapidly increasing patient numbers, significant demand was placed on all front-line workers to provide adequate care, provisions, and services without any prior specific knowledge of the disease. This unprecedented pandemic was described as a marathon not a sprint (Heber et al., 2020) with World Health Organisation (WHO) expressing the potential mental health impacts as “an emergency within an emergency” (Diamond & Woskie, 2020). Front-line healthcare workers arguably have an increased risk of psychological stress and trauma in response to exposure to emotional and situational stressors in their daily workload, regardless of facing a pandemic (Kumar, 2016; McCain et al., 2017). Moreover, front-line healthcare workers are vulnerable to developing compassion fatigue, burnout and psychological trauma, which can ultimately affect a medical workers ability to deliver effective care to their patients (Kumar, 2016).

It can be speculated that front-line workers employed within other sectors, such as transport or food and retail, may have a decreased risk of workplace induced psychological injury in contrast to those previously mentioned, namely health care workers. As those employed within these sectors are unlikely to have been exposed to the same trauma-inducing experiences as healthcare workers, on a daily basis (Wankowicz, 2020). However, during the COVID-19 pandemic, the identified epidemic related stressors (e.g., fear of infection and transmission) may have impacted front-line workers in all sectors (Gautam & Hens, 2020; Pokhrel & Chhetri, 2021; Sarkodie & Owusu, 2021). Furthermore, it can be speculated that those employed within sectors which do not frequently experience trauma-inducing events, may not have the experience or resilience to withstand the increased demand and psychological cost of a pandemic (Wankowicz, 2020). Therefore, it can be speculated that as a result they may

experience significant stress and may be more susceptible to developing psychological trauma in response to providing essential services during a pandemic (Wankowicz, 2020).

Whilst providing essential services to the public during public health crises, was expected individuals would be exposed to morally injurious events, where they are be exposed to decision making which violates personal codes of conduct (Cartolovni et al., 2021). As noted in earlier chapters, there is little literature available on the development of moral injury in healthcare workers, furthermore the presence and impact of moral injury is considerably under-investigated in public health crises. It is possible individuals employed within front-line roles encountered morally injurious events throughout the COVID-19 pandemic. Likewise, it can be speculated that the family members of front-line workers may vicariously adopt moral injury, in response to witnessing moral distress displayed by family members. It is therefore critical to investigate if front-line workers endured moral injury during the pandemic and any subsequent impacts this may have on themselves and their families. It is also pertinent to explore if the family members developed moral injury, and if this occurred vicariously or in response to personal experiences.

In order to capture the severity and longitudinal consequences of working on the front-line during a public health crisis, it is also crucial to consider the factors that may ameliorate the development of trauma (Luthar et al., 2000). Social support has been highlighted as a notable protective factor against trauma and has been shown to enable resilience to develop after adversity (Vaughan & Wade, 2020). Front-line workers may require additional support from their social environments to provide care, enhance active coping and support resilience, as they may not be equipped with the sufficient levels of coping abilities and resilience (Firew et al., 2020; Labrague, 2021).

In March 2020, the UK government introduced lockdown measures to impede human movement in an effort to prevent the spread of the COVID-19 virus. The different restrictions

introduced to combat transmission, such as quarantine, social distancing and lockdowns, arguably prevented front-line workers from engaging in activities that may have previously been utilised to cope effectively with distress (Lebrague, 2021). Therefore, in response to reduced social contact during public health crises, front-line workers potentially become dependent on families to provide additional support (Das et al., 2021). Families were then required to enhance resilience whilst counteracting the stress front-line workers may experience (Das et al., 2021). Family support has been shown to mediate stress levels and reduce burnout in front-line workers during adversity (Tselebis et al., 2008; Tselebis et al., 2020). During COVID-19 it was possible that front-line workers may have utilised family support over other forms of coping due to accessibility. As such, the role of family support will be investigated throughout this thesis to determine if family support was utilised by front-line workers as a form of coping, and the impact this may have upon the potential levels of trauma, moral injury, and resilience in front-line workers. However, this role may expose family members to trauma, risk of infection and quarantine whilst providing social support to front-line workers.

Figley & Kiser (2013) had previously highlighted how family members who attune to the distress of loved ones, can develop and share the symptomology of the distressed family member (Figley & Kiser, 2012). This can result in ‘familial trauma’, whereby, all family members may develop and share the trauma response (Kiser et al., 1998; Liu & Doan, 2020). Additionally, the distress can be shared by family members through emotional contagion (Hatfield et al., 2014; Panksepp & Lahvis, 2011; Tenkin et al., 2022). It is certainly possible family units may have developed vicarious psychological distress, trauma and/or familial trauma during the COVID-19 pandemic (Figley & Kiser, 2013; Figley & Kiser, 2017). Arguably, if family members endure psychological distress in response to supporting front-line workers, this may diminish the social support they are able to then provide (Stazdins & Bloom,

2007). Ultimately affecting a front-line workers ability to develop resilience and counteract trauma (Labrague, 2021). Nevertheless, members of familial groups are different and therefore will respond differently when encountering similar stressful experiences (Figley & Kiser, 2017). It is essential the literature on public health crises encompass the lived experiences of these individuals in order to understand the role and impacts of providing social support during such events.

5.3 Overall aims of this research

This thesis adopted a mixed methods approach to gain an understanding of the impact of the public health crisis (COVID-19) on front-line workers and their families. This thesis opted for an explorative design due to an absence of identified vulnerability and protective factors of trauma, moral injury and resilience in front-line workers and their families, during a public health crisis.

The overall aim was therefore to ascertain an understanding of the protective and vulnerability factors of psychological trauma and moral injury in front-line workers and their families during a public health crisis. This thesis further aims to determine how resilience operated in those working on the front-line, alongside exploration of the impact of social support, subjective wellbeing, engaging in nature activities and coping styles, and how these factors have influenced resilience. This thesis concludes by presenting a conceptual model outlining the protective and vulnerability factors of trauma and moral injury during public health crises, with attention paid to the development of resilience. It is hoped that such a model could be of value to practice.

The following specific aims are noted per study:

Study one: Systematic review.

Aims

The aim of the systematic review is to conduct a comprehensive review of the available literature in the area of psychological trauma, moral injury and resilience in front-line workers during public health crises. The systematic review aimed to ascertain the vulnerability factors associated with the development of trauma and moral injury during such a crisis, and highlight factors that could reduce or obstruct the development of resilience.

Study two: Qualitative interviews with front-line workers and their families.

Aim

To gain an understanding of the lived experiences of front-line workers and their families during the COVID-19 pandemic, capturing responses to lockdown measures and the increased demands placed on them. In two parts, this captured the lived experiences of the family members of front-line workers (Part A), and the lived experiences of front-line workers (Part B).

Study two, part A specific aims.

To investigate and understand how families supported front-line workers during the COVID-19 pandemic. It aimed to explore and identify the risk factors associated with psychological distress and trauma. To ascertain the development of vicarious trauma in the family members of front-line workers, and how resilience merges.

Study two, part B specific aims.

To investigate the psychological impact of working on the front-line throughout the COVID-19 pandemic, capturing the factors promoting or mitigating the development of trauma and/or moral injury in front-line workers. It also aimed to understand how front-line workers coped during the COVID-19 pandemic, and how resilience emerged.

Predictions.

Study two conducted qualitative interviews and was explorative in nature and, as such, no predictions are presented. However, it was expected the thematic analysis would reveal protective and vulnerability factors associated with the noted aims.

Study three: Trauma, moral injury and resilience: exploring the impact of the COVID-19 pandemic on front-line workers and their families.

Aim

This utilised quantitative methodology to ascertain the impact of the pandemic, identifying further vulnerability factors of trauma and moral injury, whilst examining how resilience can be fostered and the effect of resilience in mitigating the development and/or severity of psychological trauma and moral injury.

Specific Aims

Study three aimed to examine the impact of the pandemic and ascertain the protective and vulnerability factors for psychological trauma and moral injury, also capturing resilience. This was investigated in front-line workers and their families. Lastly, this study also aimed to explore the mechanisms potentially influencing levels of resilience in front-line workers and

their families, such as levels of interpersonal support, relatedness to nature, subjective wellbeing, connectivity to nature and coping styles.

Predictions:

- H1: Front-line workers will experience psychological trauma and vicarious trauma in response to providing support during the COVID-19 pandemic (Abolfotouh et al., 2017; Arribas-Garcia et al., 2020).
- H2: Front-line workers will experience moral injury in response to providing support in public facing roles throughout the COVID-19 pandemic (Asken, 2019; Riedel et al., 2022).
- H3: Front-line workers will display moderate to high levels of resilience in response to their experiences throughout the COVID-19 pandemic (Fullana et al., 2020).
- H4: Family members of front-line workers will experience psychological trauma and vicarious trauma in response to providing care to front-line workers throughout the COVID-19 pandemic (Figley & Kiser, 2017).
- H5: Families of front-line workers will display moderate to high levels of resilience in response to their experiences throughout the COVID-19 pandemic (Figley & Kiser, 2013; Herrando & Constantinides, 2021).
- H6: Spending time in nature, increases interpersonal support, connectiveness with nature, subjective wellbeing and coping will be associated with increased levels of resilience in front-line workers and their families (Calpaldi et al., 2015).
- H7: Identifying with and feeling related to nature will serve to increase perceptions of available social support, connectiveness with nature, subjective wellbeing and

coping, and will be associated with increased levels of resilience in front-line workers and their families (Capaldi et al., 2015).

H8: The association between the reported levels of trauma symptoms and reported levels of moral injury will be moderated by increased levels of resilience. This will be found in front-line workers and their families.

CHAPTER SIX

SYSTEMATIC REVIEW: TRAUMA, RESILIENCE AND MORAL INJURY IN FRONT-LINE WORKERS DURING PUBLIC HEALTH CRISES

6.1 Study one summary

A systematic review of the literature was conducted in response to the identified gap in the literature as presented in earlier chapters. The current review aimed to establish an understanding of the existing literature in the area of psychological trauma, resilience and moral injury in front-line workers during a public health crisis. A public health crisis within this systematic review refers to any large-scale event that may have had the potential to impact public health services, for example an epidemic, natural disaster, or war zone. The methodology is presented, followed by the results, and this chapter concludes with a discussion of the findings.

6.2 Method

A systematic review was conducted in accordance with the standards of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Mohor et al., 2009). This systematic review aimed to collect articles that contained primary data only, which was collected using quantitative or qualitative methods (e.g. cross sectional surveys, longitudinal surveys and qualitative interview/focus group studies). A front-line worker within this systematic review refers to anyone who was employed with a public facing role in the health and/or social care sectors, or to anyone who provided emergency and/or disaster relief. This definition was chosen to enable data to be collected on any psychological impact that may have occurred on those providing emergency aid, health care and/or social care during public health crises. Other front-line workers were not included in this definition, e.g., retail, governmental

or funeral care, as these individuals were unlikely to be directly exposed to immediate danger, in comparison to those working on the immediate front line during a public health crisis. The following section outlines the data search, including exclusion and inclusion criteria, search strings and databases, and the quality appraisal.

6.2.1 Search Strategy

Two search approaches were used to identify potential literature for inclusion within this review. The first approach included searching bibliographic databases. The databases that were utilised to obtain articles were, PsychINFO, PsycARTICLES, JSTOR, Taylor & Francis Online, Elsevier, E-Journals, MEDLINE and SOCIndex. The full search string was inputted into each database during the data collection phase and all articles were screened. In addition, a manual search was conducted using Google Scholar. The search string was inputted into Google Scholar and the first ten pages were reviewed using the inclusion criteria and collected for future screening following PRISMA guidelines. Further to this, the second approach searched the reference list of included articles for further relevant literature to ensure all possible articles were collected. This involved screening the titles of all the full text articles and was performed to ensure all relevant articles were obtained. The search continued until data saturation occurred.

During the planning stage, an initial search of available literature was conducted using Google Scholar. Key terms were developed using the literature that underpins the rationale of the review. Search terms were further refined using the key terms obtained within the initial literature search. The final search terms were, ‘Psychological trauma’, ‘Vicarious trauma’, ‘Secondary trauma’, ‘Mental health difficulties’, ‘Compassion fatigue’, ‘Moral injury’, ‘Resilience’, ‘Protective factors’, ‘Vulnerability factors’, ‘Risk factors’, ‘Epidemic’,

'Pandemic', 'Endemic', 'SARS', 'EBOLA' and 'Public health crises' were combined with AND and OR using wildcard features. These key terms were combined into one search string (see Appendix One) and were inputted into the aforementioned databases. Unfortunately, no key words were included for front-line workers. This occurred due to an unintentional omission during the planning phase, in which the researcher did not add this in as a search term. This increased the burden on the researcher to review a wider number of papers as a result of this not being included. However, it was also acknowledged that the term front-line workers does not translate well to some locations. But nevertheless, this was an omission. Data collection began in September 2020 and ended in December 2020. No articles from 2021 onwards were included as data collection had finished. There was no defined beginning date for eligibility, this was to ensure all relevant papers could be included. Nevertheless, the earliest paper, which met the eligibility criteria was published in 2004.

6.2.2. Inclusion Criteria

Studies were considered eligible for consideration if they: (a) presented information on the vulnerability or protective factors, which directly related to the development of psychological trauma in front-line workers after exposure to public crisis situations (disaster/large scale medical/war), OR (b) reported data highlighting the vulnerabilities or protective factors which relate to the development and maintenance of resilience after psychological trauma, OR (c) exhibit evidence to provide an understanding of which factors may affect the development and/or maintenance of resilience in the workplace, OR (d) highlight and explore the development of moral injury in individuals in positions of responsibility or authority, OR (e) present information on the prevalence, vulnerabilities or protective factors which relate to the development of moral injury AND (f) were written in English AND (g) collected primary data using either quantitative or quantitative methods (e.g.,

longitudinal studies, cross sectional studies and quantitative interviews and/or focus groups studies).

6.2.3. Exclusion Criteria

Studies were excluded if they: (a) did not present any information on the prevalence, mitigating or protective factors of trauma, resilience and moral injury in front-line workers during public health crises, or (b) focused on alternative types of psychological trauma (for example, single incident trauma, such as sexual assault, or complex trauma, such as domestic abuse or historical trauma) and (c) non primary data sources (e.g., commentaries, opinion articles, systematic reviews, case studies, policies, reports, and grey literature).

6.2.4. Quality Appraisal

In order to establish whether studies met the inclusion criteria, a quality appraisal was conducted on each included article using the guidelines as recommended by Jadad (1996) and the Critical Appraisal Skills Programme (CASP, 2018) and JBI Analytical Cross Sectional Studies Checklist (Moola et al., 2020) (see Appendix One). The CASP checklists were used on all qualitative articles and the quality of the papers were summarised as “good”, “fair” or “poor”. Each CASP checklist contained ten questions which were scored “yes”, “no” or “can’t tell” (CASP, 2018). A score of “poor” was rated if the article did not meet the screening questions (e.g., “Was there a clear statement of the aims of the research?”), “fair” was provided if the article scored at least 7 and “good” was rated if the article was rated “yes” to all questions (CASP, 2018).

The JBI Analytical Cross Sectional Studies Checklist (Moola et al., 2020) was used on all quantitative articles and the quality of the papers were summarised as “good”, “fair” or “poor”. The JBI contained eight questions that were scored “yes”, “no” or “unclear”. A score

of “poor” was rated if the article scored less than 3, “fair” was provided if the article scored at least 5 and “good” was rated if the article scored 7 or more (Moola et al., 2020). During this stage any articles that were not providing empirical data generated from participants (e.g., opinion articles, reviews or editorials) were removed. Grey literature (i.e., policies, reports, graduate dissertations) was also not included. Thus, all obtained literature was peer-reviewed. All studies were rated as “good”. Table 1 displays the rated total scores using the quality assessment tools of all the papers included in this review.

6.2.5 Data extraction

Data extraction was conducted using the inclusion criteria. It gathered data on the vulnerability or protective factors that directly related to the development of psychological trauma, moral injury, or resilience in front-line workers after exposure to public crisis situations (disaster/large scale medical/war). During the data extraction phase a table was populated in a Microsoft Word document, which was used to record all obtained information. The information recorded included, study design, sample information, location, methodology, overall findings, and implications. This is presented in Table one and in Appendix Three.

6.3 Results

6.3.1. Search results.

Initially, the articles extracted from the database totalled 612,389. All extracted articles were screened using the inclusion and exclusion criteria and were managed in Zotero. After duplicates, editorials, overviews, non-peer reviewed and opinion pieces were removed, 187,617 articles were left for title review. Of this, 185,380 were removed due to not meeting the aforementioned eligibility criteria. In total, 2237 abstracts were exported to the reference

manager Zotero and screened based on the information provided; after screening 1990 were excluded. There were 247 articles retained for full text review. Of this, 156 did not report any information towards which factors may affect the development, maintenance or reduction of psychological trauma, resilience, and moral injury during a public health crisis. A total of 52 papers were excluded due to inaccessibility, these could not be accessed via the University library and/or through the British Library. Leaving 27 articles that met the inclusion criteria for full analysis. Five articles were included in the final analysis after hand searching full text references. Thus, a final total of 32 articles were acquired for full analysis. Figure 1 displays the review process using PRISMA (Moher et al., 2009).

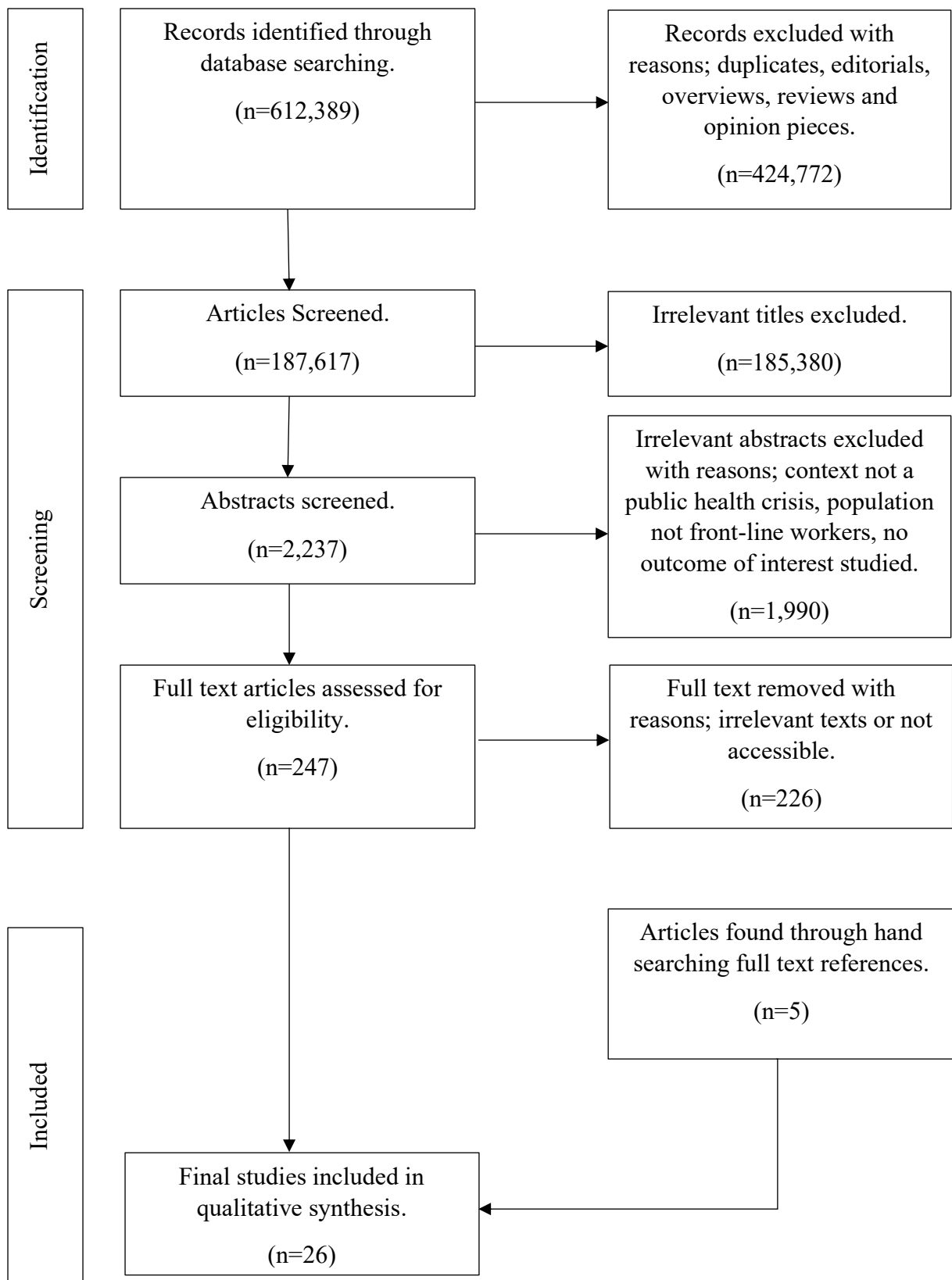


Figure 1. A flowchart to represent the steps used in the systematic review using the PRISMA guidelines.

6.3.2. Main focus of the studies

The studies in this review included twenty-two articles focusing on the development of trauma, ten focused on the advancement of resilience and five describing the occurrence of moral injury in front-line workers. Moreover, twenty-three highlighted protective and vulnerability factors of psychological trauma and five protective and vulnerability factors for moral injury. The studies included articles from nineteen countries and were written in English. In order to identify how trauma, resilience and moral injury can develop in front-line workers during a public health crisis a thematic analysis was undertaken on the selected papers (Braun & Clarke, 2006).

Table 1
Studied characteristics of all reviewed English language publications.

Reference	Quality	Country	Content/ Crisis	Outcomes	Study Design and Analysis	Participants Demographics
Arribas-Garcia et al., 2020	Good	Spain	Non PHC Oncology	Compassion fatigue and Compassion satisfaction	QNT; Cross sectional study ProQOL-V, CD-RISC- 10, DAP-R, NEO-FFI-3	Nurses (<i>N</i> = 110)
Austin et al., 2017	Good	USA	Non PHC Palliative care	Secondary traumatic stress, Moral distress, Compassion fatigue and Burnout	QNT; Cross sectional study Moral Distress scale- Revised, PeoQOL	Total (<i>N</i> = 329) Physicians (<i>N</i> = 113) Nurses (<i>N</i> = 211)
Berlanda et al., 2020	Good	Italy	Non PHC Hospital settings	Risk and protective factors of wellbeing	QUL; Self-reported open ended questionnaires online. Thematic analysis	Health care workers (<i>N</i> = 795)
Barr, 2017	Good	Australia	Non PHC NICU	Compassion fatigue, Compassion satisfaction, Stress and Social support	ProQOL, WS, SPS	Nurses (<i>N</i> = 157)
Bryan et al., 2018	Good	USA	Non PHC Public services	Moral injury, PTSD and Suicidal behaviour	QNT; Cross sectional study PCL-5, Differential emotions scale- IV, Patient health questionnaire 9, ISI, Alcohol use disorders identification test screener, nightmare	National Guards (<i>N</i> = 930)

Reference	Quality	Country	Content/ Crisis	Outcomes	Study Design and Analysis	Participants Demographics
					disorders checklist, Deployment, risk and resilience inventory v2, Life events checklist, Self-injurious thoughts interview,	
Delaney et al., 2018	Good	Scotland	Non PHC Health care	Moral injury, Secondary traumatic stress, Compassion Satisfaction, Resilience	Mixed methods; QNT; Neff 26 Self compassion scale, Freiburg Mindfulness inventory, ProQOL version 5, CD-RISC QUL; hand-written questionnaires using IPA (e.g., 'How did you experience the effects of the pilot MSC training')	Nurses (N= 13)
Forkus et al., 2019	Good	USA	Non PHC Military	Moral injury and Self- compassion	QNT: Cross sectional study, Moral injury events scale, PCL-5, Patient health questionnaire, Drug abuse screen test, Alcohol use disorders identification test, Deliberate self harm inventory, Self compassion scale.	Military veteran (N = 203)

Reference	Quality	Country	Content/ Crisis	Outcomes	Study Design and Analysis	Participants Demographics
Gibbons et al., 2013	Good	USA	Non PHC Combat Health care	Moral injury	QUL; Interviews (e.g., “Can you describe a potentially traumatic exposure that you experienced while deployed and what you thought about it?”	Deployed Physicians and Nurses (<i>N</i> = 20)
Gonzalez et al., 2019	Good	USA	Non PHC Crisis responders	Trauma, Resilience, Compassion fatigue, Compassion satisfaction. Burnout	QNT: Cross sectional study, ProQOL, RS-14, RSES, Demographic questionnaire	Disaster responders (<i>N</i> = 70)
Kang et al., 2018	Good	South Korea	MERS	Burnout, high volumes of work and fear for personal safety	QUL; Focus groups and in-depth interviews Focus group question: “What are the challenges of working during the MERS outbreak?”. Individual interviews: “What are your working experiences of caring for suspected or infected patients with MERS during the outbreak?”	Total (<i>N</i> = 7) 7 Focus groups with Nurses (<i>N</i> = 27) (<i>N</i> = 3) Individuals interview with Nurses

Reference	Quality	Country	Content/ Crisis	Outcomes	Study Design and Analysis	Participants Demographics
Kaye-Kauderer et al., 2019	Good	Japan	Non PHC Health care following natural disaster	Post-traumatic growth and Resilience	QNT; Cross sectional study DTS, PTGI-X, CD- RISC	Volunteer Medical students (<i>N</i> = 579)
Kirby et al., 2011	Good	Australia	Non PHC Health care	PTSD and Coping	QNT; Cross sectional study PTGI, IES-R, Revised COPE	Ambulance personnel (<i>N</i> = 125)
Lancaster, 2018	Good	USA	Non PHC Military	Moral injury and negative outcomes	QNT; Cross sectional study Transgressive acts scale, Moral injury events scale, State shame and guilt scale, Dimensions of anger reactions 5, Patient health questionnaire, PCL-5	Military personnel (<i>N</i> = 161)
Lee et al., 2018	Good	Korea	MERS	Psychological impact (depression, anxiety, stress), Moral distress	QNT; Cross sectional study Impacts of events scale, HAS, MINI,	Hospital staff (<i>N</i> = 1800)
Lin et al., 2007	Good	Taiwan	SARS	Impact of working conditions on trauma development	QNT; Cross sectional study DTS-C, CHQ-12	Medical staff (<i>N</i> = 92)
McAlonan et al., 2007	Good	Hong Kong	SARS	Chronic stress, Depression, Moral distress, and fatigue	QNT: Cross sectional study	Health care workers in

Reference	Quality	Country	Content/ Crisis	Outcomes	Study Design and Analysis	Participants Demographics
					Impact of events scale, PSS-10, DASS-21,	respiratory care (<i>N</i> = 266)
McKinley, 2020	Good	United Kingdom	Non PHC Emergency response doctors	Resilience, Secondary traumatic stress, Compassion satisfaction and Burnout	QNT; Cross sectional study CD-RISC, Brief COPE, ProQOL-V	Medical Doctors (<i>N</i> = 1651)
Mottaghi et al., 2020	Good	Iran	Non PHC Health care	Empathy, Secondary traumatic stress and Compassion satisfaction	QNT; Cross sectional study ProQOL, Interpersonal reactivity index, Interpersonal guilt scale	Nurses (<i>N</i> = 300)
Si et al., 2020	Good	China	COVID-19	Post-traumatic stress, Moral distress, Depression, Anxiety, Stress, Perceived threat, Social support and Coping	QNT; Cross sectional study IES-6, DASS-21, Perceived threat scale, PSSS, SCSQ	Health care professionals (<i>N</i> = 836)
Sodeke-Gregson et al., 2013	Good	United Kingdom	Non PHC Health care	PTSD, Compassion satisfaction, Burnout, Secondary traumatic stress and Professional quality of life scale	QNT; Cross sectional study ProQOL, CSI,	Therapists (<i>N</i> = 320)
Soffer et al., 2010	Good	Haiti	Non PHC Post disaster	Burnout, Fear and PTSD	QNT; Cross sectional study SF-36, SPANE, SoMe, PDEQ-SR, IES-R	Rescue personnel (<i>N</i> = 20)

Reference	Quality	Country	Content/ Crisis	Outcomes	Study Design and Analysis	Participants Demographics
Son et al., 2019	Good	South Korea	MERS	Resilience, PTSD, Coping and Perceived risk	QNT; Cross sectional study IES-R, Willingness to work scale, CD-RISC, Perceived risk scale, Negative emotional experience scale.	Health care workers (<i>N</i> = 280)
Styra et al., 2008	Good	Canada	SARS	Moral distress, Post-traumatic stress syndrome	QNT; Cross sectional study IES-R, PCL-5	Health care workers (<i>N</i> = 248)
Tam et al., 2004	Good	Hong Kong	SARS	Trauma, Psychological morbidity, Stress and Social support	QNT; Cross sectional study General health questionnaire, Preliminary questionnaire developed using Brief COPE, IES-R, DASS- 21, Perceived threat scale, PSSS,	Health care workers (<i>N</i> = 652)
Tzeng, 2004	Good	Taiwan	SARS	Fear, Attitudes towards infection control, Health status, Professional experience	QNT; Cross sectional study SF8 health survey, ProQOL, IES-R	Nurses (<i>N</i> = 172)
Vagni et al., 2020	Good	Italy	COVID-19	Secondary traumatic stress, hardiness, Resilience and Stress	QNT; Cross sectional study STSS-I, DRS-15, ESQ	Front-line workers (<i>N</i> = 236) Health care (<i>N</i> = 140)

Reference	Quality	Country	Content/ Crisis	Outcomes	Study Design and Analysis	Participants Demographics
						Emergency workers (<i>N</i> = 96)
Wild et al., 2016	Good	United Kingdom	Non PHC. Emergency medical staff	PTSD and depression	QUL; Structured Clinical Interviews the assessed every four months for a period of two years SCID, Life events checklist	Study one: (<i>N</i> = 453) Paramedics Follow up: (<i>N</i> = 386) Paramedics

Notes. QNT = quantitative methodology; QUL = qualitative methodology; Non PHC = Non Public health crisis; PDEQ-SR = Peri-traumatic dissociative experiences questionnaire self report version; SoMe = Sources of Meaning and meaning in life; SPANE = Scale of positive and negative experience, SF36 = Health survey: Manual and interpretation guide; IES- R = Impact of events scale revised; CD-RISC = Connor-Davidson resilience scale; STSS-I = Secondary traumatic stress scale, Italian version; DRS-15 = Dispositional resilience scale, ESQ = Emergency stress questionnaire; SCID = Structured clinical interview for the DSM-4; ProQOL = Professional quality of life.; RS-14 = Resilience scale, RSES = Response to stressful experiences scale. Brief COPE = Brief coping scale; PCL-5 = PTSD checklist; DAP-R = Death attitude profile revised; NEO-FFI-3 = Neo five factor inventory; WS = Work stress scale; SPS = Social provision scale.

6.3.3. Narrative synthesis

The extracted data was analysed using a narrative synthesis. This approach utilises a textual approach to analyse the relationship between multiple studies to give an overall assessment of the evidence (Bryman, 2001; Popay et al., 2006). As such, this approach was deemed appropriate to enable the exploration of relationships within multiple studies to emerge and assess the strengths of the evidence (Popay et al., 2006; Rodgers et al., 2009). Following the recommended general framework for narrative synthesis by Popay et al., (2006). The four main elements recommended were, 1). *Develop a theoretical model*, 2). *Developing a preliminary synthesis of findings from the included studies*, 3). *Exploring relationships within and between studies*, and 4). *Assessing the robustness of the synthesis* (Popay et al., 2006).

Element 1 (Develop a theoretical model) was used as a deductive framework to gain an initial understanding of the findings of the existing literature in the area of psychological trauma, resilience, and moral injury in front-line workers during a public health crisis. This provided a rigorous empirical basis to develop the following studies in this thesis. Whereas Element 2 (Developing a preliminary synthesis of findings from the included studies), involved using four of the seven tools suggested by Popay et al., (2006). These were textual descriptions, grouping and clusters, tabulation and translating data (Popay et al., 2006). A tabulation of the studies gathered preliminary information that provided details of the study design, results of the studies, quality assessment and outcome measures. Grouping enabled the studies to be clustered by study design and by the outcome of the results. The qualitative data was translated using thematic analysis (Braun & Clarke, 2006).

Element 3 (The focus was on exploring relationships within and between studies), explored the causation or prevalence of psychological trauma, moral injury, and resilience. Likewise, it considered any factors that may explain the differences and/or effects across the included studies. Lastly, in Element 4 (Assessing the robustness of the synthesis product), this

review provided an assessment of the strengths of the included studies through the quality appraisal process. Moreover, detailed information was provided for the included articles. This has enabled this review to provide an overall assessment of the strengths of the available evidence when drawing conclusions. These elements were not completed in a linear manner and instead used an iterative process that moved between each stage in a direction that made sense of the data (Popay et al., 2001).

Overall, five main factors emerged that suggest how front-line workers were psychologically impacted, these were; 1.) *Promoting the development of psychological trauma*, 2.) *Fear of transmission and contagion*, 3.) *Working conditions*, 4.) *Peer support* and 5.) *Sociodemographic factors*.

Promoting the development of psychological trauma

Public health crises were noted to increase the susceptibility to developing psychological trauma in front-line workers (Son et al., 2019). In total, 9 articles reported information pertaining to the psychological impact that occurred during public health crises. Of this, 5 examined the impact of the SARS epidemic (Lin et al., 2006; McAlonan et al., 2007; Styra et al., 2008; Tam et al., 2004; Tzeng, 2004), 2 investigated the COVID-19 pandemic (Si et al., 2020; Vagni et al., 2020), and 2 explored the impact of MERS on front-line workers (Lee et al., 2018; Son et al., 2019). Furthermore, in total 11 articles reported information surrounding the impact of working on the front-line during non-public health crises. Of this, 8 examined the impact on medical professionals in various settings (e.g., hospitals) (Arribas-Garcia et al., 2020; Bryan et al., 2018; Delaney, 2018; Kaye-Kauderer et al., 2019; Kirby et al., 2011; McKinely et al., 2020; Mottaghi et al., 2020; Wild et al., 2016), 2 investigated the impact on emergency personal (e.g., rescue personnel) (Gonzalez et al., 2019; Soffer et al., 2010), and 1 explored the impact on trauma therapists (Sodeke-Gregson et al., 2013).

Overall, the results of all studies suggested that front-line workers endured stress, depression, fatigue, poor wellbeing, emotional distress and constant guilt, discomfort due to personal protective equipment, social stigma, and dissociative experiences (Lin et al., 2007; McAlonan et al., 2007; Si et al., 2020; Son et al., 2019; Styra et al., 2008; Tam et al., 2004; Vagni et al., 2020). Tam et al., (2004) examined the origins of stress and psychological trauma in those who cared for SARS positive patients ($n = 652$), in Hong Kong. The findings indicated 68% ($n = 444$) of front-line workers reported severe job-related stress, whereas 32% ($N = 205$), reported mild levels of stress (Tam et al., 2004). Furthermore, of those who reported high levels of job stress, 79% ($N = 351$) reported having low levels of job-related stress prior to the onset of the SARS epidemic (Tam et al., 2004). Therefore, the results suggest that providing care to infected patients can increase levels of stress during public health crises. However, psychological trauma has been reported to develop in front-line workers outside of public health crises (Wild et al., 2016).

Wild et al., (2016) examined possible risk factors of psychological trauma and depression in newly recruited Paramedics ($N = 453$). The results indicated 8.3% ($N = 32$) developed at least one episode of PTSD, and 10.6% ($N = 41$) experienced at least one episode of major depression in the first two years of service (Wild et al., 2016). However, this study did not collect data regarding the aetiology of the reported episode of PTSD. Nevertheless, Wild et al., (2016) collected data regarding history of mental disorders, whereby, 41.5% ($N = 188$) reported experiencing a major mental disorder, of which 15% ($N = 66$) reported past experiences of PTSD. Due to similarity in levels of PTSD it is difficult to ascertain if the trauma reported occurred as a direct result of exposure within the workplace, or as a result of re-traumatisation. Nevertheless, the results of the logistical regression displayed that a past history of mental disorders can predict vulnerabilities to the development of trauma ($\beta = 1.81, p < .01$, CI [2.35 – 14.67]). Furthermore, lifetime past trauma did not statistically predict trauma

development (Wild et al., 2016). Thus, exposure to potentially traumatic experiences in the workplace may increase the susceptibility to developing trauma whilst at work.

McAlonan et al., (2017) investigated the immediate and sustained impact of chronic stress, depression, fatigue, and fear in front-line workers ($N = 176$) during an outbreak of SARS in Canada. Front-line workers were split into two groups; high risk (working directly with infected patients) ($N = 106$), and low risk (no direct contact with positive patients) ($N = 70$). (McAlonan et al., 2017). Findings displayed that the immediate impact on high risk workers ($M = 17.0$, $SD = 5.7$) was not significantly different than those classified as low risk ($M = 15.9$, $SD = 4.7$) (McAlonan et al., 2017). Furthermore, total negative psychological responses were positively correlated in both high risk ($r(1,105) = 0.5$, $p < 0.05$) and low risk ($r(1,69) = 0.6$, $p < 0.05$) groups. However, high risk front-line workers reported significantly higher levels of fatigue (70.3%, compared with 22.1%; $\chi^2 = 37.9$, $p < 0.05$), poor sleep (30.2%, compared with 7.4%; $\chi^2 = 12.7$, $p < 0.05$), and worry about health (57.3%, compared with 41.2%; $\chi^2 = 4.1$, $p < 0.05$). Lastly, a further two-way ANOVA indicated a significant difference in perceived stress from 2003 to 2004 between the two groups ($F_{1,336} = 4.6$, $p < 0.05$), with a decrease over time in low risk front-line workers ($M = 14.8$, $SD = 5.0$), in comparison to an increase over time in high risk front-line workers ($M = 18.6$, $SD = 4.9$) (McAlonan et al., 2017). Therefore, it is possible that front-line workers who were exposed to increased organisational stressors have increased vulnerabilities to developing negative psychological consequences during public health crises. Nevertheless, these results may not explain any possible psychological impacts that may occur to front-line workers who provided care during other public health crises, such as MERS or COVID-19.

In similarity to those who treated infected patients during SARS and MERS, proximity to infected patients was reported to increase the likelihood of developing stress and secondary traumatic stress during COVID-19 (Si et al, 2020; Vagni et al., 2020). Vagni et al., (2020)

explored levels of stress, hardiness, and secondary traumatic stress in Italian front-line workers ($N = 236$) during the COVID-19 pandemic. The sample was split into front-line workers ($N = 140$) and emergency responders ($N = 96$) (Vagni et al., 2020). Of those who were front-line workers, 56.8% ($N = 134$) reported working in direct contact with COVID positive patients during the acute phase (March to June 2020). Significant differences were found between the front-line worker and emergency responders. Whereby, front-line workers reported higher levels of stress ($M = 84.54$, $SD = 15.01$), in comparison to the emergency responders ($M = 69.69$, $SD = 12.02$) ($t(1,235) = 8.60$, $p < 0.01$). Furthermore, front-line workers reported higher levels of secondary traumatic stress ($M = 26.48$, $SD = 4.04$), in comparison to the emergency responders ($M = 23.69$, $SD = 4.27$) ($t(1,235) = 5.06$, $p < 0.01$) (Vagni et al., 2020). Thus, the psychological impact of COVID-19 appears to be similar to those reported during other public health crises e.g., SARS and MERS (Lee et al., 2018; Lin et al., 2006; McAlonan et al., 2007; Styra et al., 2008; Tam et al., 2004). Furthermore, it is possible this may impact levels of resilience, and further create vulnerabilities to trauma.

Son et al., (2019) explored the levels of PTSD and resilience in front-line workers in hospital settings during MERS ($N = 280$). The sample was split into two groups, Health care ($N = 153$), and Non health care ($N = 127$). Findings of a Path analysis indicated that in terms of the magnitude of direct effects, the health care group was significantly more impacted by psychological trauma and perceived risk (HCW group: $\beta = .42$, $p < .05$; Non health care group: $\beta = .17$, $p < .05$). However, in the non health care group, high negative emotional experience increased the likelihood of PTSD (HCW group: $\beta = .17$, $p < .05$; Non health care group: $\beta = .30$, $p < .01$) (Son et al., 2019). Further differences were also found between the groups regarding resilience (measured via willingness to work), and coping ability. In the Non health care group, coping ability reduced perceived risk ($\beta = -.22$, $p < .05$), the likelihood of PTSD ($\beta = -.18$, $p < .05$), and increased willingness to work ($\beta = -.24$, $p < .01$). In contrast, in the health

care group the effect size between coping ability and willingness to work was smaller and was the only factor that impacted resilience ($\beta = .24, p < .01$) (Son et al., 2019).

Fear of contagion and transmission

Front-line workers were reported to have increased susceptibility to enduring psychological distress during public health crises, as a direct result of experiencing fear (Berlanda et al., 2020; McAlonan et al., 2017; Soffer et al., 2010). In total seven studies indicated that fear was experienced by front-line workers during public health crises. This was reported to occur through chronic daily exposure to a virus or disease, through proximity to infected patients, and was amplified by a perception of ineffective personal protective equipment (Berlanda et al., 2020; Kang et al., 2018; McAlonan et al., 2017; Sodeke-Gregson et al., 2013; Soffer et al., 2010; Tzeng, 2004; Vagni et al., 2020). McAlonan et al., (2017) investigated the impact of chronic stress, depression, fatigue, and fear in front-line workers ($N = 176$; high risk, $N = 106$; low risk, $N = 70$). Despite 84% of high-risk front-line workers reporting confidence in infection control measures, compared to 64% of low-risk workers ($\chi^2 = 8.2, P < 0.05$). High-risk front-line workers reported higher levels of fear of social contact, in comparison to low-risk front-line workers (41.7%, compared with 23.5%; $\chi^2 = 5.8, P < 0.05$) (McAlonan et al., 2017). Furthermore, the levels of fear reported were asserted to have contributed to the levels of perceived stress reported by high-risk workers ($M = 18.56, SD = 4.91$), compared to low-risk workers ($M = 14.81, SD = 5.02$) ($F_{1,175} = 18.33, p < .001$).

Similarly, Si et al., (2020) examined the psychological impact of working on the front-line in China during the COVID-19 pandemic on front-line medical workers ($N = 863$). Specifically, to determine the impact of perceived threat (e.g., fear), social support and coping, anxiety, depression, and posttraumatic stress (Si et al., 2020). The findings indicated 74% ($N = 639$) of front-line workers reported high levels of concern about COVID-19, in contrast to

2% who reported less concern ($n= 224$) (Si et al., 2020). Furthermore, 60.8% ($N = 525$) reported being afraid of being infected by COVID-19, and 48.3% ($N = 417$) reported their roles placed them in a high risk of being infected by COVID-19 (Si et al., 2020). Bivariate corrections displayed that those who reported being Nurses were more likely to have anxiety ($\beta= 0.93, p <0.01$). Likewise, Nurses who reported high levels of concern about the outbreak of COVID-19 ($\beta= 1.70, p <0.01$), were more likely to have symptoms indicative of post traumatic stress. Nevertheless, overall levels of concern towards COVID-19 were positively correlated with post traumatic stress ($\beta= 1.22, p <0.01$) and stress symptoms ($\beta= 1.49, p <0.01$). Lastly, perceived threat and passive coping strategies were positively associated with post traumatic stress ($\beta= 0.28, 0.25, 0.29, 0.31, p <0.01$) and depression ($\beta= 0.27, p <0.01$), anxiety ($\beta= 0.22, p <0.01$) and stress ($\beta= 0.29, p <0.01$) (Si et al., 2020). Thus, the fear experienced during the COVID-19 pandemic, as presented by Si et al., (2020) demonstrates how fear exacerbated stress levels and created vulnerabilities to psychological trauma.

Strya et al., (2008) investigated the impact of working in high risk area during a SARS outbreak on Nurses ($N = 248$). The sample was split into high risk ($N = 120$) and low risk ($N = 88$), in which risk was determined by proximity to infected patients (Strya et al., 2008). For those working in high-risk areas, multivariate logistical regression suggested that perception of personal risk ($\beta = .67, p <0.01$), impact on work life ($\beta = .062, p <0.01$), caring for a single patient ($\beta = .127, p <0.01$), and depressive affect ($\beta = 0.79, p <0.01$). contributed to the presence of post traumatic stress. Thus, further demonstrating the impact of working with infected patients and the risks of psychological trauma.

Fear for personal safety emerged as a theme within the qualitative studies obtained. In total, two studies indicated fear was a contributing factor towards developing negative psychological impacts such as, stress, anxiety and psychological trauma (Berlanda et al., 2020; Kang et al., 2018). Fear of infection emerged as a significant concern for Nurses and was

experienced through chronic daily exposure to a virus or disease, through proximity to infected patients, and was amplified by a perception of ineffective personal protective equipment (Berlanda et al., 2020; Kang et al., 2018). Moreover, Nurses reported that this was exacerbated by ambiguity surrounding best practices when treating infected patients. For example, the unclear guidelines and clarity on personal protection and patient care during infectious outbreaks created confusion surrounding 'best practice', instigating concern, stress and fear surrounding overall infection control (Berlanda et al., 2020; Kang et al., 2018). Nevertheless, when Nurses attempted to manage their personal feelings through gaining peer support, this assisted in reducing the fear experienced (Berlanda et al., 2020).

Working conditions

During a front-line worker's 'normal' working duties, individuals reported exposure to differing workplace stressors, which could foster the development of negative psychological impacts (Austin et al., 2017; Forkus & Weiss, 2020; Gibbons et al., 2013; Gruber et al., 2020; Kang et al., 2018). In total, 10 included articles reported differing workplace stressors that front-line workers were exposed to during public health crises. This included, insufficient staffing, unmanageable workloads, increased working hours, lack of social support from both peers and management, decreased job satisfaction, reduced availability to personal protective equipment, poor workplace communication, and poorly organised business structures (Kang et al., 2018; Lee et al., 2018; Lin et al., 2006; McAlonan et al., 2017; Si et al., 2020; Son et al., 2019; Strya et al., 2008; Tam et al., 2004; Tzeng, 2004; Vagni et al., 2019). Furthermore, the impact of these work conditions was also reported in articles where front-line workers were not involved in public health crises. But were involved in front-line services, such as emergency departments, large scale disasters or war zones (Arribas- Garcia et al., 2020; Austin

et al., 2017; Berlanda et al., 2020; Delaney et al., 2018; Forkus et al., 2019; Kaye-Kauderer et al., 2019; Lancaster, 2018; McKinley, 2011; Soffer et al., 2010; Wild et al., 2016).

Mottaghi et al., (2020) examined the relationship between levels of guilt, compassion fatigue and secondary traumatic stress in a sample of Nurses ($N = 300$). Findings indicated a mediating role of secondary traumatic stress between empathy and compassion fatigue (Mottaghi et al., 2020). The levels of stress and compassion fatigue were argued to develop in response to exposure to systemic factors (e.g., increased workloads, shift work), and communicating with patients with severe conditions, which resulted in increased empathy and guilt (Mottaghi et al., 2020). In similarity, McKinley et al., (2020) reported Emergency medical Doctors experienced higher levels of burnout, secondary traumatic stress and lower levels of compassion satisfaction in comparison to any other speciality group. McKinley et al., (2020) examined levels of resilience, professional quality of life and coping in a sample of UK Doctors ($N = 1651$). Findings suggested that Emergency Doctors held higher levels of burnout in comparison to other groups ($F = 6.43, p < 0.01$), which was argued to develop in response to increased exhaustion and stress from long working hours and increased patient numbers (McKinley et al., 2020).

However, Arribas-Garcia et al., (2020) reported that training and exposure to death in the workplace positively impacted levels of resilience, and lead to an increase in compassion satisfaction in a sample of Nurses and Auxiliary Care Technicians ($N = 110$). The findings indicated those with past exposure to death and/or grief in the workplace were more satisfied and resilient (Arribas-Garcia et al., 2020). Nevertheless, individual characteristics were reported to impact levels of compassion fatigue and compassion satisfaction (Arribas-Garcia et al., 2020). Whereby, secondary traumatic stress was positively correlated with fear of death ($r = .44, p < 0.01$), and death avoidance ($r = .32, p < 0.01$). However, secondary traumatic stress was negatively correlated with agreeableness ($r = -.33, p < 0.01$), extroversion ($r = -.37,$

$p < 0.01$), and resilience ($r = -.55$, $p < 0.01$). Thus, suggesting personal characteristics can impact levels of satisfaction in the workplace (Arribas-Garcia et al., 2020). Moreover, exposure to negative workplace conditions (e.g., death), may not consistently result in negative psychological impacts and can promote resilience (Arribas-Garcia et al., 2020).

Working conditions emerged as a theme within the qualitative studies obtained in this review. In total, five studies indicated that working conditions were associated with job dissatisfaction and could interfere with individual perceptions regarding ability to provide high quality care (Berlanda et al., 2020; Delaney et al., 2018; Gibbons et al., 2013; Kang et al., 2018; Wild et al., 2016). In particular, under staffing and increased workloads appeared to play a major role in job dissatisfaction, turnover of staff and quality of work life for those working on the front-line (Berlanda et al., 2020). Berlanda et al., (2020), examined the physical and psychosocial conditions in the workplace on a sample of health care workers ($N = 795$), using qualitative questionnaires shared online. The results suggested that reduced autonomy regarding working hours, reduced managerial support and perceived heavy workloads, impacted perceptions of wellbeing in health care workers (Berlanda et al., 2020). This was argued to increase the vulnerabilities to psychological trauma and result in a reduction in perceived levels of resilience (Berlanda et al., 2020).

Peer support

During a public health crisis, seeking social support to cope with adversity was reported to assist front-line workers in maintaining healthy emotional states, which was effective in reducing distress (Berlanda et al., 2020). Peer support was reported in eight studies as being beneficial in promoting resilience, and/or reducing the impact of psychological trauma and moral injury (Berlanda et al., 2020; Barr, 2017, 2018; Forkus et al., 2019; Kirby et al., 2011; Lancaster, 2018; Si et al., 2020; Tam et al., 2004; Tzeng, 2004). Barr et al., (2018) investigated

levels of stress, compassion fatigue and social support in NICU Nurses ($N = 140$). The findings indicated levels of work stress predicted lower levels of compassion fatigue, however social support mediated the impact of work stress with secondary traumatic stress (Barr, 2017). Similarly, Si et al., (2020) reported perceived levels of social support assisted in reducing negative psychological impacts in a sample of health care workers ($N = 863$) during the COVID-19 pandemic. The findings indicated social support negatively predicted depression ($\beta = -0.064, p < .001$), anxiety ($\beta = -0.074, p < .001$) and stress ($\beta = -0.083, p < .001$). Therefore, further supporting the positive impact of social support in the workplace during public health crises (Si et al., 2020). Furthermore, gaining emotional support from peers was noted to act as an outlet for stress and permitted a safe and understanding environment to express emotions experienced after trauma exposure (Si et al., 2020). Social support may provide front-line workers with an effective tool to cope with stress that may assist to counteract distress and mitigate against the development of trauma (Si et al., 2020). Therefore, further supporting the positive impact of social support in the workplace during public health crises.

Sociodemographic factors

All studies obtained within this systematic review collected demographic information that pertained to age, gender, profession, length of service and/or proximity to infected patients. Of the articles included in this review, 19 collected data on front-line health care workers. Of these, 7 collected data on Nurses, 3 on Doctors, 2 on Paramedics and 1 on Therapists. Furthermore, 2 collected data on War Veterans and 4 on Disaster Relief workers. Pertaining to age, 26 articles collected data. Moreover, 26 articles collected data regarding gender (e.g., males and females), however no articles examined other genders (e.g., non-binary). 3 article collected information concerning ethnicity, and 6 collected data on education and/or length of experience. Other demographics for example, religion, were not collected by any of the

included studies. It is possible this information was not collected as it may not have provided useful information that enabled an understanding of the psychological impact of public health crises and/or working on the front-line.

In total, 3 studies examined differences by gender. Kirby et al., (2011) examined the positive possible outcomes following exposure to trauma in the workplace on a sample of Paramedics ($N = 125$). This study collected sociodemographic information regarding, gender (Females: $N = 40$, Males: $N = 78$), age ($M = 37$, $SD = 10.49$) and length of service (Years: $M = 10$, $SD = 9.32$). Regarding gender, the results indicated significant differences between males and females. Whereby, females reported higher levels of perceived coping ($M = 14.97$, $SD = 5.04$) in comparison to males ($M = 11.97$, $SD = 5.79$) ($t = -2.78$, $p < 0.01$) (Kirby et al., 2011). Furthermore, differences by gender were also reported by Vagni et al., (2020). Significant differences were reported between levels of stress, whereby males reported less stress in comparison to females (Males: $M = 7.96$, $SD = 5.05$; Females: $M = 11.09$, $SD = 5.04$; $t = 3.44$, $p < 0.01$). Moreover, levels of reported COVID-19 stress was also higher in females than in males (Males: $M = 14.24$, $SD = 3.77$; Females: $M = 15.62$, $SD = 3.28$; $t = 3.77$, $p < 0.01$). In the emergency group, females display higher levels of physical stress (Females: $M = 9.41$, $SD = 4.70$; Males: $M = 6.94$, $SD = 3.99$; $t = 2.78$, $p < 0.01$), and emotional stress (Females: $M = 11.52$, $SD = 4.70$; Males: $M = 9.79$, $SD = 2.86$; $t = 3.20$, $p < 0.01$). However, males reported perceptions of greater inefficacy decisional stress (Males: $M = 13.37$, $SD = 2.34$; Females: $M = 12.07$, $SD = 2.46$; $t = 2.65$, $p < 0.01$). Nevertheless, McKinley et al., (2020) reported no significant difference by gender in levels of reported burnout. Thus, continued investigation regarding gender differences during public health crises is of clear value.

Tam et al., (2004) reported age increases the susceptibility to developing negative psychological consequences during public health crises. Tam et al., (2004) investigated the vulnerability factors of stress and distress in front-line workers ($N = 652$) in Hong Kong during

a SARS outbreak. The results suggested that demographic risk factors did result in high levels of job-related stress in those with a median age of 33 (odds ratios, 1.46, 95% confidence interval, 1.01 – 2.10, $p < 0.05$), being a nursing professional (odds ratios, 2.47, 95% confidence interval, 1.67 – 3.65, $p < 0.05$), having direct contact with SARS patients (odds ratios, 1.92, 95% confidence interval, 1.36 – 2.71, $p < 0.05$) and poor reported physical health (odds ratios, 4.01, 95% confidence interval, 1.79 – 9.01, $p < 0.05$) (Tam et al., 2004). Nevertheless, demographic factors such as, years in service, age, gender, and marital status did not affect any reported levels of psychological distress in any of the other articles included. Thus, suggesting that working conditions may impact front-line workers psychological health during a public health crisis.

6.4 Discussion

A number of factors emerged in the narrative synthesis conducted in this systematic review, these were 1.) *Promoting the development of psychological trauma*, 2.) *Fear of transmission and contagion*, 3.) *Working conditions*, 4.) *Peer support* and 5.) *Sociodemographic factors*. The results of this systematic review indicate that within the remit of a front-line worker's normal daily work environment, individuals are susceptible to developing acute stress responses or psychological trauma due to exposure to emotional and situational stressors (Berlanda et al., 2020; Bryan et al., 2018; Kang et al., 2018; Lavoie et al., 2020). Experiencing elevated levels of stress for protracted periods can have wide-ranging effects such as burnout, compassion fatigue and psychological trauma (Berlanda et al., 2020; McKinley et al., 2020; Wild et al., 2016), which can ultimately affect a front-line workers ability to deliver effective care to patients. Research on large-scale public health crises is limited, however, the available literature indicates a clear psychological impact can occur in those who work in public facing roles (Si et al., 2020; Soffer et al., 2009; Styra et al., 2008).

This systematic review indicated that healthcare workers, for example, face a plethora of challenges during infectious virus outbreaks, which have been documented during the Ebola epidemic (Van Bortel et al., 2016), Severe acute respiratory syndrome (SARS) epidemic (Styra et al., 2008; Tam et al., 2004; Tzeng, 2004), and Middle East Respiratory Syndrome (MERS) (Kang et al., 2017; Lee et al., 2018; Lin et al., 2006; Son et al., 2019). Moreover, this systematic review was able to ascertain that research is emerging regarding the COVID-19 pandemic (Si et al., 2020; Vagni et al., 2020).

During infectious viral outbreaks, increased pressures are placed on front-line workers and significant changes can occur to normal working conditions. Front-line workers were reported to be faced with increased patient numbers, limited availability of personal protective equipment, insufficient staff levels, and limited disease specific evidence to guide appropriate treatment (McCain et al., 2017; Styra et al., 2008; Tzeng 2004). Moreover, front-line workers were reported to experience emotional distress, constant guilt, poor wellbeing, dissociative experiences, and discomfort due to personal protective equipment in response to exposure to infected individuals (Berlanda et al., 2020; Lee et al., 2020; Son et al., 2010; Tzeng, 2004). These factors were reported to amplify the stress experienced by front-line workers (Vagni et al., 2020; Wild et al., 2016), therefore highlighting the amplified risk of stress developing in front-line workers during public health crises. However, it is important to note that increased stress is reported to be a common workplace threat for those working on the front line. Nevertheless, the findings of this review suggest that this risk is amplified during public health crises.

Associations were also reported between high levels of stress, depression, anxiety, and PTSD after prolonged exposure to infectious disease outbreaks (McAlonan et al., 2007; Si et al., 2020; Vagni et al., 2020). The results of this review indicated that increased workplace stress, alongside fear of transmission and limited disease specific knowledge can exacerbate

the pre-existing vulnerability factors of psychological trauma (McAlonan et al., 2007; Si et al., 2020; Tzeng, 2004; Vagni et al., 2020). Furthermore, fear was highlighted as a significant factor that can contribute towards the psychological consequences faced by front-line workers (Berlanda et al., 2020; Soffer et al., 2010; Son et al., 2019). As such, it is certainly possible that fear may promote the development of trauma in front-line workers. The possibility of infection is a common threat within health care, however, front-line workers were reported to be susceptible to enduring psychological distress in direct response to experiencing fear (Son et al., 2019; Styra et al., 2008; Tam et al., 2004). Fear was reported to be a factor that contributed towards the development of trauma (Si et al., 2020; Son et al., 2019; Tam et al., 2004). Furthermore, during public health crises, fear was reported to be experienced through direct exposure, and/or being in close proximity to a virus or disease, having a limited understanding of the pathogen and was reported to be amplified by the perception that personal protective equipment may be ineffective (Berlanda et al., 2020; Sodeke-Gregson et al., 2013). Nevertheless, fear may be induced by other factors (e.g., media outlets) and promoted outside of the workplace. Thus, caution is needed when measuring fear in the workplace to ensure the levels of fear captured are those that occur while at work. It is also important to note that proximity to infected individuals did not consistently result in negative psychological consequences, therefore fear may not consistently promote the development of trauma.

The risk of trauma development in the workplace was reported to be reduced by positive workplace influences (Berlanda et al., 2011; Soffer et al., 2011; Styra et al., 2008). For example, during the SARS epidemic, increased contact with infected patients was found to lower the levels of distress reported (Styra et al., 2008). It is possible this occurred in response to effective coping, whereby repeated exposure without infection may have boosted personal confidence in clinical skills and resulted in a reduction to distress and boosted self-efficacy (Pearlin, 1978). Nonetheless, caring for infected patients during virus outbreaks, was reported

to increase the incidence of traumatic stress occurring (Austin et al., 2017; Lee et al., 2018; Lin et al., 2007; Si et al., 2020).

Front-line workers were reported to experience extreme levels of fear towards the transmission of the virus to family, friends, and colleagues (Kang et al., 2018; Tam et al., 2014). Moreover, front-line workers reported experiencing low levels of perceived influence towards overall infection control (Kang et al., 2018). It can be theorised that if fear is experienced over protracted periods, it may restrict the ability to cope and reduce the ability to develop and or utilise levels of resilience, due to altered perceptions of individual competence (Kang et al., 2018; Lee et al., 2020). Confidence in knowledge and personal abilities are vital when making critical decisions regarding treatment and end-of-life decisions during public health crises, which may cause trepidation of providing potentially ineffective care (Elpern et al., 2005). Over time, this can negatively impact individuals and initiate compassion fatigue, burnout, and moral injury (Austin et al., 2017; Gibbons et al., 2013). Nonetheless, there is limited information available which identifies how exposure to morally distressing events may occur in public health crises and how this can initiate moral injury.

The findings of this systematic review suggest that moral distress was reported to arise during situations in which adherence to organisational policies and procedures caused dissonance between what was perceived to be in the best interest of patients, and organisational policy (Austin et al., 2017; Lancaster, 2018). For example, as reported by Austin et al., (2017), prescribing treatments or making end of life decisions based on shortage of equipment (e.g., ventilators), was reported to expose front-line workers to making decisions that created feelings of ambivalence. Moreover, front-line workers were reported to feel compelled to act against their own personal code of morals when providing care to patients (Austin et al., 2017; Forkus et al., 2019; Gibbon et al., 2013). However, it is possible that the reported levels of suspected moral distress may have occurred for other un-measured reasons, for example witnessing others

engage in acts that violated moral codes of conduct (Cartolovni et al., 2021). As such, continued investigation in this area is of clear value, to consider any factors that may contribute to or mitigate the development of moral distress.

Increased workloads, low levels of self-compassion and empathy were reported to increase the potential to endure moral injury after exposure to morally distressing experiences (Austin et al., 2017; Focus et al., 2019; Gibbons et al., 2013). However, if front-line medical workers adopt ‘moral balance’ (an ethical framework designed to aid in moral decision making) (Harvey & Gardener, 2019), when making ethical decisions it may aid towards rendering difficult decisions, protecting patients and moderate against the risk of moral injury. Therefore, these results suggest moral distress and injury can develop in front-line workers who provide emergency care. In spite of this, it was reported that front-line workers who are exposed to morally distressing experiences that occurred alongside guilt, emotional distress and/or limited personal protective equipment reduced a front-line workers ability to foster resilience (Forkus et al., 2019; Xiao et al., 2020). Nevertheless, protective factors, such as social support can promote resilience during public health crises (Berlanda et al., 2020).

Experiencing social support in the workplace was reported to mitigate against the likelihood of trauma and moral injury developing (Berlanda et al., 2020). Receiving social support in the workplace was reported to act as a protective factor against the development of trauma, enhance physical health, encourage coping, and promote personal growth (Arribas-Garcia et al., 2020; Forkus & Weiss, 2020; Mottaghi et al., 2020; Soffer et al., 2011). Seeking support from peers was reported to alleviate levels of trauma and provided a supportive environment (Arribas-Garcia et al., 2020; Forkus & Weiss, 2020; Mottaghi et al., 2020; Soffer et al., 2011). Wherein front-line workers were reported to be able to express the emotions experienced after trauma exposure, relieve distress, receive support, and maintain healthy emotional states (Berlanda et al., 2020; Si et al., 2020). Moreover, receiving support from

management was further reported to be beneficial in reducing the risk of trauma developing in front-line workers (Styra et al., 2008; Vagni et al., 2020).

Receiving appraisal and informational support from management was reported to permit front-line workers to gain useful information for self-evaluation and encouraged personal growth in the workplace (Kang et al., 2018). Management support has previously been identified to predict lower levels of burnout and increases compassion satisfaction (Soffer et al., 2010). Front-line workers were reported to be able to engage in professional development and receive reassurance, which promoted job satisfaction (Berlanda et al., 2020; Forkus & Weiss, 2020; Hernandez et al., 2010). As such, social support may provide front-line workers with an effective tool to cope with stress, counteract distress and trauma, and promote resilience (Berlanda et al., 2020; Kang et al., 2018; Sodeke-Gregson et al., 2013).

In front-line workers, resilience was reported to be multi-faceted and was promoted in response to trauma (Gonzalez et al., 2019). Whereby, facing fears (Tzeng, 2004), attending to physical and emotional wellbeing (Kirby et al., 2011), developing active coping skills (Son et al., 2019) and a desire to help (Kaye-Kauderer et al., 2019). Furthermore, resilience was reported to be a protective factor against burnout and compassion fatigue in front-line workers during public health crises (Delaney, 2018; Gonzalez et al., 2019). Despite this, the levels of resilience in front-line workers during public health crises is reported to be lower than in those who face adverse events (Ferreria et al., 2020). Moreover, resilience did not consistently mitigate the levels of reported trauma. It is possible this may occur in response to front-line workers facing additional stressors outside their *normal* job roles for example, fear of transmission to family and friends while seeking social support (Ferreria et al., 2020). As such continued investigation into *how* resilience may be promoted is needed to assist in the prevention of harm in future public health crises.

Nevertheless, resilience was reported to be associated with positive experiences and appraisals after enduring challenging experiences (Gonzalez et al., 2019; Tugade et al., 2004). It is possible there may be multiple factors that affect the development or maintenance of resilience during public health crises, for example volunteering, as reported by Kaye-Kauder et al., (2019). Moreover, resilience may develop vicariously by witnessing patients recover or through witnessing others display resilience (Hernandez et al., 2010). Therefore, as evidenced by this review resilience can develop in front-line workers during public health crises and can aid in compassion satisfaction, mitigate against burnout, and compassion fatigue. However, the specific factors which underpin its development require further investigation to determine how to best support front-line workers and protect against the development of trauma and moral injury.

As demonstrated within this systematic review front-line workers can endure a plethora of psychological consequences when providing care and assistance during public health crises (Vagni et al., 2020). Psychological trauma can develop in individuals who perceive themselves to have low workplace support and limited access to personal protective equipment. Likewise, can develop in those who endure augmented demand while providing care to increasing patient numbers (Berlanda et al., 2020; Ferrera et al., 2020; Soffer et al., 2010; Tam et al., 2004; Wild et al., 2016). However, the exact causation of stress, distress and trauma did vary throughout all included articles. For example, fear was reported to increase the susceptibility to trauma, however the mechanisms of fear did vary. Therefore, continued investigation into the underlying causes of trauma during public health crises is of clear value. Moral injury was suggested within this review to develop following exposure to decision making that induced feelings of ambiguity and instigated dissonance between policy guidance and personal morals (Chau et al., 2007; Forkus et al., 2019). However, the articles contained within this review that examined moral distress and injury were limited. Moreover, no articles examined moral injury

during public health crises and were limited to war veterans and/or health care settings. Nevertheless, the results indicate that moral distress can develop in front-line workers outside of war zones. As such, continued investigation into moral injury in front-line workers will benefit psychological understanding of this concept. Lastly, resilience was found within this review to aid in the mitigation of psychological trauma and moral distress by reducing the impact of burnout and compassion fatigue (Austin et al., 2017; McKinley et al., 2020; Son et al., 2019). Furthermore, was highlighted to develop in response to gaining social support and by fostering autonomy (Kang et al., 2018). However, resilience was not consistently measured in all obtained articles, as such it is difficult to ascertain if resilience will consistently develop following adversity on the front-line during public health crises. Moreover, if resilience is able to enable front-line workers to resist and/or mitigate against psychological trauma and moral injury. Nevertheless, the findings of this review suggest that front-line workers who have access to positive social support are less susceptible to enduring moral injury, trauma or developing vicarious trauma following exposure to traumatic or morally injurious events during public health crises (Gonzalez et al., 2019).

6.5. Implications and recommendations

A number of implications can be drawn from this systematic review. Firstly, workplace support has been identified as a protective factor against the development of psychological trauma, moral injury and can enable self-compassion and resilience to foster (Kang et al., 2018; Soffer et al., 2010). Therefore, it is recommended organisations could consider providing additional training opportunities, professional development and regular supportive appraisals to front-line workers throughout public health crises. This will encourage front-line workers to self-appraise and acquire job satisfaction, reduce the risk of trauma, thereby enabling a higher quality of care to be provided. Additionally, supportive groups should be encouraged in order

to provide peer to peer support. This may assist in the alleviation of distress after experiencing potentially traumatic events, promote staff belonging and foster individual wellbeing.

Lastly, it is recommended future research aims to identify and understand the link between moral injury and trauma. To date, the research in this area is limited, however the current findings indicate that moral injury and psychological trauma may present with different signs and symptomologies (Gibbons et al., 2013; Kaye-Kauderer et al., 2019; Xiao et al., 2020). Furthermore, the factors that underpin trauma and moral injury are suggested to coexist and likely occur within the same event. As such, continued investigation in this area is beneficial in providing an understanding of the development of trauma and moral injury during a public health crisis. In addition, research that identifies any relationship between these factors, and how resilience may assist in the mitigation of trauma and moral injury. May assist in reducing the psychological impact of providing care during any future public health crises.

6.6. Limitations

It is certainly expected this systematic review has neglected research which was published after data collection and analysis was conducted. It is, therefore, possible there may be contemporary advancements in the understanding of trauma and moral injury that provide valuable insights into its development during public health crises are not included in this review. In addition, this systematic review does not capture any literature that was published from 2020 onwards. As such, this limits its ability to reflect the experiences of front-line workers during the COVID-19 pandemic. However, efforts have been made in this program of studies to keep abreast of the literature, and to include key findings and considerations in the later presented studies. Moreover, it will consider recent developments within the discussion chapters to ensure the later presented studies are grounded in the most recent understanding of the impact of COVID-19 on front-line workers.

This study did not adopt any key words to capture front-line workers and did not gather data regarding the nature, severity, or type of exposure to potentially traumatic events. This limits this studies ability to determine what accounted as a traumatic event during public health crises, and what type of workers may have been deemed as ‘front line’. Nevertheless, psychological trauma is argued to be a subjective experience (van der Kolk, 2011), and therefore the nature of exposure was not a necessary component of this study. However, gaining data that pertains to exposure to trauma will enable a greater understanding of how trauma can develop in front-line workers during any possible future public health crisis.

A worldwide health crisis has not been captured within contemporary research. As such, the data captured within this review was drawn from the literature conducted during epidemic and/or public health emergencies. A pandemic may introduce unknown factors which may contribute towards or decrease the possibility of psychological trauma developing thus, the results may not provide a full understanding of the experiences and subsequent consequences front-line workers faced during a pandemic.

A final consideration in this review reflects on the data acquired regarding moral injury. There is a significant lack of research investigating moral injury in healthcare workers within the remit of their normal role. Likewise, limited literature is available that provides an understanding of moral injury in anyone who has not encountered military based action. As a result, the data obtained on moral injury must be considered with scepticism until further research is able to confirm and identify its presence. Furthermore, that ascertains how it can aid towards the development of trauma and resilience during public health crises. As a result, the findings within this review will provide the foundation for the subsequent studies within this thesis and influence the measures utilised in the final study.

CHAPTER SEVEN

LIVED EXPERIENCES OF FRONT-LINE WORKERS AND THEIR FAMILIES DURING THE COVID-19 PANDEMIC.

7.1. Structure of this chapter

This chapter presents a qualitative analysis of the lived experience of front-line workers and their families during the COVID-19 pandemic. Two qualitative studies were conducted. Part A captures the family members of front-line workers, and Part B the lived experiences of health and/or social care front-line workers. Both present the methodology and results, concluding with a discussion of both components.

7.2. Study Two Part A: Families of front-line workers during the COVID-19 Pandemic.

7.2.1 Aim

Semi structured interviews were conducted in order to ascertain how family members of front-line workers coped and supported their loved ones during the COVID-19 pandemic.

7.2.2 Research Questions

1. To investigate and understand how families supported front-line workers during the COVID-19 pandemic.
2. Explore and identify risk factors associated with psychological distress in front-line workers families and how it may lead towards the development of vicarious trauma during the COVID-19 pandemic.

3. Explore and identify protective and vulnerability factors that can inhibit the development of trauma and/or enhance resilience in front-line workers families during the COVID-19 pandemic.

7.2.3. Participants

Study two A utilised individuals aged 18 and over who had at least one family member working on the front-line during the COVID-19 pandemic. Families were defined as a social group of individuals who share a strong emotional bond. Members can be connected through marriage, birth, adoption, or close friendship. Close friendships were included to enable those who may rely on friendships in times of distress. It includes those who may not have families, or those who do not perceive themselves to have close and strong emotional links with their biological family. This definition was chosen to enable any avenues of family support to be gained, and in response to the restrictions of COVID-19. Whereby, families were separated (e.g., parents and adult children), and unable to interact in person during periods of enforced lockdown during the COVID-19 pandemic. Family members of all front-line services (e.g., health and social care, public services, education, and childcare, food and retail, and transport and utilities), were eligible to participate in this study. This decision was made to permit a wider understanding of the lived experiences of all those providing care to any front-line worker/s during the COVID-19 pandemic.

Twenty-one participants were recruited online using social media sites (Facebook and LinkedIn). Ninety percent identified as female ($n = 19$) and 10% identified as male ($n = 2$), with ages ranging from 21 to 66 (mean age of 36). This study was advertised worldwide using social media sites. Of those who chose to participate, 95% of the participants reported to reside within the United Kingdom ($n = 20$) and 5% resided internationally ($n = 1$). In total, the participants reported twenty-six front-line occupations including Health and Social care (31%),

Judicial (27%), Education and Childcare (14%), Food and Retail (12%), Funerary (8%) and Building and Logistics (8%). Furthermore, sixty-one percent reported they were front-line workers themselves ($n= 13$). Table Two displays the demographic information of the participants.

Table 2

Demographics characteristics of participants include sex, gender and reported front-line role/s by the families of front-line workers.

Demographic Characteristic	N	%
Gender		
Female	19	90%
Male	2	10%
Sexuality		
Heterosexual	18	85%
Homosexual	3	15%
Marital status		
Single	3	14%
Married	4	19%
In a relationship	14	67%
Relationship to front-line worker/s		
Spouse	13	50%
Parent	4	14%
Child	3	12%
Sibling	3	12%
Friend	3	12%
Reported front-line role/s	26	
Total Health care and Social care	8	31%
Doctor	2	8%
Nurse	1	4%
Paramedic	1	4%
Health Care assistant	1	4%
Operating department practitioner	1	4%
Residential support workers	1	4%
Community care worker	1	4%
IT Technician	1	4%
Total Judicial	7	27%
Detective	1	4%
Firearms officer	1	4%
Police officer	2	8%
Probation officer	1	4%
Domestic abuse practitioner	1	4%
Community anti extremism officer	1	4%
Total Education and Childcare	4	14%
Teacher	2	8%
Teaching assistant	1	4%

Demographic Characteristic	N	%
Childcare provider	1	4%
Total Food and Retail	3	12%
Food Retail manager	1	4%
Customer services team leader	1	4%
Retail worker	1	4%
Funerary	2	8%
Funeral director	2	8%
Buildings and Logistics	2	8%
Buildings worker	1	4%
HGV driver	1	4%

Note: Three participants reported having two family members and one reported having three family members who were in front-line roles.

7.2.4. Procedure

Ethical approval was granted by the University of Central Lancashire in January 2021. Recruitment occurred online only using a poster that was shared on social media sites. These sites were: Facebook, LinkedIn, and X (previously Twitter). These sites were chosen due to high user numbers and the ability to reach audiences worldwide. However, data collection occurred predominantly using Facebook. The researcher joined public Facebook ‘buy and sell’ pages to share the poster publicly. Recruitment began in January 2020 until May 2021.

In total, 31 individuals expressed interest in this study via email. However, 10 opted to not participate in the interviews after receiving the information sheet from the researcher. The reason for this choice is unknown as the researcher did not have ethical permission to request this information. Potential participants were asked to contact (via email) the researcher to register interest in the study. At this point, the researcher emailed the potential participant with a copy of the information pack and a consent sheet and interview dates were scheduled.

Using Microsoft Teams, semi-structured qualitative online interviews were conducted individually during the third coronavirus national lockdown in England (January to June 2021). Before the interviews commenced, all participants were shown a consent sheet on screen (via the screen sharing function on Teams). Each consent statement was read out loud by the

researcher to the participant before asking for verbal consent. Participants were asked to turn off their cameras throughout the interviews, to protect their identities, however the interviewer's camera remained on. After the interview finished the researcher requested verbal consent again to use the information provided. All materials used in this study as presented in Appendix Three.

This study did not screen participants for trauma or resilience. This was chosen for two reasons. Firstly, this study sought to investigate the subjective experiences of trauma and resilience in the families of front-line workers, following an examination of the literature as presented in earlier chapters. As such, screening for the presence of trauma and resilience would not provide an understanding of the individuals' subjective experience of trauma, or their perception of their ability to be resilient during COVID-19. It would also risk limiting the research to those who already perceived themselves as traumatised when the aim was to gain a broader understanding that was not just linked to a 'clinical' group. Secondly, the COVID-19 pandemic was theorised to induce trauma in those working on the front-line (Diamond & Woskie, 2020). As such, this study aimed to capture how the families of these individuals provided support to their loved ones. Measuring pre-existing levels of trauma and/or resilience would not provide data that pertained to these research question. Instead, participants were asked to provide their own definition of trauma and resilience to gauge individual understanding of these concepts. This was chosen to enable an understanding of how the reaction and response to trauma maybe subjective, as suggested by Roseman (2013), Figley and Kiser (2013), Kurtz (2018) and van der Kolk (2015). Furthermore, this approach enabled an understanding of the subjective experiences of the families of front-line workers during COVID-19.

The interview schedule contained twenty-eight questions, developed after an examination of the psychological literature, and in response to Study One's findings. The

interviews lasted 46 minutes on average, with the longest interview lasting 2 hours and 32 minutes. Interviews were video record using Microsoft Teams and later transformed into an audio file using VLC player, and the original video was then deleted to protect participants identity. The audio data was transcribed by the researcher (Caroline Mead). The interviews were transcribed verbatim and anonymised to remove any identifiable characterises (e.g., removing gender). Table three displays the questions asked during the interview.

Table 3
Interview schedule Study 2 Part A

Interview questions

1. Can you tell me the job title and the sector of the front-line/key worker you are related to? *Please do not tell me the organisations name the person works within only the sector, i.e. health care, social care etc.*

2. Can you please tell me your age? *You do not need to answer if you prefer not to.*

3. Can you please me your gender? *You do not need to answer if you prefer not to.*

4. Can you please tell me your relationship status? *You do not need to answer if you prefer not to.*

5. Can you please describe yourself as a person? *What do you feel are your strengths and what do you feel you're not as good at?*

6. What does the term 'traumatic experience' mean to you? *How would you define it?*

7. How would you define a traumatic reaction?

Interview questions

8. How do you feel about the trauma front-line workers may have been exposed to during the COVID-19 pandemic?

9. During the pandemic, has your relative/s been exposed to trauma whilst at work?

10. During the pandemic has your relative/s ever confided in you about their experiences at work? *If so, how did this make you feel? If not, can you tell me why?*

11. Do you think they have been affected by this pandemic? *Have they struggled? If not, why do you think this is? If they were able to cope, why do you think this was?*

12. What does the term 'wellbeing' mean to you? How would you define it?

13. Can you tell me how you have supported your relative/s during difficult times throughout the pandemic? *Has there been any difficulties? Have you found anything worked well?*

14. During the COVID-19 pandemic can you tell me about how you have supported or boosted your relative/s wellbeing? *Have you found anything worked well? Has there been any difficulties?*

15. Have you used any form of technology to communicate and support your front-line/key worker during the pandemic? *What did you use and why did you choose it?*

Interview questions

16. Do you feel front-line/key workers have been/are offered enough support during the pandemic? *If so, what support do you think they got, if not why?*

17. During the pandemic, have you had any personal experiences with stress or trauma? *If yes, how did you cope with the stress or trauma? If no, why is this, how you protected yourself from harm? -If not move onto Q20.*

18. Thinking back over the last year to the beginning of the COVID-19 pandemic, which traumatic events have caused you the most distress?

19. What do you remember of this event? How do you feel about it now? How have you come to understand this experience?

20. How much do you think this event impacted your life? *Positively? Negatively? Can you tell me how you have coped with this?*

21. During the COVID-19 pandemic have you sought emotional support from those around you? From another family member? Or the relative/s working on the front line? *If so, what support did you receive? If not, why did you not seek support?*

22. Can you tell me about the type of things you have done to support yourself and your wellbeing during the pandemic?

23. During the COVID-19 pandemic have you been fearful towards your relative/s catching the virus? Or fearful towards them passing it to you? *If yes, can you tell me what made you afraid. If no, why?*

Interview questions

24. During the COVID-19 pandemic, how do you feel you coped during the first and second lockdowns? *If you coped well, can you tell me what you did that helped you? If not, can you tell me why you think you did not cope well.*

25. What does the term 'resilience' mean to you? How would you define it?

26. Do you feel you coped better or worse with day to day life as a result of the COVID-19 pandemic? Have your experiences affected your ability to cope with daily stress or trauma? *If so, why do you think this? If not, can you tell me why you think this?*

27. How do you think your experiences with the COVID-19 pandemic have affected your ability to cope with new stress or trauma in the future?

28. Thinking back to the second lockdown which began in November 2020, did you feel prepared to handle another lockdown as a result of your experiences in the first lockdown?

29. Before we end, is there anything else you would like to say that you feel has been missed?

7.2.5. Analysis

A Thematic Analysis (Braun & Clarke, 2006) was adopted as it was deemed appropriate to identify patterns in the data and extract general themes from the participants lived experiences. NVivo was used to store, manage, and identify themes based on the six-phase process as suggested by Braun & Clarke (2006). This was: 1). Familiarisation with the data, 2). Produce initial codes, 3). Identify themes in the codes, 4). Review the identified themes, 5). Define and name the themes, and 6), Produce final results (Braun & Clarke, 2006). Step one

involved printing and reading physical copies of the transcripts several times to ensure the researcher was familiar with the data. The transcripts were uploaded to NVivo during step two, and initial codes began to form based on patterns that emerged in the data. In step three the codes were classified into themes and later reviewed in step four. At this point, stage three and four were conducted several times to ensure the themes were an accurate representation of the data set. Following this, the themes were named in step five and the themes were then inter-rated for reliability by a second researcher (King, 2004). The second researcher was provided with 10% of the transcripts ($N = 3$) and an overview of the themes. A meeting was held in September 2021 with the inter-rater to discuss the themes. The inter-rater agreed with the proposed themes and suggested an additional sub theme. After discussion, consensus was obtained on the final themes. The final step was producing the final results.

7.2.6. Definitions of trauma and resilience provided by participants.

All participants provided a definition of their understanding of psychological trauma. Some variations were found in the words chosen to describe trauma (e.g., Distressing, upset, stressful, emotionally painful). However, all participants reported a traumatic experience as a life challenging event that created significant distress that could impact daily life. For example, Participant H stated,

“An event that is devastating I suppose. Its stressful, hurtful, unusual and someone would feel grief, anxiety, be angry or be tearful. It could just shut you down emotionally so that you do not feel anything. You could withdraw or have nightmares and kind of relive it over, and over, and over again. It could be triggered by certain events”
[Participant H].

Furthermore, families of front-line workers also reported very similar definitions of resilience. This included the ability to ‘bounce back’, ‘being able to cope in a different situation’ and ‘mental strength’. For example, Participant O reported,

“It is a strength. To me it’s a mental strength of coping that you have through experiences, and it’s built up over time” [Participant O].

7.2.6. Results

This section provides the results of the thematic analysis conducted for part A. Seven superordinate themes emerged that provided an insight into the lived experiences of family members of front-line workers during the COVID-19 pandemic. These were, 1.) *Elevated stress, including aggravation of pre-existing challenges*, 2.) *Enhancing wellbeing by using time productively*, 3.) *Unhelpful coping emerging due to restrictions*, 4.) *Connecting with nature to improve wellbeing*, 5.) *Fear of transmission of the virus*, 6.) *Psychological cost of caring*, 7.) *Benefits and negatives of online communication*. These themes are presented next.

Theme One: Elevated stress, including aggravation of pre-existing challenges.

All 21 participants experienced significant stress as a direct result of changes to their daily lives due to the COVID-19 pandemic. The reduction in social movements created new problems families had not faced before such as, being a teacher and/or trying to work from home. Moreover, for those who had pre-existing difficulties and stress before the onset of COVID-19, the pandemic was reported to amplify this stress. This theme incorporates three subordinate themes, which encapsulates the different causes of stress reported by all participants during the COVID-19 pandemic, and are presented as follows:

Subordinate One: Uncertainty about the future.

Families reported the COVID-19 pandemic instigated new stress due to uncertainty about the future. Families reported the stress of not knowing when the pandemic would end, or when restrictions would be lifted created significant levels of stress. For example, Participant E reported,

“Not knowing what I could do, or when I could do it was stressful. I am a problem focused copier. I cope by fixing things. I couldn’t fix COVID, and all I could do was wait. The not knowing when it would end was very stressful” [Participant E].

Furthermore, the levels of stress experienced were reported to be amplified by not being able to change their personal circumstances, Participant E added,

“You felt helpless because you couldn’t do anything. I found not being able to help myself was very stressful” [Participant E].

Subordinate Two: Unfamiliarity with home working and schooling.

Families reported unfamiliarity with home-working and/or home schooling caused them significant stress. For parents, the role of educator created negative affect due to feelings of inadequacy, a perceived inability to teach, and time constraints due to concurrent homeworking. These factors reduced an individuals’ ability to support their wellbeing and resulted in a perceived reduction in their ability to be resilient. One individual stated:

“I think I felt stressed. Probably a lot of the time. Constantly, constantly stressed and constantly worrying, which is not sort of what I'm like generally. I was over thinking and over worrying, which obviously is a constant stressor” [Participant A].

Another individual recounted the stress experienced:

“I’ve been stressed. Well, it's not a big stress, it's just the worry of everything. I was very worried all the time” [Participant D].

Subordinate Three: Difficult and challenging life events.

The pandemic was reported to alter and amplify any pre-existing challenges faced by the participants during times of difficulty, which created additional stress. For example, as a result of the imposed lockdowns that were intended to limit social movement, normal services such as, funeral care and post-natal care were extremely reduced. Participant U's personal circumstances (for example) were aggravated by the pandemic, causing significant stress, i.e.:

“I gave birth before any COVID restrictions came in and before we really even were talking about it in this country. But, then all of the post-natal care stopped and then we had none. I had a very traumatic birth, so the fact that then my child wasn't being weighed at all, and no one seemed to care that my child wasn't being weighed, was very, very stressful” [Participant U].

Theme Two: Enhancing wellbeing by using time productively.

In response to the enforced national lockdowns 81% of participants reported the additional time spent at home enabled them to explore their interests. A range of hobbies were disclosed, such as baking, exercising, reading, gardening and crafts. The engagement in hobbies was helpful in reducing stress and contributed towards improving mental health. Families reported feeling they used their time productively and it enabled an accessible means of becoming more creative. As a result, were able to spend time completing tasks they enjoyed. This boosted self-esteem, increased motivation and enhanced wellbeing. One individual stated:

“I've really thrown myself into baking. One, because I love cake and two, because it's been a good distraction. So yeah, I think it's just been something to focus on really, instead of just sitting there thinking about the fact that we've got really nothing else to do” [Participant N].

Similarity, another individual reported engaging in hobbies supported their wellbeing:

“I read a lot of books in my free time. It sort of just took over the stress in my mind, and I was able to think of things other than COVID. I was able to focus on those books and relax” [Participant Q].

Furthermore, mindfulness was beneficial in enhancing well-being:

“I brought tranquilly into my home. I started meditating more. I started doing more yoga. I just started doing more grounding and more lavender baths. I just started being a lot more mindful” [Participant L].

Theme Three: Unhelpful coping emerging due to restrictions.

Families reported experiencing elevated levels of stress and a reduced ability to rely on previous coping strategies, such as physical social support. This was reported by 71% of the participants. In response, families reported adopting unhelpful coping strategies in order to alleviate the stress endured. An increase in alcohol consumption and unhealthy eating were commonly reported, for example:

“Yeah, so that's how I dealt with lockdown, drinking and binge eating on food. I felt that I was always looking forward though, so then it was like, wait, hang on a minute. Yes, this is stressful. It's not very nice, it's been traumatic. Yes, I feel better because I had a drink. But then you wake up in the morning and then you don't feel better and then you go through it all again” [Participant B].

Another individual stated utilising alcohol and comfort eating in an effort to cope:

“I won't lie about some very unhelpful coping strategies. I've been drinking a lot more wine than I should and comfort eating all the wrong things, and you know, sort of trying to ignore problems, I suppose” [Participant E].

Additionally, the consumption of alcohol was reported to help with sleeping:

“I'm not like an alcoholic, but I've definitely been drinking like two bottles of wine a week, just because I feel it helps me sleep better because otherwise, I'd just be up all night worrying about things” [Participant D].

Theme Four: Connecting with nature to improve wellbeing.

All participants reported enjoying spent time connecting with nature during the COVID-19 pandemic. As a direct result of the calming and peaceful environment of nature, individuals directly benefitted via a reduction of the physiological and psychological consequences of stress. Increased exercise promoted physical wellbeing and the outdoor atmosphere altered the levels of stress inducing emotions such as irritability, anxiety and guilt, to calm, hope and joy. One participant stated:

“Going for a walk, I think that's the best thing that you can do because, you know, it's so nice to be out and about and not just sat in the same four walls all the time” [Participant N].

Similarly, another stated:

“I was at my allotment on Sunday and it's amazing how I felt so much different from being outside on the Saturday in my garden. It's like your inner self is recharging. It makes one hell of a difference” [Participant O].

While in nature, family units seemingly benefited from a decrease in arousal. This promoted stress recovery and improved hedonic wellbeing, appearing to protect families against psychological distress. The emotional bonds and susceptibility to contagion of emotions encouraged the shared absorption of the stress-reducing properties of nature, e.g.:

“So, my partner often will say let's go for a walk. Especially at the weekend and we will get out for an hour. I'm often, at first, make out like I really can't be bothered and

sort of say no. But my partner will say come on, the fresh air will do us all good and it does” [Participant E].

Moreover, walking in a group was reported to be therapeutic:

“I walked three times a week with a friend of mine who lost their sibling right at locked down last year and it's therapeutic for both of us” [Participant P].

Theme Five: Fear of transmission of the virus

Fear developed in response to transmission and contagion and was amplified at the beginning of the pandemic due to a fear of the unknown, for example:

“I was terrified my partner was going to catch it. I'm still terrified that they could still get it because you don't know if you can get it a second time. I mean my partner has had both injections now as well, and because of the position my partner does but even now it concerns me that my partner could still get it because it's the unknown, isn't it?” [Participant P].

This theme incorporates four subordinate themes, which encapsulates the fear reported by all participants during the COVID-19 pandemic, and are presented as follows:

Subordinate One: Fear of catching COVID-19.

Families experienced severe fear of the transmission and contagion of the COVID-19 virus.

One participant stated:

“I felt like it was lurking, like the virus was lurking out to get me” [Participant T].

Moreover, 100% of the participants reported the fear experienced was in response to catching the virus and passing it on to their loved ones. For example:

“I think I've been more worried about picking it up myself and passing it on to them than I have been the other way around. Is that guilt complex, isn't it? It's that you don't want to be the one who's hurt somebody, ultimately” [Participant E].

Subordinate Two: Taking evasive action to minimise transmission risk.

Families took evasive steps to minimise the risk of the transmission to others, taking extreme actions to ensure transmission control (e.g., removing clothes before entering the home, quarantining packages) and strictly following government guidance. One participant reported:

“So, my partner would come in the house and take all their clothes off. Put them in the washing machine and go and have a shower every single day because of the level of that paranoia. It's going to be living on your clothes and in your hair and hands. I said don't touch me, don't touch the dog, and it was like that for ages” [Participant E].

The intense levels of fear experienced, resulted in families altering *normal* physical acts of affection during family interactions, i.e.:

“I would Dettol spray everything that was touched. Every touchpoint, switches, handles and the car keys. Before I let my partner put anything down, everything they wore went to wash and my partner would go for a shower. My partner couldn't touch the kids, it was like no kisses. Only air kisses. I was like pretty obsessed” [Participant G].

Furthermore, extreme cleaning measures was also reported:

“They just had to clean the house all the time. They were paranoid. Especially, like firstly the toys, but secondly, all the handles at the front door, the bathroom door and they got like covers for the sofas so they could clean them” [Participant R].

Subordinate Three: Fear as a contagion.

High levels of fear about the COVID-19 pandemic also spread throughout the family unit. The fear was felt by one individual and through emotional contagion (Hatfield et al., 2014; Panksepp & Lahvis, 2011), resulted in a shared emotional response to the pandemic in all family members. This resulted in all members of the family utilising the same strategies to reduce transmission, one participant stated:

“There's been times when we're not comfortable having physical contact with each other because we don't want to expose or put each other at risk. There's been times when they've been wearing a mask indoors, we were just that fearful” [Participant L].

The shared fear was exacerbated by social media sites, media outlets (e.g., news channels, newspapers), economic insecurity and by the daily HM Government briefings (the British Government held daily meetings which reported daily infection and death rates). One participant stated:

“The thing is you've read about it on social media that someone passed away or in the newspapers or something on the news” [Participant H].

Subordinate Four: Fear of not being able to get essential goods.

In total eleven individuals reported intense levels of fear towards obtaining essential goods such as food, toilet roll and pet food. Families expressed they dealt with this through ‘panic buying’, whereby families endeavoured to ‘stock up’ and have all the necessary food and goods required to survive, e.g.:

“We thought that we never go short of food in the house. We didn't suffer the toilet roll shortage or pasta or any of those things. It did scare me though. I remember when I got up early one morning to go to Tesco's to get, you know, to panic buy essentially like

the rest of the country. When I saw all of the empty shelves that really scared me. Now that was quite the traumatic experience looking back because I never expected to see it in our huge Tesco's. It had empty shelves where the toilet roll used to be and soap, and the pasta, and dog food had gone" [Participant B].

Theme Six: Psychological cost of caring.

Eighty-one percent of families reported events, where they experienced distress in response to witnessing and/or hearing the distress from front-line workers during the COVID-19 pandemic. Family members were adversely affected by witnessing the distress displayed by front-line workers, with one stating:

"It's been hard at times, and I thought I'd do it for my parent and then sometimes it feels like there's nothing left for me" [Participant A].

The inability to protect their families from harm instigated distress:

"Your natural instinct as a parent and as a human being is to protect people; specifically, your family, and of course I'm not able to do that. I was very upset that I couldn't help them, I cried a lot" [Participant H].

This theme comprises of three subordinate themes that further identify how distress was experienced in families, and are presented as follows:

Subordinate One: Sharing the distress of family members.

Families reported they knew their loved ones were experiencing trauma at work, one participant stated:

"For my parent, it's the having to visit the Mortuary. They were picking up the dead bodies and my parent has come back saying the number of bodies that were at the

Mortuary was unbelievable. There was just tags and tags and tags of names at the Mortuary. So, I think the amount of death they saw impacted them” [Participant K].

Likewise, another participant stated witnessing their family member endure distress:

“My child was getting messages about Junior doctors who were on ventilators. They were only young and were dying. My child was getting loads of that coming through and was living with us at the same time. My child was saying, “Don't come near me! don't come near me, I'm going to kill you!” and all of this. So, my child was getting very, very traumatised by that at the beginning” [Participant S].

Subordinate Two: Managing and reacting to the distress of family members.

The inability to ease the distress of the front-line worker and the fear for their safety at work was vicariously experienced by the family, for example:

“You feel pretty helpless because there's not a lot you can do to help really. Especially, when my child was feeling like they were going to kill us. They were also saying they were ready to die as well, which isn't a nice thing for your child to say or for you to hear from your child. My child said, “I've prepared myself! I am ready to die because doctors are dying, and I'll probably die!”. It was pretty traumatic for all of us at the time” [Participant S].

The role of providing social support, alongside the emotional bonds connecting families contributed towards the family members experiencing a psychological cost of caring.

Subordinate Three: Feeling unable to support.

Families also reported that front-line workers did not disclose their experiences at work to them. This amplified the psychological cost of caring as families experienced increased distress in response to feeling unable to support their loved one. One participant reported their child

confided in them about their experiences at work during a window visit (staying outside the property and communicating through a window) at Christmas in 2020. They stated:

“My child actually said, “I’ve lost count of the people I’ve held a telephone to their ear for, while they spoke to the relatives, before we put them on a ventilator”. They then said, “At work we often heard later, a couple of days later, if I’ve gone on the intensive care unit that they have then died”” [Participant A].

Participant A then disclosed:

“So, I said, “Why have you never said anything?” and my relative said “I’ve not been able to because the people I have been doing it for are people that’s been so close to home because they’ve been similar ages to you and my parent”. I think for me, it’s quite a shock because we are very close, very small family, very close knit and we’ve had that taken away from us because we aren’t able see each other, be with each other, and support each other” [Participant A].

For this participant, the news of this event caused them significant distress. Similar levels of distress were found in all participants, and as a result, family units were adversely affected by the perception of being unable to support their loved ones, while witnessing them endure distress as a result of COVID-19.

Theme Seven: Benefits and negatives of online communication.

Gaining online social support from wider social groups helped to ease the discomfort and isolation endured by the families during the COVID-19 pandemic. This was reported by all participants. Utilising online communication platforms such as Zoom, WhatsApp and FaceTime allowed the participants to feel connected to others. This helped to promote healthy emotional states, motivation, resilience and was effective towards reducing distress, e.g.:

“I made a lot of internet friends actually during the lockdown from different countries. It helped me to express how I was feeling and not be so alone” [Participant J].

In similarity, another stated,

“Definitely. It isn’t perfect and doesn’t replace you actually physically being there, but it helped me a lot” [Participant L].

Furthermore, online communication was beneficial in releasing stress,

“I think that helps as well just knowing that they are listening to you, even if you're having a rant” [Participant K].

This theme comprises of three subordinate themes that further identify the benefits and negatives of online communication, and are presented as follows:

Subordinate Theme One: Easing discomfort through online contact.

Online communication acted as an outlet for distress and was an effective tool to cope with stress. One participant recounted:

“I can't imagine how you would stay connected if you didn't have something like that, because obviously we haven’t been able to see each for, well, it's been the most part of last year. But yeah, it's over Christmas and people’s birthdays and things. When you would normally be together, so it was nice having a group conversation where we would all come on the screen, on a video call” [Participant N].

Similar benefits were reported by another participant:

“So on a call, even just someone saying I know exactly how you feel. I feel the same way. Or, you know, that your feelings are legitimate. I found that very helpful” [Participant U].

Subordinate Theme Two: Achieving social support and connecting through online communication.

Families were affected also collectively by social isolation from wider support networks. This significantly impacted the family unit's perception of being able to provide and receive social support from others. The reduction of social contact had a significant effect on families, especially in those who relied on wider social networks for physical social support and guidance. This was particularly pertinent in elderly relatives, for example:

“There is an old couple who live next door and their family had come to see them. They were stood at the end of the garden talking to them. It just makes you want to well up. I'm sure all they wanted was to have a hug” [Participant O].

Nevertheless, family groups were adaptive and utilised online communication to counteract the limited ability to congregate. The online communication enabled families to provide virtual support and all members benefited from an increase in perceived closeness for example:

“Yeah, it lifts them up. A phone call itself lifts them. I am quite a jovial person as a coping mechanism. I don't cope with sadness very well, so I'll just throw some humour in and that's my coping mechanism. Which I hope lifts them as well, it does. So yeah, it does. It does lift them, it does, and my giving them advice as well and reassurance. Yeah, it helps them” [Participant L].

Subordinate Theme Three: Reduced intimacy online.

All the participants felt online communication lacked the full support attainable by face-to-face support. A range of issues were reported including, technical difficulties, difficulty reading body language and a loss of physical support. Moreover, the restriction to social contact affected wellbeing, for example:

“Well, to be honest, I'm a very huggie person and it has been awful not to hug everybody. I know, when this is over, I'm going to hug everybody till it's weird. But more than anybody, the person that I've missed hugging is my parent” [Participant P].

Furthermore, online communication did not provide the levels of support that are attainable via face to face interactions:

“It's totally different. It's nowhere near the same level of comfort and support, I find anyway. Aside from technical issues, when you're in a video call with someone, which are very annoying, you don't get the body language and you can't give someone a hug and sort of it's that sort of physical thing” [Participant U].

Figure Two

Superordinate themes and subordinate themes identified from the analysis in part A.

Superordinate	Subordinate
1. Elevated stress, including aggravation of pre-existing challenges.	1. Uncertainty about the future 2. Unfamiliarity with home life 3. Difficult and challenging life events
2. Enhancing wellbeing by using time productively.	N/A
3. Unhelpful coping emerging due to restrictions.	N/A
4. Connecting with nature to improve wellbeing.	N/A
5. Fear of transmission of the virus	1. Fear of catching COVID-19. 2. Taking evasive action to minimise transmission risk. 3. Fear as a contagion.

Superordinate	Subordinate
	4. Fear of being able to get essential items
6. Psychological cost of caring	1. Sharing the distress of family members. 2. Managing and reacting to the distress of family members. 3. Feeling unable to support
7. Benefits and negatives of online communication	1. Easing discomfort through online contact 2. Achieving social support and connecting through online communication. 3. Reduced intimacy online.

Note: N/A – Not Applicable

7.3. Study Two Part B: The lived experiences of front-line workers during the COVID-19 pandemic.

7.3.1. Aim

Semi structured interviews were conducted in order to ascertain how health and/or social care front-line workers coped and supported their wellbeing during the COVID-19 pandemic.

7.3.2. Research Questions

1. To investigate and understand how front-line workers coped during the COVID-19 pandemic.
2. Explore and identify risk factors associated with psychological distress in front-line workers while at work and how it may lead towards the development of trauma and moral injury during the COVID-19 pandemic.
3. Explore and identify protective and vulnerability factors that can inhibit the development of trauma and/or enhance resilience in front-line workers during the COVID-19 pandemic.

7.3.3. Participants

This research utilised individuals aged 18 and over who were employed as front-line workers throughout the COVID-19 pandemic (see part A for description). In response to the literature and findings captured in earlier chapters, Part B only recruited front-line workers employed within health and/or social care sectors. This was chosen in reflection of the results of the systematic review, and in response to the challenges that were predicted to be experienced during COVID-19 (e.g., rising patient numbers) (WHO, 2021). Other front-line workers were not included in this study to enable an understanding of the experiences of those working directly in front-line patient facing roles.

In total, 20 individuals expressed interest in this study via email, however 9 chose not to participate in the interviews after receiving the information sheet. The reason for this choice is unknown as the researcher did not have ethical permission to request this information. In total, 11 participants were recruited online using social media sites (Facebook, LinkedIn, Twitter). This study was advertised worldwide using social media sites. Of those who chose

to participate, 95% of the participants reported to reside within the United Kingdom ($n = 20$) and 5% resided internationally ($n = 1$). Ten percent identified as male ($n = 2$) and 90% identified as female ($n = 9$). Ages ranged from 21 to 64, with a mean age of 36. This study was advertised worldwide, of those who participated, ninety-five percent of the participants reported to reside within the United Kingdom ($n = 10$) and 5% resided internationally ($n = 1$). The roles reported by the participants who worked in health care included, Palliative Urgent Response Sister, IPC Consultant Nurse specialising in infection control (9%), Acute Consultant Doctor specialising in infectious diseases (9%), Community Mental Health Nurse (9%), Occupational Therapist (9%), and Clinical Practitioner (9%). The social care roles reported included, Residential Adult Health Care Workers (9%), Mental Health Support Workers (19%), Health Care Team Leader (9%), and Residential Child Health Care workers (18%). Table four displays the demographic information (e.g., reported roles) of participants.

Table 4
Demographic characteristics of participants including gender, sexuality, and job role of front-line workers.

Characteristic	N	%
Gender		
Female	9	82%
Male	2	18%
Sexuality		
Heterosexual	8	73%
Homosexual	3	27%
Marital status		
Single	2	18%
Married	5	46%
In a relationship	3	27%
Divorced	1	9%
Reported front-line role/s		
Total Health care	6	55%
Acute Consultant Doctor specialising in infectious diseases	1	9%
Palliative Urgent Response Sister	1	9%
IPC Consultant Nurse specialising in infection control	1	9%
Community Mental Health Nurse	1	9%
Occupational Therapist	1	9%
Clinical Practitioner	1	9%

Characteristic	N	%
Total Social care	5	45%
Residential Adult Health Care Workers	1	9%
Mental Health Support Workers	1	9%
Health Care Team Leader	1	9%
Residential Child Health Care workers	2	18%

7.3.4. Procedure

Ethical approval was granted by the University of Central Lancashire in January 2021. Recruitment began in January 2021 until June 2021, and occurred online only using a poster that was shared on social media sites. These sites were: Facebook, LinkedIn, and X (previously Twitter). These sites were chosen due to high user numbers and the ability to reach audiences worldwide. However, data collection occurred predominantly using Facebook. The researcher joined public Facebook ‘buy and sell’ pages to share the poster publicly. Recruitment began in January 2020 until June 2021.

Part B did not screen participants for trauma, moral injury, or resilience. Part B sought to investigate the subjective experiences of trauma, moral injury, and resilience in front-line workers during the COVID-19 pandemic. As such, screening for the presence of trauma and resilience would not provide an understanding of the participants unique perceptions and/or understanding of their own experience during COVID-19. Instead, the participants were asked to provide their own definition of trauma and resilience to gauge individual understanding of these concepts. This was chosen to enable an understanding of how the reaction and response to trauma maybe subjective, as suggested by Roseman (2013), Figley and Kiser (2013), Kurtz (2018) and van der Kolk (2015).

Before the interviews commenced, all participants were shown a consent sheet on screen (via the screen sharing function on Teams), where each consent statement was read aloud by the researcher to the participant before asking for verbal consent. Potential participants were asked to contact (via email) the researcher to register interest in the study. At

this point, the researcher emailed the potential participant with a copy of the information pack and a consent sheet. Interview dates were then scheduled. The procedure for part B was identical to that used in part A (see part A for details). The interview schedule contained thirty questions which were developed after an examination of the psychological literature, and in response to the results of Study One and Study Two, part B's findings. The interviews lasted, on average, one hour and fifteen minutes. Interviews were video recorded using Microsoft Teams and later transformed into an audio file using VLC player, and the original video was then deleted to protect participants identity. The audio data was transcribed by the researcher (Caroline Mead). Table five displays the questions asked during the interview.

Table 5
Interview schedule Study 2 part B

Interview questions

1. Can you tell me the job title and the sector of the front-line/key worker you are related to? Please do not tell me the organisations name the person works within only the sector, i.e. health care, social care etc.

2. Can you please tell me your age?

3. Can you please me your gender?

4. Can you please tell me your relationship status?

5. Can you please describe yourself as a person?

6. What does the term 'traumatic experience' mean to you? How would you define it?

Interview questions

7. How would you define a traumatic reaction?

8. During the pandemic, have you had any personal experiences with stress or trauma in work? *If yes, how did you cope with the stress or trauma? If no, why is this, how did you protect yourself from harm?*

9. During the COVID-19 pandemic have you been fearful of catching the virus at work? *If yes, can you tell me what made you afraid. If no, why?*

10. During the pandemic did you ever seek emotional support from those around you in work? *If so, how did this make you feel? Was it helpful? What support did you receive? If not, why did you not seek support? If not, can you tell me why?*

11. During the pandemic have you ever confided in your family/partner about your experiences at work? *If so, how did this make you feel? Did you find it helpful? If not, can you tell me why?*

12. Thinking back to the beginning of the COVID-19 pandemic, have there been any events that have caused you the most distress? *Why did this cause you the most distress? If not, move onto Q15.*

13. When you remember this event, how do you feel about it now? How have you come to understand this experience?

14. How much do you think this event impacted your life? *Positively? Negatively? Can you tell me how you have coped with this?*

Interview questions

15. During the COVID-19 pandemic, did you ever witness things you felt were morally wrong? *If so, how did this impact you? Can you tell me how you have coped with this?*

16. During the COVID-19 pandemic, were you ever troubled by something you felt you should have done, which you felt violated your own personal morals (that is, the principles and rules that you personally live by and believe to be morally right and sound)? *If so, how did this make you feel? How did you cope with this?*

17. During the COVID-19 pandemic, did you ever feel betrayed by your leaders, or colleagues who you trusted? *If so, how did this make you feel? How did you cope with this?*

18. While at work, do you trust that yourself, your leaders and those around you to live up to their own core values and moral codes? *If so, why, if not, why do you feel this way?*

19. Do you think your family members have been affected by this pandemic? *Have they struggled? If not, why do you think this is? If they were able to cope, why do you think this was?*

20. During the COVID-19 pandemic, have you been fearful towards your relative/s catching the virus? Or, fearful towards them passing it to you, or you to them? *If yes, can you tell me what made you afraid. If no, why?*

21. What does the term 'resilience' mean to you? *How would you define it?*

Interview questions

22. Can you tell me what the term wellbeing means to you?

23. Can you tell me about the type of things you have done to support yourself and your wellbeing during the pandemic?

24. Can you tell me how you have supported or boosted your relative/s wellbeing during difficult times throughout the pandemic? *Has there been any difficulties? Have you found anything worked well?*

25. Did you use any form of technology to communicate and support your relatives during the pandemic? *What did you use and why did you choose it?*

26. During the COVID-19 pandemic, how do you feel you coped during the first, second and third lockdowns? *If you coped well, can you tell me what you did that helped you? If not, can you tell me why you think you did not cope well.*

27. What does the term 'resilience' mean to you? *How would you define it?*

28. Do you feel you coped better or worse with day-to-day life as a result of the COVID-19 pandemic? Have your experiences affected your ability to cope with daily stress or trauma? *If so, why do you think this? If not, can you tell me why you think this?*

29. How do you think your experiences with the COVID-19 pandemic have affected your ability to cope with new stress or trauma in the future?

30. Thinking back to the third lockdown which began in January 2021, do you feel prepared to handle another lockdown as a result of your experiences in the first,

Interview questions

second and third lockdown? *If so, why? If not, can you tell me why?*

31. Before we end, is there anything else you would like to say that you feel has been missed?

7.3.5 Analysis

The transcripts were analysed using the same method as presented in part A and utilised Thematic Analysis to look for emergent themes (Braun & Clarke, 2006). The theoretical codes were rated by a second researcher⁹ who was provided with 10% of the transcripts ($n = 2$) and an overview of the themes. A meeting was held in May 2023 with the inter-rater to discuss the themes. The inter-rater suggested two sub themes were removed and agreed with all the other themes.

7.3.6 Definitions of trauma and resilience provided by participants.

All participants provided a definition of their understanding of psychological trauma. Overall, a good understanding of psychological trauma was shown by participants, which aligned with that proposed by van der Kolk (2014), and Herman (1992). who asserted that trauma is a consequence of extreme stress following exposure to adversity (Herman, 1992; van der Kolk, 2014). Moreover, all participants reported a traumatic experience to be an event that was life changing. Furthermore, the participants reported that experiencing trauma could create significant distress that may impact daily life. For example, Participant H stated,

⁹ The inter-rater was chosen due to their experience and publishing record conducting qualitative research.

“It is something that is harmful to a person and is physically and psychologically harmful, like being raped or being abused. It has an impact on people whether that is acute or in the longer term. It isn’t something that is part of your everyday life. It is not something that normally happens to you” [Participant H].

Front-line workers also reported similarities in their understanding and definitions of resilience. Resilience was generally referred to as the ability to recover mentally following adversity. This included the ability to ‘be able to cope’, ‘bounce back’, and to have a form of ‘psychological strength’. For example, Participant B reported,

“It is being able to cope with life. We are all going to have bad days and have low moods, but it’s the ability to cope and get through it. It is psychological strength. To me it’s a mental strength that is built up over your life and helps you cope when things go wrong” [Participant B].

Study two, Part B did not ask front-line workers to provide a definition of moral injury. Part B aimed to explore if front-line workers had experienced moral injury during COVID-19. As such, asking the participants for a definition of moral injury infers the researcher had an assumption that moral injury had occurred, and that the participants would have a pre-existing understanding of this concept. Therefore, a definition was not asked for to enable an exploration of this concept during COVID-19.

7.3.6 Results

This section provides the results of the thematic analysis conducted on the transcripts obtained in study 2, part B. Overall, ten themes emerged which provided an insight into the lived experiences of front-line workers during the COVID-19 pandemic. These were, 1.) *Elevated stress in the workplace*, 2.) *Organisational support*, 3.) *Fear of transmission*, 4.)

Feeling betrayed and unsupported by leadership, 5.) Experiencing moral distress in the workplace, 6.) Promoting wellbeing through adopting internal and external coping strategies, 7.) Connecting with nature, 8.) Supporting families, 9.) Feeling resilient and/or able to take control of future actions. 10.) Maladaptive coping adopted. These themes are discussed below.

Theme One: Elevated stress in the workplace.

All participants reported experiencing elevated levels of stress as a direct result of working on the front-line during the COVID-19 pandemic. Working in close proximity to infected patients combined with elevated levels of stress, created vulnerabilities to psychological trauma in front-line workers. 36% of the front-line workers reported experiencing psychological trauma at work during the COVID-19 pandemic. One participant stated:

“I think the pandemic in the first wave was traumatic. There's part of me that's thinking, OK, this is acute trauma and it'll go. It'll pass in time. But there was this inner voice and this inner reasoning telling me that this was going to be a very, very long process”
[Participant C].

This theme comprises of three subordinate themes that identify how stress was experienced, and are presented as follows:

Subordinate Theme One: Changes in practices causing stress.

All front-line workers reported experiencing significantly elevated stress throughout the COVID-19 pandemic. They reported a range of stressors, such as, changes to workplace responsibilities, additional workloads, unfamiliarity with the virus and a reduction in their perceptions of competence. Furthermore, the rapidly changing policies and procedures instigated significant stress, for example:

“I think it's the guidelines change so frequently, and we don't know what we're doing from one minute to the next. That has been stressful in some respects” [Participant F].

Likewise, another participant stated:

“I've never known anything like it in my career. Huge amounts of work that we normally do just stopped, literally overnight. It felt like on a Friday it was business as normal and on Monday it all changed. For me, I was kind of staying in my comfort zone really, because as an Acute Medical Doctor I was needed to continue as normal. But the stress was suddenly on a different level” [Participant H].

Subordinate Theme Two: Perceived competence negatively affected, causing stress.

The level of stress was also amplified in those who provided direct care to infected COVID-19 patients. Front-line workers reported their perceptions of their levels of competence were impacted in response to a lack of knowledge about the COVID-19 virus. One participant stated:

“I've experienced an epidemic and the organization and management of that. But then it was completely different, I did feel very overwhelmed. It's just like all my experience didn't help me cope [Participant B].

Furthermore, another participant stated:

“Yes, every day. My job since 1998 has been to prevent or control infections and here comes an infection. I haven't got a hope in hell chance of making a difference here because it's everywhere. But there's this professional feeling and responsibility. Why can't I do anything about this? Why can't I stop all these patients in my hospital getting COVID. So, there was a real sense of failure” [Participant C].

Subordinate Theme Three: Elevated client distress impacting workers.

Front-line workers employed within social care roles reported the COVID-19 restrictions affected the health of the patients within their care. The restrictions on movement created significant stress for the patients, which induced substantial challenges for front-line workers and amplified the pre-existing stress. One participant recounted:

“What became extremely stressful was that everybody who was in this environment could no longer follow their own routines that they liked, which can be quite an important thing for people in care homes or with people with mental health difficulties. It made it very stressful trying to help them” [Participant J].

Furthermore, the working conditions and the fear expressed by patients was vicariously developed by the front-line workers. One participant stated:

“There was something pretty terrifying at that point about putting an oxygen mask on someone and telling them they had COVID, and you could see that absolute fear. So yeah, that was quite stressful, and I found it very hard to cope with” [Participant H].

Theme Two: Organisational support.

A range of support was instigated by the organisations the front-line workers were employed by to help front-line workers mitigate stress during the COVID-19 pandemic. These included, support groups, counselling services, trauma support, wellbeing services, mindfulness, helplines and forums. One participant reported utilising these services, they stated:

“Yeah. I accessed mind matters. It was very helpful. But I found it's all behavioural based, it's low intensity. So, I found it helpful as long as I was doing it” [Participant E].

In contrast, ninety-one percent of front-line workers reported they did not utilise the available services, as they felt they did not want or require additional support, for example:

“No, I think it wasn't something that I like to do. It's just not how I personally deal with these things, but I can absolutely say that for other people, it must have been something quite useful, something quite helpful” [Participant J].

However, peer and management support were utilised to combat and reduce stress. Front-line workers reported they found this beneficial as it provided an opportunity to express frustrations and gain support from those who understood. One participant stated:

“I spoke about it with friends at work, obviously they understand your work problems a lot more” [Participant J].

Furthermore, peer support encouraged and promoted group belonging, for example:

“They said to me that I got them through it. But they got me through it. It was that kind of comradery” [Participant G].

Theme Three: Fear of transmission.

Extreme levels of fear were reported by all front-line workers and was reported to impact their lives and alter their behaviours. This theme comprises of five subordinate themes that identify how fear was experienced, and are presented as follows:

Subordinate Theme One: Fear of what would happen.

Intense levels of fear were experienced about the contagion and transmission of the COVID-19 virus. One hundred percent of front-line workers reported experiencing extreme fear towards the unknown at the beginning of the pandemic. One participant stated:

“I was really afraid, especially at the start” [Participant A],

Moreover, another noted:

“It was a fear of what this virus is and how it is going to affect us. The panic within the team I was managing was really, really difficult” [Participant F].

Subordinate Theme Two: Adopting intense cleaning practices.

Intense cleaning practices were adopted to reduce and control transmission of the COVID-19 virus. This included, changing clothes (e.g., before leaving work, before entering the home, after entering the home), repeated daily washing (e.g., hands and body), and washing and/or sanitising groceries, for example:

“I'd shower at work and take off all my scrubs and put them in a bag then I'd come home, and again, take off the clothes I'd worn in my car and shower. We wouldn't hug. We kept apart” [Participant H].

In similarity, another noted:

“You just strip off your clothes after work and get changed and everything and then you come home. But you were obviously walking out the unit in your own clothes, so you would get changed at the front door and then shove everything in the washing machine” [Participant A].

Subordinate Theme Three: Limiting social contact to manage fear.

The levels of fear led to front-line workers limiting contact with individuals outside the home; despite lockdown measures lifting as time progressed, for example:

“I wouldn't go to big crowds. I can't bear crowds. Can't bear people. What would happen if I caught COVID? [Participant C].

The fear was exacerbated by news of transmission shared within the medical community. One participant stated:

“I had friends in London who are in hospital medicine and one friend was saying they are hiding it. They said there's a couple of Junior Doctors on ventilators in ICU in London” [Participant H].

Subordinate Theme Four: Fear of transmitting to family members.

Intense levels of fear were experienced by front-line workers towards transmitting the virus to family, friends and colleagues. This was reported by all front-line workers. The levels of fear experienced were exacerbated in those who worked in close proximity to infected patients. As a result, the front-line workers reduced social movements in an effort to avoid transmission to others and to ensure they kept their families safe from harm. For example, not go for walks or visiting family in the garden, even as restrictions lifted. One participant stated:

“I was really scared of giving it to them. I was really scared. More than anything else. I just thought, how on Earth would I ever live with that?” [Participant H].

Another participant stated:

“So, we were dropping food off to them and at one point I remember I actually did have a bit of a cough and I was like, I'm not going down. I can't drop food off for them. I don't want to pass it on to them. I think for me, I wasn't scared of myself dying as much as I was scared of bringing it to someone I loved and them dying” [Participant G].

Subordinate Theme Five: Learning to live with the fear.

The fear began to reduce as information concerning the virus become available. Moreover, the fear was reduced by personal protective equipment, acceptance and the introduction of the vaccines. One participant recounted:

“As the time progressed that fear reduced. I would say that was isolated more to the first six months and then since then having learned more about the pandemic and actually gaining a more educated understanding of it” [Participant G].

Likewise, gaining acceptance assisted in reducing the fear, another participant stated:

“So, I think I just took the precautions that were necessary and just accepted the fact that I had to travel. Also, I just wanted to get on with my life” [Participant I].

Sixty-four percent of the front-line workers reported they were not afraid of contracting the virus themselves. They deemed the severity of symptoms to be low and viewed themselves as healthy and able to recover, for example:

“I wasn't too scared to get it because I saw that the symptoms weren't that bad. So yeah, I was preparing myself to get it” [Participant D].

The reduction in fear enabled individuals to continue with employment and contributed towards their desire to help others during the COVID-19 pandemic. One participant reported:

“I think it's because I was facing it every day in work. Your fear, your perspective changes. Initially I was fearful and then it becomes, oh well, if I get it, I get it. You become a little bit more accustomed and blasé to it really” [Participant F].

Theme Four: Feeling betrayed and unsupported by leadership.

Front-line workers perceived betrayal from leaders who were in senior positions and executive level management. Eighty-one percent of workers reported perceiving a degree of distance between themselves and senior management in response to the enforced lockdown restrictions in the United Kingdom. Furthermore, they felt their leaders did not understand the hardships they faced working on the front-line. One participant stated:

“I think your senior leadership are so far in, for example your executive teams are so far removed from clinical practice that they don't know what it's like. They were all working from home and just sending out your weekly newsletter around about how well we're doing. But we're witnessing it and they are not because they were all working from home. So, we did feel a little bit on our own in that respect” [Participant F].

Front-line workers who worked directly with COVID-19 positive patients reported feeling that leadership ignored patient safety and contributed towards the transmission of the virus, for example:

“The senior team knew no new patients were to be admitted to a ward because of COVID and the empty beds would be used for step down patients who were recovering. But the management went against it. The next morning and all the beds on that ward had been used and then loads more patients got COVID” [Participant C].

The lack of PPE available increased the levels of fear and stress felt by front-line workers. Front-line workers reported feelings of anger towards a perception that they were expected to provide care without the necessary equipment, for example:

“So, we should have been wearing fit-tested masks, visors, full gowns. You know, exactly like they wear in intensive care. We didn't have that” [Participant B].

Moreover, front-line workers felt they had to provide the equipment needed themselves if they wanted to protect their patients from harm, i.e.:

“We weren't protected because we didn't have the PPE that was sufficient to cover that level of transmission. So, we're still just wearing the surgical masks and the handmade school visors” [Participant G].

This promoted feelings of betrayal and a lack of support felt by the front-line workers from their senior leadership.

Theme Five: Experiencing moral distress in the workplace.

Front-line workers witnessed practices that they felt were morally objectionable throughout the COVID-19 pandemic. Sixty-four percent of workers reported experiencing a range of morally injurious events. This included constraints on patient care (e.g., limited PPE equipment, limited

medical equipment), a disregard to the health and safety of others (e.g., staff not wearing PPE equipment properly), staff shortages, delayed treatments, and limited clinical supervision during the pandemic. Front-line workers felt that the reduction in social movements reduced the levels of care which should be provided. This resulted in a perception of unethical procedures being adopted when providing end of life care to patients and their families. One participant stated:

“I verified a death with a GP over the phone and I had to ask the families permission to do a video call. The patient had died in the home and then I had to ask the family if I could show the GP this person in the bed over WhatsApp. Show them the dead person on a video call so they could verify the death. It's just awful, it wasn't right” [Participant B].

Front-line workers encountered morally difficult situations that they felt forced them to either violate their individual codes of conduct or feel unable to express their opinions. These situations included, family visitation, changes of policies and procedures and the COVID-19 vaccine, for example:

“With the vaccine rollout one of my patients was ardently against having the vaccine. I was silent on the matter. It would be fraudulent if I really did talk too much about it and encourage something that I didn't believe in. This colleague said, let's try and entice them to get the vaccine by telling them that ghost hunts require it. The patient liked ghost walks. I thought that was really deceptive” [Participant H].

Another noted:

“The frustrating bit is that when we were seeing 220,000 cases a day, which was probably an underestimate, we were taking less precautions in a hospital, than in the wider community when we saw 50 to 60 cases a day. That made no sense to me” [Participant B].

Front-line workers in health care settings, for examples, Doctors, reported feelings of moral transgression. This included perceiving personal acts of omission (e.g., failing to prevent a death). The perception of failing to prevent infection or death initiated moral distress. These acts instigated feelings of guilt and shame in response to a perceived inability to help their patients. One participant stated:

“I'm not really being a Doctor. I'm just kind of patting people on the back while dressed in PPE. There's nothing I can give them. There's nothing to make them better. Just trying to stop them pulling their oxygen mask off. So, I think it did impact me. It got me down a little bit and I felt like what's the point? What good am I doing? For a good few weeks afterwards.” [Participant H].

Front-line workers reported witnessing medical futility (providing treatment, which will not alleviate symptoms) which contributed towards the moral distress experienced. Participant H further stated:

“I was trying to scrutinize every blood test, every physiological parameter, and I was trying to fix things. What was the point because I did no good. You know, all that kind of mental energy trying to work out how to make them better, tweaking the drugs, looking at their blood test results, and none of it did any good. Every single one of them died” [Participant H].

Theme Six: Promoting wellbeing through adopting internal and external coping strategies.

Front-line workers adopted several external and internal coping strategies which supported and promoted their wellbeing. Ninety percent of participants reported using internal and external coping to mitigate the stress, distress and the psychological trauma experienced. External coping strategies included spending time with family, communication with friends, engaging

in hobbies, challenging others and self-care (e.g., exercise). Promoting self-care and engaging in social support online assisted front-line workers to cope with the stress and promoted their overall wellbeing, for example:

“I used to ring my friends quite a lot and talk with them through WhatsApp with camera on. So, then it felt like I was meeting them in person because we're there seeing each other. I think that helped a lot because I think my friends were quite supportive and were always there to listen and share life with” [Participant I].

Another participant stated:

“Every day in the lock down was quite difficult to distinguish so my family made Wednesday’s pizza day. So, I always knew it was pizza on Wednesdays and I looked forward to it. I couldn't wait to go home to it” [Participant D].

Front-line workers also adopted internal cognitive coping strategies to promote subjective wellbeing. Such as, seeing the positives, reflection, maintaining normality, acceptance and self-belief, for example:

“I think you’ve got to put things into perspective, you know there were people dying and I was having a holiday cancelled. In the grand scheme of things it isn’t that bad” [Participant E].

Theme Seven: Connecting with nature.

All front-line workers reported engaging in nature was beneficial in reducing stress and promoting healthy mental health. This included, gardening, walking in nature and spending time on the beach. One participant stated:

“I would go down to the beach, run down to the beach, and take my socks and my trainers off and just run in the sand and through the waves. When you hear the waves

coming in, that really helps the brain, when you see the colour of the blue and that also helps. So doing activities like running really, really helps me” [Participant D].

Another participant reported:

“My wellbeing is getting better as I walk. I've been going for a walk every day and it's been really interesting to see how the trees changed. I noticed the leaves were changing and I thought actually this is something nice that I have in my life. Now I go for this little walk and then I think it's probably the most helpful thing actually” [Participant H].

Theme Eight: Supporting families.

Front-line workers reported their families did not cope well throughout the enforced lockdowns. This was reported by seventy-two percent of participants. The families were affected by the enforced lockdowns and the restrictions to social movement, and were further impacted by fear of infection, homeschooling and ill health. This theme contains two subordinate themes that identify the perceived burden of caring for and protecting families from harm.

Subordinate Theme One: The burden of caring for and worrying about their families.

All of front-line workers reported significant levels of fear, guilt and concern for the welfare of their families. Resulting in an increased need to protect their families from psychological and physical harm, for example:

“We were worried about their mental health, their levels of anxiety and their fear for us and whatnot. So yeah, it did have a big impact on the family, yeah” [Participant B].

Furthermore, the pandemic amplified pre-existing stress within families and the additional stress instigated significant difficulties, such as mental health problems. Front-line workers

reported feelings of guilt and an increased perception of responsibility to care for their families.

One participant reported:

“This parent was on the phone to me and would cry. They didn't know how much longer they could take it. I couldn't help, I didn't live close. I felt awful. So, I sent them care packages” [Participant A].

Twenty-seven percent of workers captured in this study lost loved ones during the COVID-19 pandemic. One participant stated:

“I did have a close relative that passed away, but I wouldn't have expected it, in a sense. So, I wasn't worried for them as I thought they'd be OK. But when it hit them, it turned to a different thing” [Participant J].

The loss of loved ones significantly impacted front-line workers and their families and increased the levels of perceived responsibility to care for their families.

Subordinate Two: Protecting their family from physical and psychological harm.

Front-line workers reported feeling responsible for their families and expressed concern towards the levels of fear held by their families. In response, front-line workers reported they did not disclose their experiences at work to their loved ones. Moreover, they did not frequently seek support from their families. All workers reported feeling their families would not understand the difficulties of working on the front-line and did not want to cause them any further fear or worry. One participant recounted:

“I found myself telling them at the beginning because as you remember that's all we were talking about. Everybody in every household. Then I suddenly thought, oh, hang on a minute, this is actually scaring them. So, I stopped” [Participant H].

Furthermore, one participant did not disclose to their family when they contracted COVID.

They stated:

“I get this news that, I am positive. I went to my home and maintained quarantine and isolated. I didn’t want to worry them. Only my sibling who lived with me knew. When I was better, I shared it with them” [Participant K].

Theme Nine: Feeling resilient and/or able to take control of future actions.

All workers expressed feeling they were resilient. Moreover, seventy-two percent reported their ability to cope with daily stress had improved since the beginning of the pandemic. One participant stated:

“I’m definitely less controlling and I think I accept change more than I did. I think it’s just become day-to-day practice, whereas before, I would’ve got stressed out. So, I’d say that’s the probably the biggest thing that’s changed for me” [Participant F].

In those who did not report an *improvement* in their levels of resilience, they felt they either had pre-existing high levels of resilience or expressed they would refuse to work on the front-line in another future lockdown. One participant reported:

“I don’t think I could handle another lockdown, professionally. I might be able to handle it, but I don’t want to handle it. I do not want to. I might be able to handle it, but I would choose not to. I would leave. I don’t think it’s in me to want to experience all that again” [Participant B].

Theme Ten: Maladaptive coping adopted.

Eighteen percent of front-line workers reported working on the front-line was difficult and to cope, adopted maladaptive coping strategies, such as alcohol consumption. This was reported to enable them to counteract the distress experienced. One participant stated:

“When I came home and I didn’t sort of share things, but I drunk a lot more. I drunk a lot more alcohol. I go to sleep after two glasses of wine, so I got drunk” [Participant B].

Lately, another added:

“I sometimes would stare at my bed at night or stay in my bed all day long. I slept more than I normally did. It helped me forget” [Participant K].

Figure Three

Superordinate themes and subordinate themes identified from the analysis in part B.

Superordinate	Subordinate
1. Elevated stress in the workplace.	1. Changes in practices causing stress. 2. Perceived competence negatively affected, causing stress. 3. Elevated client distress impacting workers.
2. Organisational support	N/A
3. Fear of transmission	1. Fear of what would happen. 2. Adopting intense cleaning practices. 3. Limiting social contact to manage fear. 4. Fear of transmitting to family members. 5. Learning to live with the fear.
4. Feeling betrayed and unsupported by leadership	N/A
5. Experiencing moral distress in the workplace.	N/A

Superordinate	Subordinate
6. Promoting wellbeing through adopting internal and external coping strategies.	N/A
7. Connecting with nature.	N/A
8. Supporting families.	1. The burden of caring for and worrying about their families. 2. Protecting their family from physical and psychological harm.
9. Feeling resilient and/or able to take control of future actions.	N/A
10. Maladaptive coping adopted	N/A

Note: N/A – Not Applicable

7.4 Discussion

This study aimed to explore the lived experiences of front-line workers and their families during the COVID-19 pandemic. The findings of this study indicated front-line workers and their families were impacted. Consistent with the existing literature a range of vulnerability factors of psychological distress and trauma were described and were indicative of having a substantial effect on their lives. This study also found a range of promotive and protective factors of trauma in both front-line workers and their families. As presented in part A, seven themes were identified which described the lived experiences of families. Four themes elucidated the risk factors of psychological distress and vicarious trauma in the families. These were: 1.) *Elevated stress, including aggravation of pre-existing challenges*, 5.) *Fear of transmission*, 3.) *Unhelpful coping emerging due to restrictions* and 6.) *Psychological cost of*

caring. This study also identified three themes which described how resilience was promoted in families. These were, 4.) *Connecting with nature to improve wellbeing*, 2.) *Enhancing wellbeing by using time productively*, and 7.) *Benefits and negative of online communication*.

As presented in part B, ten themes emerged which presented the lived experiences of workers during the pandemic. Front-line worker experienced elevated levels of stress in the workplace, psychological trauma, moral distress and a perception of betrayal by senior management. Four themes emerged which identified the vulnerability factors of psychological distress, trauma and moral injury in the workplace. These were: 1.) *Elevated Stress in the workplace*, 3.) *Fear of transmission*, 4.) *Feeling betrayal and unsupported by leadership* and 5.) *Experiencing moral distress in the workplace*. In addition, four themes emerged which described how workers mitigated the distress and promoted resilience. These were, 2.) *Organisational support*, 6.) *Promoting wellbeing through adopting internal and external coping strategies*, 7.) *Connecting with nature*, and 9.) *Feeling resilience and/or able to take control of future actions*. However, workers experienced distress while attempting to support families, as shown in the theme, 8.) *Supporting families* and 10.) *Maladaptive coping strategies*.

As evidenced in Theme One (part A), families reported increased levels of stress, distress, feelings of isolation, and sleep difficulties. These factors were reported to be difficult to manage and are consistent with the findings of Feng et al., (2020). In order to cope, families engaged in a number of unhelpful coping strategies, such as increased food and alcohol consumption, as presented in Theme Three (part A). It is possible these behaviours developed in an effort to counteract the negative emotions developed following exposure to COVID-19, as suggested by The Cognitive Appraisal Theory of Emotions (Moors, 2013, 2014). It can also be speculated that the maladaptive coping strategies (e.g., increased alcohol consumption, Part A, Theme Three), enabled family members to counteract the negative symptoms of trauma

exposure when *normal* coping strategies were unattainable, namely face-to-face social support. However, this has not been captured in the literature to date and, as such should be regarded with a degree of scepticism.

Engagement in hobbies was reported by families to boost motivation, self-esteem and assist their ability to cope. A range of hobbies were reported, including baking and crafts, as presented in Theme Two (part A). It is possible that engaging in these activities was beneficial in reducing stress, aided in the mitigation of psychological trauma and promoted the development of resilience. Families reported seeking social support using online forms of communication, as identified in Theme Seven (part A). This was reported to be beneficial in reducing distress. Despite the negative cost of exposure to COVID-19, it can be speculated that families displayed ‘minimal-impact-resilience’ (Bonanno & Diminich, 2013). Whereby, families engaged in several identified protective factors (e.g., hobbies, social support) that promoted recovery from trauma, as suggested by The Minimal Impact Resilience Trajectory (Bonanno & Diminich, 2013). To date, there is no literature that has examined the levels of resilience in the families of front-line workers during public health crises. Thus, continued investigation in this area is of clear value.

Elevated levels of fear towards the transmission and contagion of COVID-19 were reported by families and front-line workers (Theme Five, part A; Theme Three, part B). Fear of the unknown was found to manifest into intense cleaning practices and limiting contact with others in an effort to reduce the transmission of COVID-19. It is possible the intense cleaning practices was a manifestation of obsessive-compulsive coping, which fostered a sense of competence when facing extremely stressful experiences (Sani et al., 2021). However, the fear was reported to become intrusive and lead to a significant perception of personal responsibility towards keeping loved ones safe from harm, in both workers and families. In similarity to the findings of Ahorsu et al., (2020), Collantoni et al., (2021) and Šuriņa (2021), the fear reported

presented more intensely towards the perception of transmitting the virus to family, friends and colleagues. As described in Theme Five (part A), the levels of fear remained consistent in the families, however, was shown in Theme Three (part B) to reduce over time in front-line workers. It is possible the reduction in fear in front-line workers occurred in response to increased knowledge about the virus and/or after frequent exposure to infected patients. Similar reductions in fear in front-line workers during COVID-19 have been reported by Labrague et al., (2020). Despite this, front-line workers were exposed to a number of factors in the workplace that created vulnerabilities to developing psychological trauma and moral injury.

Theme one (part B) identified factors in the workplace that created vulnerabilities to developing psychological consequences while working on the front-line during COVID-19. Front-line workers reported experiencing, increased patient numbers, additional responsibilities, unethical practices, increased workloads, and changes to organisational procedures. These factors are established risk factors of stress and psychological trauma in the workplace (Boran et al., 2012; Curtis et al., 2012; Sorenson et al., 2016). It can be speculated that these factors, combined with the reported levels of fear (Theme Three, Part B) instigated vulnerabilities to trauma and resulted in the high levels of traumatic stress, as reported in Theme One (part B).

Front-line workers reported increased workplace demands (e.g., increased patient numbers, increased responsibilities) as presented in Theme One (part B). It is possible, the reported high workplace demands, alongside, potential low job resources may have increased the social, cognitive, physical and emotional demands placed on front-line workers, as suggest by the Job Demands Resources Model (Baker & Demerouti, 2007). This may have resulted in an increase in job stress and instigated susceptibilities to compassion fatigue, burnout and psychological trauma. The current finding were consistent with the reported findings of Zhou

et al., (2022), thus supporting the identification of public health crisis related workplace stressors.

Front-line workers who disclosed frequent exposure to infected patients reported experiencing amplified stress and distress as found in Theme One (part B). It can be speculated, that the distress described by the front-line workers was indicative of compassion fatigue (Bride et al., 2007). Whereby front-line workers expressed feelings of despair, self-blame, exhaustion and guilt. Furthermore, several front-line workers reported experiencing events they perceived as traumatic. For example, patient deaths and insufficient patient care surrounding end of life procedures, as presented in Theme One (part B) and Five (part B). This is consistent with the literature that highlights the risk of burnout and psychological trauma developing in those who are exposed to emotion-inducing events (Grandey, 2000; van Mol et al, 2015; Zhou et al., 2022). Furthermore, is consistent with the Epidemiology literature which suggests the pre-existing vulnerability factors are exacerbated during public health crises and can result in significant psychological consequences (Garden et al., 2018; Hyun et al., 2021; van Bortel et al., 2016).

Front-line workers reported feelings of betrayal in the workplace in response to limited PPE equipment, organisational constraints, limited authority, and perceptions of unsupportive senior leadership, as shown in Theme Four (part B). These factors were reported to increase the stress and psychological distress experienced. Workers also reported witnessing acts they felt were morally wrong, which resulted in moral distress, as evidenced in Theme Five (part B). For example, exposure to staff shortages, increased patient numbers and unethical patient care. It can be speculated that the exposure to moral distress during COVID-19 may have augmented the susceptibility to developing psychological complications, such as Emotional labour (Hochschild, 1982), burnout and trauma. Thus, providing evidence towards the vulnerability factors of moral distress in front-line workers during public health crises, and is

consistent with the findings of Nelson et al., (2022) and Norman et al., (2021) and Spilg et al., (2022).

The current findings indicated that after exposure to trauma and moral injury, front-line workers adopted maladaptive coping strategies to counteract distress (Brere & Richard, 2007). For example, Theme Ten (part B) reported that alcohol consumption was utilised in an effort to alleviate the stress. Increased alcohol consumption has not been captured in the literature to date. However, it is possible this is due to a lack of qualitative research conducted in this area. Nevertheless, maladaptive coping in response to working in high-risk environments during COVID-19 has been reported by Sani et al., (2021). Furthermore, Sani et al., (2021) reported functional coping, such as seeking emotional social support was utilised by front-line workers during COVID-19.

Front-line workers reported their organisations provided additional support and services aimed to counteract the increased distress experienced. This included, helplines, forums, wellbeing services, trauma support and support groups, as shown in Theme two (part B). However, Theme Two indicated some front-line workers did not use the services provided. It is possible that front-line workers repressed and denied the negative impact of the stress (Malta et al., 2009), which would explain why they did not use the services available. It is also possible that they did not wish to use the services, or to admit the presence of any problems. Despite this, this study did not capture the severity of the reported stress and psychological trauma. As such, is unable to fully elucidate the psychological impact the COVID-19 pandemic had on front-line workers. Nevertheless, the current findings indicated that front-line workers did seek social support (e.g., from peers) in the workplace as evidenced in Theme Two (part B).

As presented in Theme Two (Part B), front-line workers sought social support from peers and management in the workplace during COVID-19. The social support gained was

reported to be beneficial in providing a supportive environment to release tension and emotional distress. Thus, enabling front-line workers to receive appraisal from individuals who understood the demands of the role (Sippel et al., 2015).

It is likely the social support received from peers was valuable in promoting coping, while reducing the severity of the stress and/or distress (Lakey & Cohen, 2000). Furthermore, emotional support from peers was reported to assist in buffering against the psychological consequences of stress, and enhanced coping abilities. This provides support towards the Stress and Coping Perspective Theory, as suggested by Lazarus & Folkman (1984). It can be speculated that seeking social support in the workplace enabled front-line workers to share stressful experiences with others, gain encouragement and assistance. Likewise, it is also possible seeking support assisted in promoting resilience. The reported peer support obtained within the current study is consistent with the findings reported by Labrague et al., (2020). However, front-line workers did not disclose their experiences to their families which instigated problems within the family unit.

As evidenced in Theme Eight (part B), front-line workers did not confide in their families about their experiences in work in an effort to protect families for further distress. However, the burden of this role impacted front-line workers and instigated feelings guilt and concern for the welfare of their families. Despite this, Theme Six (part A) reported that the families were aware of the trauma experienced by front-line workers. Moreover, families reported witnessing their loved ones endure significant distress as a direct result of working on the front line. The families, through emotional contagion, as suggested by Emotional Contagion Theory (Hatfield et al., 2014), vicariously developed the emotional distress exhibited by the front-line workers (Hatfield et al., 2014). This also occurred in wider family units (e.g., in those who did not reside within the primary familial home) after exposure to front-line workers (Figley & Kiser, 2013; Hatfield et al., 2008; Lui & Doan, 2020). This finding has not been

captured within the literature to date, and as such should be considered with a degree of scepticism until further research is able to support this finding. Nevertheless, the findings indicate a clear psychological impact occurred.

The current findings indicate that in families, the inability to ease the distress, the role of providing social support, and pandemic specific stressors (e.g., fear) contributed towards the families developing a psychological cost of caring (Theme Six, Part A). It can be speculated that if front-line workers had confided in their families about their experiences, they may have been able to obtain emotional support that may have enabled a reduction in distress, as suggested by Family Resilience Theory (Figley & Kiser, 2013; Walsh, 1996). Furthermore, this may have decreased the vicariously developed distress in families, thus protecting the family group from further psychological harm. To date, there is currently no available literature to support this finding. Nonetheless, it is certainly possible front-line workers and their families may have been able to counteract distress if they engaged in supportive practices together (Figley & Kiser, 2013).

As evidenced in Themes Two (part A) and Six (part B) front-line workers and their families reported to engage in a number of wellbeing activities on an individual basis, and as part of a family group. These activities included baking, art and crafts and walking. These activities promoted subjective wellbeing, group belonging and fostered resilience (Figley & Kiser, 2013). Furthermore, when wellbeing activities were completed as part of a family group, through emotional contagion, as suggested by Emotional Contagion Theory (Hatfield et al., 2014), the whole group collectively benefited from a decrease in stress and/or distress and shared resilience. Additionally, as demonstrated in Theme Nine (part B), front-line workers maintained they felt they were more resilient following their experiences during COVID-19 and were better able to cope with everyday *normal* stress. These findings provide support towards The Resilience Process and Outcome Model (Ungar, 2018). It is possible, resilience

was fostered through a dynamic process of adaptation after adversity, namely COVID-19. In supporting their subjective wellbeing, workers and families were able to mediate the negative aspects of trauma exposure, which promoted resiliency (Ungar, 2018).

The current findings indicate that front-line workers and their families reported increased levels of enjoyment and a reduction in stress after spending time in nature, as evidenced in Theme Four (part A) and Seven (part B). Spending time in nature was reported to be beneficial in boosting mood, and over time promoted sustained positive mood states (Capaldi et al., 2015). This is consistent with the literature which suggests improvements in hedonic and eudaemonic wellbeing occurs following exposure to nature (Capaldi et al., 2015). It can be speculated that positive physiological adaptations in the body occurred, for example, a reduction in pulse and cortisol levels, in response to the stress reducing properties of green spaces (Buyung-Ali et al., 2010; Tsunetsufu et al., 2010). Resulting in feelings of calm, restored emotional states and a reduction in the perceived levels of stress (Capaldi et al., 2015; McManhan & Estes, 2015). Furthermore, it is possible that as a result of emotional contagion, as suggested by Emotional Contagion Theory (Hatfield, 2008), the stress-reducing properties of nature were vicariously shared between family members. Resulting in the group collectively benefiting from a reduction of stress (Capaldi et al., 2015). Nevertheless, the influence of nature on reducing stress and psychological trauma in front-line workers and their families during public health crises, individually and/or collectively, has not been ascertained in the literature to date. As such, continued investigation into the potential restorative influence of nature on psychological health is of clear value.

In summary, the current study investigated the psychological impact of the COVID-19 pandemic on front-line workers and their families. Front-line workers experienced elevated levels of stress, moral distress and psychological trauma in response to working on the front-line during COVID-19. This was further exacerbated by pandemic induced stressors (e.g., fear)

and increased workplace demands, and resulted in maladaptive coping strategies to counteract the distress. This finding was consistent with the emerging literature on the COVID-19 pandemic. Families experienced social isolation and pandemic specific stressors (e.g., home-schooling), which resulted in families adopting unhelpful coping to reduce the stress and distress. Families also vicariously developed psychological distress after witnessing their loved one's experience trauma and moral distress during COVID-19. Furthermore, develop a psychological cost of caring in response to attempting to alleviate the distress experienced by front-line workers. In spite of this, families and front-line workers were able to mitigate the psychological distress through promoting subjective wellbeing. Engaging in hobbies and spending time in nature, as individuals and as wider family units promoted recovery and fostered resilience. The understanding of the impact of public health crises on the families of front-line workers is very limited. Furthermore, the current findings that elucidated the impact on families (e.g., a psychological cost of caring) and the benefits of spending time in nature have not been captured in the literature to date, thus continued investigation in this area is of clear value.

7.5 Statement of reflexivity

At the time part A and B were completed the researcher also lived through the pandemic, as such the author was mindful of how my own experiences during COVID-19 may have impacted the development of this study. For example, I was home schooling two young children, studying a post graduate degree and trying to ensure my wider family (whom I am a carer for), were safe from harm. Upon reflection, I do not believe my personal experiences impacted the aims or design of part A or B, as I did not have a family member who was a public facing front-line worker. I also had regular supervision from the PhD supervisory team. However, I do believe that the responses I gained from the participants did assist me to cope

with the pandemic on a whole. For example, after the participants reported how spending time in nature improved their wellbeing; my family bought a dog and began walking. My family and I benefited from spending time outdoors and it did assist us to become closer as a family. Nevertheless, I may have experienced vicarious distress after hearing the lived experiences of front-line workers during part B of the study.

At times, it was of course emotive to hear the lived experiences of the participants, especially those who worked with COVID positive patients, or from those who lost loved ones. Hearing individuals describe events they perceived as traumatic, at times, did create an expected, yet measured, emotional response. I believe I managed my emotions well during the interviews and remained professionally supportive to the participants. At times I had to be creative in how I offered support to the participants as I was unable to see their emotions (cameras were turned off to protect their identities), and had to instead rely on tone of voice and statements. Yet, I received supervision in this from my supervisory team, who are also critical incident trainers and advisors. I do believe that I was supportive and displayed how grateful I was that the participants shared their lived experiences with me.

As such, and immediately following the interviews if I felt I had a response I needed to discuss, I sought supervision from my Director of Studies, Dr. Carol Ireland. Dr Ireland was available following each interview to enable me to debrief if required and manage my own responses. I also engaged in self-care to promote my own wellbeing, such as walking the dog. I do not believe I experienced vicarious trauma and feel that my actions (e.g., debrief and wellbeing activities), prevented any harm from occurring. I also kept a diary to keep track of my own emotional responses during the data collection phase.

Before I began the analysis I reflected on the diary and requested additional supervision to discuss my reflections, enabling me to remain objective as a researcher. I do not believe my experiences or any emotional reactions interfered with my ability to remain unbiased and

objective as a researcher. Furthermore, to ensure my personal thoughts, experiences and emotions did not impact the results of this study I asked a second researcher to inter-rate the thematic analysis.

7.6 Reflections on the design of this study

This study aimed to examine how the COVID-19 pandemic impacted individual family members, and how this impacted their ability to provide care to front-line workers. Examining the impact of the pandemic holistically enabled an understanding of how family groups perceived and experienced the COVID-19 pandemic. However, if this study had only considered the impact of caring for a front-line worker, it is likely this would have resulted in limited insights into a family members' individual perceptions and experiences of COVID-19. Furthermore, this may have limited this research's ability to highlight possible protective and vulnerability factors of psychological trauma and resilience in the families of front-line workers. For example, if this study had not captured the lived experiences of families holistically, it would not have been able to explain the levels of fear experienced, and how this altered ordinary behaviours in families (e.g., removing clothes and bathing immediately after arriving home, panic buying).

Nevertheless, this study did not capture multiple individuals within family groups. Therefore, the results may only represent one member's perception of the family's experience. Moreover, the findings obtained do not elucidate the levels of any shared trauma that may have occurred and does not explain how the children of any participants within this study coped. Nonetheless, this study does provide an understanding of how families integrated and collectively coped during a public health crisis that has not been explored previously.

7.7 Overall limitations

A number of limitations can be drawn from this study. Firstly, interviews were conducted remotely using Microsoft Teams, throughout the interviews the participants were asked to ensure their cameras remained off in an effort to protect identity. However, this created difficulties while conducting the interviews and limited analysis. Social interaction typically involves behavioural synchronicity, whereby facial expression and postures are mimicked (Herrando & Constantinides, 2021; Smith & Rose, 2020). The reduction of visual interactions during the interviews reduced the interviewer's ability to display empathy during emotional disclosure. Furthermore, this limited the ability to analyse non-verbal communication and an inability to capture emotional and behavioural cues, which may indicate distress, discomfort, happiness or enthusiasm. Despite this, the participants reported, during the debrief that turning their cameras off provided them with a sense of security, comfort and ease.

Secondly, this study found recruiting participants for part A (recruiting males) and part B challenging. This study struggled to recruit male participants in both parts A and B. It is possible males did not wish to disclose their lived experiences. It is possible that this may have made them feel uncomfortable and, in an effort to reduce risk of harm to themselves they opted not to participate. Moreover, it is possible that they may not have felt equipped to discuss personal feelings, or alternately not want to share any periods of potential personal difficulties. Alternatively, it is possible that males did not feel that they experienced trauma during COVID-19, and thus did not want to participate. It is also possible that males did not wish to volunteer their time. On the other hand, it is also possible the method of recruitment did not allow for men to be obtained.

It was also challenging to recruit participants for part B of this study. It is possible front-line workers may have lost loved ones or lost a number of patients (if working in medical settings), resulting in potential participants being reluctant to discuss this. Alternatively, it is

possible that front-line workers may have been unable to discuss their lived experiences due to workplace confidentiality. On the other hand, it is also possible that front-line workers did not wish to discuss their lived experiences during COVID, and therefore chose not to participate. In contrast, it is possible front-line workers did not access social media and/or were too exhausted to engage.

This study did not explore the nature, severity, or number of exposures to potentially traumatic events experienced by front-line workers or their families. This limits this studies ability to determine the subjective experience of what was considered as traumatic during the COVID-19 pandemic. Nevertheless, psychological trauma is argued to be a subjective experience (van der Kolk, 2014), and therefore the nature of exposure was not a necessary component of this study. However, gaining data that pertains to exposure to trauma will enable a greater understanding of how trauma can develop in front-line workers and their families in any possible future public health crisis.

A number of individuals responded to the advertisement of part B with animosity, with some using verbally threatening language. It is possible this reaction occurred in response to the timing of data collection (January 2022). Front-line workers were 18 months – 2 years into COVID-19 and were facing the Omicron variant. It can be speculated that front-line workers may have experienced increased levels of stress during this time, which may account for the animosity to study B's advertisement. It is also possible the advertisement of this study itself may have triggered an emotional response, which was then directed at the researcher. It is also possible individuals wanted to forget about the pandemic and did not wish to discuss it, as it had been a major aspect of their lives. They may have considered this intrusive and the response to this study could have been irritability connected to trauma, for example hyperarousal. Furthermore, this may account for the small sample size gained. As a result, it is possible the

small sample size reduced the applicability of the findings and may not fully reflect the experiences of those working in health and/or social care roles.

Lastly, the study did not ascertain the severity of the impact or capture if the psychological distress reported was manifested in physiological and psychological symptoms, such as sleep difficulties, fatigue, fluctuations in mood and sadness. This would be useful to address in future studies, including determining if any reported trauma met the criteria for PTSD.

7.8 Overall Implications and recommendations

Front-line workers reported they did not engage in the services provided by organisations to assist in mitigating stress. Further research could be conducted to ascertain why such services were not accessed and, which services may be useful in any potential public health crisis. Secondly, front-line workers and their families benefited from spending time in nature during the pandemic as it promoted wellbeing. This is consistent with the known positive aspects of being in nature (McManhan & Estes, 2015). Therefore, it is recommended organisations enable and/or encourage front-line workers to spend time outdoors in future public health crises. This is likely to promote hedonic and eudaemonic wellbeing and assist in alleviating stress and/or psychological distress. Furthermore, it can promote the development of resilience and protect against developing psychological trauma in the future. Additionally, if front-line workers spend time in nature as a group, for example, work teams, through emotional contagion the group may benefit collectively and develop social networks and a greater sense of team belonging.

Importantly, front-line workers did not disclose their lived experiences to their families in an effort to shield them from harm. However, families were impacted by witnessing their loved one's experience distress, and developed distress, concern and worry in response to front-

line workers not confiding in their families. Therefore, it is recommended that the services available to assist front-line workers are developed to also assist the families of front-line workers. This may assist families to counteract distress in front-line workers and reduce the possibility of the psychological cost of caring developing in families. This would represent a valuable area for research to consider, where the role for supporting and integrating families to manage distress could be considered.

CHAPTER EIGHT

TRAUMA, MORAL INJURY AND RESILIENCE: EXPLORING THE IMPACT OF THE COVID-19 PANDEMIC ON FRONT-LINE WORKERS AND THEIR FAMILIES.

8.1 Structure of this chapter

This chapter will first outline the expected predictions, before presenting the design and findings of the final study. The chapter will conclude by discussing the results, implications of the findings, and future recommendations.

8.2 Aims and hypotheses.

Following the results of earlier studies and the aforementioned literature base, this study aimed to examine if negative psychological impacts (e.g., psychological trauma, vicarious trauma, and moral injury), and positive impacts (e.g., resilience) were experienced in a sample of front-line workers and their families during the COVID-19 pandemic. Furthermore, it aimed to examine if levels of resilience were associated with levels of psychological trauma, vicarious trauma, moral injury, and if resilience mitigated any reported impacts.

This study also aimed to examine the factors that may have promoted resilience during COVID-19. These were social support, subjective wellbeing, and feeling connected with and relating to nature. Moreover, it investigated if relating to nature impacted levels of reported social support, connectedness to nature and subjective wellbeing, and if these factors were associated with and promoted levels of resilience during a public health crisis.

Lastly, this study aimed to explore any differences by gender in reported levels of trauma, moral injury, and resilience as a result of the findings of Study One and Two. Study Two did not specifically report differences in the perceptions of trauma severity by gender as this was not an aim of the study. However, the sample of males obtained did express feeling less impacted by COVID-19 when compared directly with females. Which led to a need to

account for potential gender differences. In addition, previous literature has not always captured gender making it important to acknowledge.

Several hypotheses were formulated based on the results of earlier studies, including the systematic review. These are as follows:

- H1: Front-line workers will experience psychological trauma and vicarious trauma in response to providing support during the COVID-19 pandemic (Abolfotouh et al., 2017; Arribas-Garcia et al., 2020).
- H2: Front-line workers will experience moral injury in response to providing support in public facing roles during the COVID-19 pandemic (Asken, 2019; Riedel et al., 2022).
- H3: Front-line workers will display moderate to high levels of resilience in response to their experiences during the COVID-19 pandemic (Fullana et al., 2020).
- H4: Family members of front-line workers will experience psychological trauma and vicarious trauma in response to providing care to front-line workers during the COVID-19 pandemic (Figley & Kiser, 2013; Herrando & Constantinides, 2021).
- H5: Families of front-line workers will display moderate to high levels of resilience in response to their experiences during the COVID-19 pandemic (Figley & Kiser, 2013).
- H6: Differences will be found in the levels of psychological trauma, moral injury and vicarious trauma reported by gender in front-line workers and in families (Goldberg & Freyd, 2005).
- H7: Identifying with and feeling related to nature will serve to increase perceptions of available social support, connectiveness with nature, subjective wellbeing, and

coping, and will be associated with increased levels of resilience in front-line workers and their families (Capaldi et al., 2015).

H8: The association between the reported levels of trauma symptoms and reported levels of moral injury will be moderated by increased levels of resilience. This will be found in front-line workers and their families.

8.3 Method

8.3.1 Participants

Three hundred and forty-one participants consented to take part, with 138 responses subsequently removed due to being incomplete. This resulted in 203 participants retained for full analysis. Regarding gender, 82.3% identified as female ($n = 167$), 16.3% identified as male ($n = 33$), 1% identified as non-binary/third gender ($n = 2$), with the remainder preferred not to disclose ($n = 1$). Ages ranged from 18-74 ($n = 203$), with a mean age of 31 ($SD = 10.33$).

Participants were also asked to report their relationship status; 40.9% reported being single ($n = 83$) and 23.2% reported being married ($n = 47$). Just under a fifth (18.7%) reported living with a partner ($n = 38$), and 15.3% reported being a relationship but residing in a different home ($n = 31$). One participant (0.5%) reported being divorced, and 1.5% declined to provide an answer ($n = 3$).

Just under half (48.3%) of the participants reported being a front-line worker ($n=98$), with the remainder representing family members of front-line workers ($n = 105$). Of those who reported to working on the front line, 42.9% were employed in the Health Care sector ($n = 42$), 24.5% in the Social Care ($n = 24$), 19.4% in Education and Childcare ($n = 19$), 19.4% in Food and Retail ($n = 19$), 6.1% in Public services ($n = 6$), 3.1% in Public Safety and Security ($n = 3$), in 3.1% Transport, Utilities and Communication ($n = 3$), and 2% Local Government ($n =$

2). Participants were able to report multiple roles or changes to role/s (e.g., new role, volunteer role etc.).

Overall, 67% of participants reported to have a family member who was a front-line worker ($n = 136$) whereas, 33% reported they did not ($n = 67$). Family members were also able to report different front-line roles to enable the reporting of multiple front-line workers, any changes to their roles and/or individuals who held multiple roles. Of those who reported family members working on the front line, 52.9% were employed in the Health Care sector ($n = 72$), 25% in Education and Childcare ($n = 34$), 19.9% in Food and Retail ($n = 27$), 17.6% in the Social Care sector ($n = 24$), 13.2% in Public Safety and Security ($n = 18$), 11.8% in Transport, Utilities and Communication ($n = 16$), 5.1% in Public Safety and Security ($n = 7$), and 2.9% in Local Government ($n = 4$).

8.3.2 Procedure

Ethical approval for this study was obtained from the ethics committee at the University of Central Lancashire. Participants were recruited online using social media sites (e.g., Facebook, LinkedIn, Twitter), with questionnaires completed using Qualtrics. Data collection took place between September 2022 and February 2023, and was collected using self-reported questionnaires. SPSS v29 was used to analyse the data. Participants were presented with an information sheet and asked to provide consent, prior to completing the questionnaire. A copy of the debrief sheet was presented when the participants either ended the study early or upon completion. The debrief detailed avenues of support available (see Appendix five for the information sheet, consent statements, demographic information and debrief).

8.3.4 Measures

Participants were asked to complete the following measures while considering their lived experiences during the COVID-19 pandemic. The following measures were completed (see Appendix Three for the measures).

PTSD Checklist- Civilian Version (PCL-CV) (Weathers et al., 1994).

This measure comprises of 17 questions, which measure the presence and/or severity of psychological trauma. Responses are measured on a 5-point Likert scale, from 1 (not at all) to 5 (extremely). The 17 questions correspond to symptoms of PTSD as presented within the DSM-4 (APA, 2000). Specifically, it measures clusters of symptoms as presented in Criteria B (re-experiencing symptoms, intrusive recollection of events, distressing dreams and/or perceiving the traumatic events as happening again), Criterion C (avoidance of trauma related stimuli such as reminders, thoughts or feelings) and Criterion D (Negative affect, feeling isolated, difficulties sleeping, hypervigilance and/or heightened reactions). The PCL-CV does not provide a detailed assessment of the traumatic event and does not measure levels of fear or perceived helplessness (Criterion A2) (Weathers et al., 1994). However, The PCL-CV does provide an indication of the possible presence of trauma. Furthermore, higher scores indicate higher likelihoods of symptoms that occur in criterion B, C and D. This measure is not intended to diagnose PTSD, rather provides an indication of its possible presence. This measure was chosen as it can provide an indication if individuals may be experiencing symptoms indicative of Post Traumatic Stress Disorder (Weather et al., 1994). Furthermore, it can provide an indication as to the severity of the symptoms associated with PTSD (Weather et al., 1994).

A score of 17-26 is reported to be indicative of little to no symptoms on the PTSD-CV, furthermore 27-29 indicates some, 30-44 moderate to moderately high and 45-85 indicated high presence of symptoms. The minimal score attainable is 17 and the maximum score is 85.

The measure has produced a coefficient alpha of .81. (Weathers et al., 1994). Example items include, ‘Suddenly acting or feeling as if a stressful event were happening again?’ and ‘Repeated, disturbing dreams of a stressful experience from the past?’

Vicarious Trauma Scale (Vrklevski & Franklin, 2008).

This measure contains eight questions. The response format is a 7-point Likert scale of 1 (strongly disagree) to 7 (strongly agree). The measure examines levels of vicarious stress from exposure to shared trauma (Vrklevski & Franklin, 2008). This measure was chosen to examine possible levels of stress experienced from shared trauma during COVID-19. The minimal score attainable is 8 and the maximum score is 56. Higher scores are indicative of an increased level of vicarious trauma. Internal consistency ranges from moderate to good with alpha coefficients of .67 - .84 (Vrklevski & Franklin, 2008). Example items include, ‘I find myself thinking about distressing material at home’ and ‘Sometimes I feel overwhelmed by the workload involved in my job and/or social support role.’

Moral Injury Events Scale (Nash et al., 2013).

This 10-item measure investigates the degree to which an individual perceives a violation, by themselves or others, against deeply held beliefs and/or morals. The response format is a 6-point Likert scale of 1 (strongly disagree) to 6 (strongly agree)¹⁰. This measure examines the levels of subjective distress that can arise following exposure to moral injury, moreover it measures the severity of symptoms indicative of moral injury (Nash et al., 2013). This measure was chosen to explore the presence of subjective morally injurious distress and severity of moral injury symptoms. Participants were asked to refer to their experiences during

¹⁰ One item was removed (item 9, ‘I feel betrayed by others outside the U.S military who I once trusted’), as it was unsuitable for use with the current sample.

the COVID-19 pandemic whilst completing the questionnaire. Higher scores are indicative of having experienced a higher intensity of events that violate personal beliefs. The minimum score attainable is 10 and the maximum score is 60. Internal consistency has been assessed, with an alpha coefficient of .90 (Nash et al., 2013). Example items include, 'I saw things that were morally wrong' and 'I am troubled by having witnessed others immoral acts.'

Nature Relatedness Scale (NR-6) short version (Nisbet & Zelenski, 2013).

This measure contains six questions that measure the degree to which an individual considers they can relate to nature, using a response format on a 5-point Likert scale of 1 (strongly disagree) to 5 (strongly agree). This measure examines the degree to which individuals are aware of, identify with, and relate to natural environments (Nisbet & Zelenski, 2013). As such, this measure was chosen to provide an understanding of how individuals are aware of and identify with nature during COVID-19. The minimum score attainable is 6 and the maximum score is 30. Higher scores are indicative of an increased perception of relatability to nature. The measure has produced an alpha coefficient of .80 (Nash et al., 2013). Example items include, 'I take notice of wildlife wherever I am' and 'I feel connected to all living things and the earth.'

Connectedness to Nature Scale (Mayer & McPherson, 2004).

This measure contains 14 questions that measure how connected individuals may feel to nature. The response format is a 5-point Likert scale of 1 (strongly disagree) to 5 (strongly agree). This measure examines how individuals emotionally connect to nature and how this can impact how individuals experience exposure to nature (Mayer & McPherson, 2004). Thus, this measure was chosen to enable the examination of any reported emotional connect to nature individuals may experience during COVID-19. The minimum score attainable is 14 and the

maximum score is 70. Higher scores are indicative of an increased perception of connectedness to nature. Example items include, 'My personal welfare is independent of the natural world' and 'I often feel part of the 'web of life.'

Brief COPE (Carver, 1997).

This is a short measure of the original 60 item COPE scale developed by Carver (1989). It contains twenty-eight items that measure problem focused coping, emotional focused coping and avoidant coping. This measure examines how individuals cope with levels of stress (Carver, 1997). Thus, was chosen to as it permits an understanding of how individuals may cope with stressors during COVID-19. The response format is a 4-point Likert scale of 1 (I haven't been doing this) to 4 (I've been doing this a lot). The minimum score attainable is 28 and the maximum score is 112. Internal consistency is noted to be good with an alpha coefficient of .72 (Carver, 1997). Example items include, 'I've been praying or mediating', and 'I've been experiencing negative feelings'.

Brief Resilience Scale (Smith et al., 2008).

This contains six items measuring resilience and is rated using a 5-point Likert scale of 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate a higher ability to counteract stress and a higher level of resilience. This measure examine how well individuals can recover following exposure to stress and/or adversity (Smith et al., 2008). Therefore, this measure was chosen to determine how well individuals recovered following exposure to stress during the COVID-19 pandemic. The minimum score attainable is 6 and the maximum score is 30. The measure has reported alpha coefficients ranging from .73 to .84 (Smith et al., 2008). Example items include, 'I tend to bounce back quickly', and 'I usually come through difficult times with little trouble.'

BBC Subjective well-being scale (BBC-SWB) (Pontin et al., 2013).

This comprises of 24 questions that measures the level of subjective wellbeing an individual may possess. The response format is a 5-point Likert scale of 1 (not at all) to 5 (extremely). This measure examines the subjective experiences of individuals and their perception towards their own quality of life (Pontin et al., 2013). As such, this measure was chosen to examine subjective experience and perceived quality of life during COVID-19. The minimal score attainable is 24 and the maximum score is 120. Higher scores are indicative of an increased degree of subjective wellbeing. Internal consistency has produced alpha coefficients of .59 - .87 (Pontin et al., 2013). Example items include, ‘Are you happy with your ability to work?’ and ‘Are you able to ask someone for help with a problem?’

Interpersonal Support Evaluation List (ISEL) (Cohen et al., 1985).

This measure contains twelve questions, with a response format on a 4-point Likert scale of 1 (definitely false) to 4 (definitely true). It is a shortened version of the original 40 item ISEL (Cohen et al., 1985). This measure is reported to measure how much social support can buffer against the effects of stress (Cohen et al., 1985). As such it was chosen to examine if social support had buffering effects on levels of stress during a public health crisis. The minimal score attainable is 12 and the maximum score is 48. Higher scores are indicative of an increased perception of social support. Example items include, ‘I feel there is no one I can share my most private worries and fears with’ and ‘If I were sick, I could easily find someone to help me with my daily chores.’

8.4 Results

This section presents the data screening process followed by the preliminary analysis, which explored the internal consistency of the measures administered, before considering the

impact of the COVID-19 pandemic on front-line workers and their families. This section will then present the main analysis, exploring also the factors that underpin resilience and assessing whether resilience can predict lower levels of psychological trauma, vicarious trauma and moral injury in front-line workers and their families.

8.4.1 Data Screening

The data was examined to look for the presence of missing values, data entry errors, univariate and multivariate outliers. Of the retained 203 participants, a total of 8.4% of data points were missing ($n = 17$). A Little's MCAR test was conducted to test the null hypothesis that the data was missing completely at random. This indicated that the missing data was missing completely at random ($\chi^2 = 1065.42$, $df = 1062$, $p = .465$). The missing items were thus replaced with the group mean (Tabachnick & Fidell, 2013).

Univariate outliers were identified using the outlier labelling rule method (Hoaglin & Iglewicz, 1987). Seven cases fell outside the parameters. These items were replaced by the next lowest score in the group (Tabachnick & Fidell, 2013). Mahalanobis distances were then used to assess for multivariate outliers. No multivariate outliers were present (Pallant, 2020).

Kolmogorov-Smirnov test of normality was conducted to determine the distribution of scores across measures. The only measures that were not normally distributed were as follows; PTSD checklist ($p = <.001$), resilience ($p = <.001$), subjective wellbeing ($p = .021$), vicarious trauma ($p = .019$) and interpersonal support ($p = <.001$). As suggested by Tabachnick and Fidell (2013) histograms, detrended normal Q-Q plots and boxplots were thus utilised to judge normality in more detail. A reasonably straight line and rectangle representing 50% of the cases was found, therefore normality was deemed acceptable (Pallant, 2020; Tabachnick & Fidell, 2013). This decision also accounted for the sample size, which attended to central limits concerning acceptable sizes (Hayes, 2014).

Levels of skewness and kurtosis were analysed and compared to the recommended range (-2 to +2), as suggested by George & Mallery (2010). Evidence of minor positive skew was found in the PTSD checklist, but this was not unexpected considering the nature of this measure. Tabachnick & Fidell (2013) suggest that levels of skew do not significantly influence the results within large data sets. As a result, histograms were observed to look for skew and kurtosis. The distribution of scores in all measures was deemed acceptable (Pallant, 2020).

Predictions:

It was predicted that; 1). **Front-line workers will experience psychological trauma and vicarious trauma in response to providing support during the COVID-19 pandemic** and 2). **Front-line workers will experience moral injury in response to providing support in public facing roles during the COVID-19 pandemic.** In addition, it was predicted that, 3). **Front-line workers will display moderate to high levels of resilience in response to their experiences during the COVID-19 pandemic.** It was also predicted that, 4). **Family members of front-line workers will experience psychological trauma and vicarious trauma in response to providing care to front-line workers during the COVID-19 pandemic** and 5). **Families of front-line workers will display moderate to high levels of resilience in response to their experiences throughout the COVID-19.**

8.4.2 Analysis

8.4.2.1 Impact of the COVID-19 pandemic on frontline workers and families.

This section presents, first the internal consistency of the measures used and provides some descriptive analysis on the impact of the COVID-19 pandemic on front-line workers and their families, before moving onto testing predictions.

Mean scores on trauma, moral injury and resilience were considered across those reporting little to no symptoms on the PTSD-CV (17-26), some (27-29), moderate to moderately high (30-44) and high (45-85) levels of symptoms. These were considered overall and across gender, families and front-line workers. Table six presents scores across all measures, along with scale reliability.

Table 6

Descriptive statistics of all variables by sex, front-line worker, family and by PTSD symptom severity.

Measures	<i>n</i>	Overall Mean	(α)
PTSD	203	40.76	.93
Females	167	40.35	
Males	33	42.31	
Vicarious Trauma	203	31.09	.85
Females	167	32.04	
Males	33	27.03	
Moral Injury Events	203	35.37	.73
Females	167	35.34	
Males	33	36.44	
Nature Relatedness	203	20.67	.85
Females	167	20.53	
Males	33	20.44	
Connectivity to Nature	203	45.66	.82
Females	167	46.14	
Males	33	43.65	
Brief COPE	203	62.26	.85
Females	167	62.35	
Males	33	60.76	
Brief Resilience	203	19.57	.85
Females	167	19.35	
Males	33	20.88	
BBC Subjective Wellbeing	203	78.70	.93
Females	167	78.80	
Males	33	79.50	
Interpersonal Support	203	30.99	.86
Females	167	30.99	
Males	33	31.18	

Front-line Workers	<i>n</i>	Mean	SD	PTSD Symptoms Range Mean Scores							
				Little to none	SD	Some	SD	Mod to mod high	SD	High	SD
PSTD	98	41.44	13.34	21.29	2.95	27.60	0.90	36.90	4.90	54.68	6.75
Females	86	40.48	13.40	21.15	3.02	27.60	0.89	36.34	4.74	54.42	7.28
Males	10	46.40	10.82	23.00	-	-	-	41.75	3.86	54.80	2.39
Vicarious trauma	98	34.29	10.28	31.64	10.03	28.60	10.41	35.08	9.69	35.15	10.88
Females	86	34.69	10.32	32.69	9.60	28.60	10.41	35.74	9.76	35.27	11.17
Males	10	31.30	10.54	18.00	-	-	-	29.25	7.76	35.60	11.55
Moral Injury	98	34.87	8.87	38.57	12.08	37.40	6.66	35.41	6.96	32.73	9.19
Females	86	35.05	8.65	37.62	12.01	37.40	6.66	35.51	6.80	33.18	9.09
Males	10	36.10	9.77	51.00	-	-	-	34.50	9.40	34.40	9.32
Nature Relatedness	98	21.60	4.58	21.93	3.15	20.20	5.81	21.56	4.52	21.70	5.01
Females	86	21.83	4.39	22.30	2.93	20.20	5.81	21.74	4.33	21.97	4.82
Males	10	19.50	6.08	17.00	-	-	-	20.00	6.48	19.60	7.06
Connectives to nature	98	47.03	6.81	48.64	6.76	46.60	5.94	46.72	6.40	46.83	7.46
Females	86	47.29	6.26	49.15	6.74	46.60	5.94	47.54	5.42	46.39	6.99
Males	10	43.30	10.08	42.00	-	-	-	39.50	10.41	46.60	10.90
Brief Cope	98	62.16	11.45	59.21	14.60	63.40	16.23	59.18	8.83	65.95	11.20
Females	86	61.66	10.69	61.31	12.82	63.40	16.23	59.09	9.00	64.27	10.40
Males	10	62.90	16.04	32.00	-	-	-	60.00	8.16	71.40	13.83
Brief Resilience	98	20.30	4.23	22.93	2.13	21.80	5.54	20.67	4.17	18.83	4.69
Females	86	20.23	4.53	22.85	2.19	21.80	5.54	20.69	4.20	18.48	4.86
Males	10	20.60	3.92	24.00	-	-	-	20.50	4.51	20.00	4.00
BBC Subjective wellbeing	98	78.73	17.10	93.14	10.10	86.60	20.18	77.59	16.36	73.83	16.81
Females	86	79.08	17.50	93.38	10.47	86.60	20.18	78.23	16.26	73.21	17.67
Males	10	76.10	16.62	90.00	-	-	-	72.00	18.62	76.60	12.48
Interpersonal support	98	30.71	3.17	30.64	3.30	30.80	2.39	30.46	2.59	30.98	3.77
Females	86	30.72	3.03	30.54	3.41	30.80	2.39	30.57	2.29	30.94	3.70
Males	10	30.00	4.14	32.00	-	-	-	29.50	4.93	30.00	4.36

Families	<i>n</i>	Mean	SD	PTSD symptoms range Mean Scores							
				Little to none	SD	Some	SD	Mod to mod high	SD	High	SD
PSTD	105	40.12	13.55	22.16	2.77	28.25	0.50	36.11	3.77	55.51	7.72
Females	81	40.68	13.17	22.57	2.85	28.33	0.58	36.38	3.94	55.23	6.53
Males	23	38.21	15.22	21.000	2.45	28.00	-	34.88	3.10	56.71	12.22
Vicarious trauma	105	28.11	10.28	24.58	9.81	23.75	10.53	28.53	9.56	29.89	10.35
Females	81	29.23	9.56	28.07	7.47	22.00	12.16	29.88	9.68	29.77	10.17
Males	23	24.39	10.92	14.80	9.44	29.00	-	24.50	8.64	30.43	11.94
Moral Injury	105	35.84	6.93	37.58	4.90	35.00	9.27	36.87	5.77	33.81	8.46
Females	81	35.64	6.80	36.43	3.88	37.67	9.29	36.53	5.92	34.07	8.42
Males	23	37.00	7.26	40.80	6.46	27.00	-	39.10	3.90	32.71	9.23
Nature Relatedness	105	19.80	4.83	17.11	3.94	23.25	4.03	19.44	5.22	21.24	4.17
Females	81	19.59	4.76	17.43	4.16	21.67	3.06	19.50	5.51	20.50	4.01
Males	23	20.43	5.18	16.20	3.49	28.00	-	19.00	4.59	24.43	3.46
Connectives to nature	105	44.38	7.96	41.47	8.09	47.00	0.82	44.51	8.56	45.43	7.37
Females	81	44.63	7.92	42.14	8.57	47.00	1.00	45.47	8.59	44.60	7.19
Males	23	43.09	8.10	39.60	7.09	47.00	-	40.30	7.41	49.00	7.62
Brief Cope	105	62.35	10.96	59.42	12.68	57.00	9.45	61.04	9.62	66.03	10.79
Females	81	63.10	10.78	64.07	9.32	57.67	10.07	60.59	10.57	66.33	11.01
Males	23	59.43	11.10	46.40	12.38	64.00	-	61.80	5.90	64.71	10.52
Brief Resilience	105	18.91	4.69	21.89	5.00	17.75	3.40	19.47	4.42	16.78	4.03
Females	81	18.19	4.43	20.36	4.75	17.33	4.04	19.29	4.25	16.00	3.70
Males	23	21.65	4.59	26.20	2.77	19.00	-	20.70	4.80	20.14	3.85
BBC Subjective wellbeing	105	78.68	15.05	86.37	13.83	79.75	19.87	79.49	15.61	73.62	13.00
Females	81	78.49	14.71	84.29	14.58	76.00	22.54	79.79	15.26	74.57	12.92
Males	23	79.22	16.80	92.20	10.62	91.00	-	78.30	18.32	69.57	13.54
Interpersonal support	105	31.25	2.60	30.89	2.02	31.25	2.22	31.18	2.28	31.51	2.85
Females	81	31.25	2.76	30.86	2.25	32.00	2.00	31.18	3.00	31.43	2.85
Males	23	31.35	1.99	31.00	1.41	29.00	-	31.40	1.26	31.86	3.08

Note: - = SD could not be calculated as the *n* = 1. Non-binary/third gender (*n* = 2) and preferred not to disclose (*n* = 1) were not analysed separately due to small sample sizes.

Predictions:

It was predicted that 6). **Differences will be found in the levels of psychological trauma, moral injury and vicarious trauma reported by gender in front-line workers and in families.**

8.4.2.2 Comparison of PTSD, vicarious trauma and moral injury by gender, in families and front-line workers.

A series of MANOVA statistical tests were conducted. Preliminary assumptions testing was conducted to assess for normality, outliers (univariate and multivariate), homogeneity of variance-covariance and linearity, with no violations noted. Post hoc tests were performed using a Bonferroni criterion adjustment, as suggested by Tabachnick & Fidell (2013). This was conducted to adjust the probability of the (p) value to reduce the risk of type 1 error occurring (Pallant, 2020). The Bonferroni criterion adjustment resulted in a new alpha level of $p < .017$. Post hoc power analysis was conducted using G*Power 3.1.9.7. (Erdfelder, et al., 2007) on the obtained sample ($N = 203$) and nine predictor variables were used as a baseline. The recommended effect size used for this assessment were as follows, small ($f^2 = .02$), medium ($f^2 = .15$), and large ($f^2 = .35$) (see Cohen, 1977). The alpha level used for this analysis was $p < 0.017$ (Bonferroni criterion corrected level). The post hoc analysis indicated the statistical power was .11 for detecting a small effect size, whereas the power for detecting moderate to large effect size was .95. Thus, adequate statistical power was found (i.e., Power* .80 as suggested by Cohen, 1962), at the moderate to large effect size, but less adequate statistical power in the small effect size level.

Firstly, PTSD symptom severity, vicarious trauma and moral injury were explored by gender (female/male). A statistically significant difference was found with little to no levels of PTSD on the PTSD-CV and vicarious trauma $F(1, 33) = 14.55, p < 0.01$; Wilks' $\Lambda = 4.80$; η^2

= .32. Post hoc tests indicated that females reported increased levels of vicarious trauma in contrast to males ($M = 30.30$, $SD = 8.71$ compared to $M = 15.33$, $SD = 8.54$). However, no statistical difference was found between PTSD symptom severity (Low, Some, Moderate to moderately high, High), moral injury and vicarious trauma between males and females.

A statistically significant difference was also identified between front-line workers and families, with moderate levels of PTSD on the PTSD-CV and vicarious trauma $F(1, 93) = 9.66$, $p < 0.01$; Wilks' $\Lambda = .88$; $\eta^2 = .12$. Post hoc tests indicated that front-line workers reported increased levels of vicarious trauma in contrast to families ($M = 35.08$, $SD = 9.69$ compared to $M = 28.53$, $SD = 9.56$). No statistical difference was found between moral injury, vicarious trauma and PTSD symptom severity (Low, Some, Moderate to moderately high, High), between front-line workers and families.

Lastly, a two-way MANOVA was conducted on PTSD symptom severity, vicarious trauma and moral injury, between gender and being a family member or a front-line worker. No statistically significant differences were found between gender, families and front-line workers.

Predictions:

It was predicted that; 7). **Identifying with and feeling related to nature will serve to increase levels of perceived available social support, connectiveness with nature, subjective wellbeing and coping, and will be associated with increased levels of resilience in front-line workers.**

8.4.2.3 Predictors and associations of resilience in front-line workers and families by gender.

Table seven presents overall correlation coefficients across all measures, Table eight presents the correlation coefficients by gender (female/male) in front-line workers, and Table nine across role by gender (female/male) in families.

Table 7

Correlation coefficients for overall relationships between all measures (N= 203).

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Resilience	-								
2. PTSD	-.326**	-							
3. Vicarious Trauma	.180*	.140*	-						
4. Moral Injury	-.122	-.243**	-.281**	-					
5. Nature relatedness	.037	.212**	.137	-.118	-				
6. Connectivity to nature	.033	.107	.180*	-.215**	.687**	-			
7. Coping	-.155*	.289**	.160*	-.274**	.222**	.247**	-		
8. Subjective wellbeing	.418**	-.325**	-.189**	.206**	.158*	.158*	-.027	-	
9. Interpersonal support	-.083	.060	.120	-.157*	.120	.113	.113	-.042	-

** $p < .01$; * $p < .05$

Table 8

Correlation coefficients for relationships between all measures in female (n = 86) and male (n = 10) front-line workers.

<i>Females</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Resilience	-								
2. PTSD	-.339**	-							
3. Vicarious Trauma	-.217*	.067	-						
4. Moral Injury	.133	-.182	-.253*	-					
5. Nature relatedness	.073	.105	.019	-.051	-				
6. Connectivity to nature	.125	-.068	.060	-.136	.560**	-			
7. Coping	-.118	.190	.039	-.251*	.135	.215*	-		
8. Subjective wellbeing	.448**	-.434**	-.285**	.121	.196	.337**	-.039	-	
9. Interpersonal support	-.085	.067	.222*	-.203	.140	.143	.223*	-.108	-
<i>Males</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Resilience	-								
2. PTSD	-.381**	-							
3. Vicarious Trauma	-.032	.063	-						
4. Moral Injury	.248*	-.236*	-.317**	-					
5. Nature relatedness	-.034	.235*	.053	-.069	-				
6. Connectivity to nature	.028	.091	.143	-.101	.776**	-			
7. Coping	-.016	.280*	.267*	-.331**	.254*	.304**	-		
8. Subjective wellbeing	.417**	-.267*	-.057	.339**	.229*	.350**	.160	-	
9. Interpersonal support	-.056	.032	.017	-.036	.198	.192	.090	-.011	-

** $p < .01$; * $p < .05$

Table 9

Correlation coefficients for relationships between all measures in female (n = 81) and male (n = 23) family members.

<i>Females</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Resilience	-								
2. PTSD	-.381**	-							
3. Vicarious Trauma	-.032	.063	-						
4. Moral Injury	.248*	-.236*	-.317**	-					
5. Nature relatedness	-.034	.235*	.053	-.069	-				
6. Connectivity to nature	.028	.091	.143	-.101	.776**	-			
7. Coping	-.016	.280*	.267*	-.331**	.254*	.304**	-		
8. Subjective wellbeing	.417**	-.267*	-.057	.339**	.229*	.350**	.160	-	
9. Interpersonal support	-.056	.032	.017	-.036	.198	.192	.090	-.011	-
<i>Males</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Resilience	-								
2. PTSD	-.290	-							
3. Vicarious Trauma	-.306	.439*	-						
4. Moral Injury	.244	-.282	-.142	-					
5. Nature relatedness	-.246	.566**	.543**	-.420*	-				
6. Connectivity to nature	-.223	.473*	.298	-.533**	.651**	-			
7. Coping	-.471*	.363	.461*	-.115	.608**	.226	-		
8. Subjective wellbeing	.454*	-.483	-.426*	.336	-.271	-.437*	-.289	-	
9. Interpersonal support	-.016	.189	.096	.088	-.099	-.058	-.077	.049	-

** $p < .01$; * $p < .05$

Several standard Multiple Regressions were performed. The regressions were conducted to identify if nature relatedness, connectiveness to nature, coping, subjective wellbeing and interpersonal support significantly predicted levels of resilience in females, males, front-line workers and families. As presented in the correlation coefficient tables (e.g., 5, 6 and 7), nature relatedness and connectiveness to nature were strongly associated, which was indicative of multicollinearity. A preliminary analysis was conducted to assess for multicollinearity and homoscedasticity in these variables, and Tolerance and Variance Inflation Factor (VIF) indicated that this fell within acceptable levels¹¹ (Pallant, 2020). As noted earlier, these measures evaluate different concepts, consequently these measures were retained in the regression. No other violations of normality were found.

The first Multiple Regression was conducted to determine if nature relatedness, connectiveness to nature, coping, subjective wellbeing, and interpersonal support predicted levels of resilience. This was conducted by gender (female/male) and by role (front-line worker/family). Resilience was entered into the regression as the Dependant variable. Nature relatedness, connectiveness to nature, coping, subjective wellbeing, and interpersonal support were entered into block one. The model of resilience in *female front-line workers* was significant, with the predictors explaining 21% of the variance ($R = .21, F(5,86) = 4.27, p < .05$). Of the unique predictors, increased subjective wellbeing positively predicted resilience ($\beta = .44, t(5, 86) = 4.12, p < .05$). However, nature relatedness ($\beta = .003, t(5, 86) = .03, p = .98$), coping ($\beta = -.10, t(5, 86) = -.93, p = .35$), connectiveness to nature ($\beta = -.003, t(5, 86) = -.02, p = .98$), and interpersonal support ($\beta = -.02, t(5, 86) = -.15, p = .88$) did not significantly contribute.

The Regression model was also significant for *female family members* ($R = .20, F(5,81) = 3.64, p < .05$), explaining 20% of the variance. Of the unique predictors, increased

¹¹ Tolerance scores were above .10 and VIF values were below 10 (Pallant, 2020).

subjective wellbeing positively predicted resilience ($\beta = .46, t(5, 81) = 4.13, p = <.05$). However, nature relatedness ($\beta = -.09, t(5, 81) = -.52, p = .60$), coping ($\beta = -.05, t(5, 81) = -.48, p = .64$), connectiveness to nature ($\beta = -.04, t(5, 81) = -.27, p = .79$), and interpersonal support ($\beta = -.02, t(5, 81) = -.19, p = .85$) did not significantly contribute. For *males*, no significant model of resilience were found in *front-line workers* ($R = .44, F(5,10) = 2.42, p = .21$) or in *families* ($R = .14, F(5,23) = 3.64, p = .17$).

A further Regression was conducted to identify if reported levels of PTSD, vicarious trauma and moral injury significantly predicted levels of resilience by gender (females/males) and by reported role (front-line workers/families). Resilience was entered as the Dependant variable, with PTSD total scores, vicarious trauma and moral injury entered into block one. The resulting model was significant in *female front-line workers*, with the predictors explaining 12% of the variance in resilience ($R = .12, F(5,86) = 4.95, p = <.05$). Of the unique predictors, levels of PTSD negatively predicted resilience ($\beta = -.32, t(5, 86) = -.3.10, p = <.05$). Vicarious trauma ($\beta = -.19, t(5, 86) = -1.80, p = .08$) and moral injury ($\beta = .03, t(5, 86) = .25, p = .81$) did not significantly contribute.

A statistically significant model was also found in *female family members* ($R = .14, F(5,81) = 5.40, p = <.05$), where the predictors explained 14% of the variance. PTSD negatively predicted resilience ($\beta = -.34, t(5, 81) = -3.20, p = <.05$). However, vicarious trauma ($\beta = .05, t(5, 81) = .43, p = .67$) and moral injury ($\beta = .18, t(5, 81) = 1.63, p = .12$) did not significantly contribute. No statistically significant models of resilience were found in *male front-line workers* ($R = -.19, F(5,10) = 53, p = .68$) or *male family members* ($R = .02, F(5,23) = 1.12, p = .36$).

Predictor:

It was predicted that 8). The association between the reported levels of trauma symptoms and reported levels of moral injury will be moderated by increased levels of resilience.

8.4.2.4 Mediation analysis accounting for the relationship between moral injury, psychological trauma and/or vicarious trauma.

A series of mediation analyses were conducted using IBM SPSS Amos 26 using a bootstrapping estimation approach¹² (Hoyle, 2014). The mediation analyses tested if resilience mediated the relationship between moral injury and psychological trauma (PTSD total scores), and moral injury and vicarious trauma. As suggested by Collier (2020), the first step of the mediation analysis tested if a direct relationship was present between moral injury and psychological trauma, and moral injury and vicarious trauma. In the second step resilience was added to identify if this mediated any effects found. The first hypothesised mediation model was tested on overall reported scores, and the second meditation model was tested by gender (female/male)¹³. Unstandardised effects and levels of significance for the mediation analyses are presented in Table ten.

¹² 95% confidence intervals were obtained using 5000 bootstrapping estimations (Hayes, 2014).

¹³ The data set was split by gender (female/male).

Table 10

Test for mediation of moral injury on psychological and vicarious trauma via resilience using bootstrap analysis with 95% confidence intervals.

Relationship	Direct effect	Indirect effect	<u>Confidence interval</u>		Indirect <i>p</i> value	Conclusion
			<i>Low</i>	<i>High</i>		
Overall						
Moral injury → Resilience → Psychological Trauma	-.32 (-2.86*)	-.09	-.19	-.03	< .05	Partial mediation
Moral injury → Resilience → Vicarious Trauma	-.36 (-3.90***)	-.02	-.07	.01	.203	No mediation
Females						
Moral injury → Resilience → Psychological Trauma	-.25 (-2.04)	-.09	-.20	-.01	< .05	Full mediation
Moral injury → Resilience → Vicarious Trauma	-.36 (-3.63***)	-.004	-.05	-.10	.646	No mediation
Males						
Moral injury → Resilience → Psychological Trauma	-.49 (-1.66)	-.11	-.93	.19	.150	No mediation
Moral injury → Resilience → Vicarious Trauma	-.38 (-1.63)	-.06	-.37	.03	.267	No mediation

Note: Unstandardised coefficients reported. Values in parentheses are t-Values. Bootstrap sample = 5000 replacement, *** $p < .001$; * $p < .05$.

In the *overall* mediation model the results presented a significant negative direct effect between moral injury and psychological trauma (unstandardised effect = -.41, 95% CI [-.67, -.15]). After resilience was added to the model, a significant negative indirect effect of moral injury via resilience on psychological trauma was found (unstandardised effect = -.09, 95% CI [-.19, .03]). A significant negative direct effect was also found between moral injury and psychological trauma (unstandardised effect = -.32, 95% CI [-.58, -.07]). Thus, a partial mediation of resilience was found in the relationship between moral injury and psychological

trauma. A significant negative direct effect was also found *overall* in the first step between moral injury and vicarious trauma (unstandardised effect = $-.37$, 95% CI $[-.56, -.20]$). After resilience was added to the model a significant negative direct effect of moral injury on vicarious trauma remained (unstandardised effect = $-.36$, 95% CI $[-.54, -.18]$). No significant indirect effect of moral injury via resilience on vicarious trauma was found (unstandardised effect = $-.02$, 95% CI $[-.07, .01]$). Therefore, no mediation was found between moral injury via resilience on vicarious trauma. Figure 5 presents the *overall* mediation analysis.

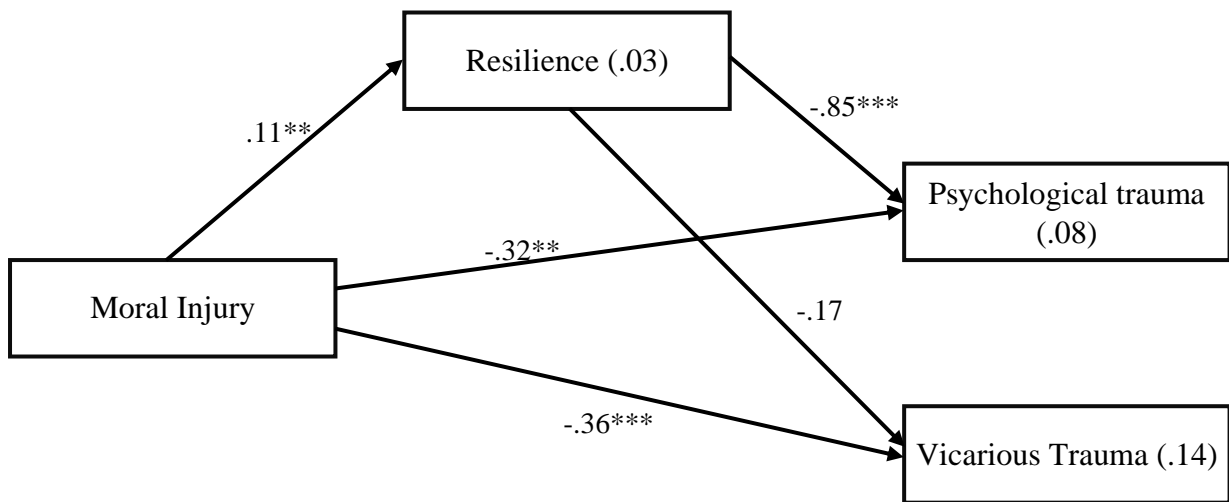


Figure 4: Estimated overall mediation analysis with unstandardized path coefficients. R-Square values are presented in parentheses (nb. All endogenous variables are associated with errors, which for simplicity are not shown in this figure). ** = $p < .05$; *** $p < .001$

In the *female* mediation model, a significant negative direct effect was found between moral injury and psychological trauma in the first step (unstandardised effect = $-.35$, 95% CI $[-.64, -.06]$). After resilience was added into the model, a non-significant direct effect was found between moral injury and psychological trauma (unstandardised effect = $-.25$, 95% CI $[-.54, .02]$). Resilience was found to have a statistically significant negative indirect effect on psychological trauma via moral injury (unstandardised effect = $-.09$, 95% CI $[-.20, -.01]$). Thus, a full mediation was found in *females*, whereby, the effects of moral injury on

psychological trauma were mediated by resilience. A significant negative direct effect was also found between moral injury and vicarious trauma in *females* during the first step (unstandardised effect = $-.37$, 95% CI [$-.56, -.18$]). After resilience was added to the model, a significant negative direct effect was found between moral injury and vicarious trauma (unstandardised effect = $-.36$, 95% CI [$-.56, .17$]). A non-significant indirect effect was found between moral injury and vicarious trauma via resilience (unstandardised effect = $.004$, 95% CI [$-.05, -.01$]). Thus, no mediation was found. Figure 6 presents the *female* mediation analysis.

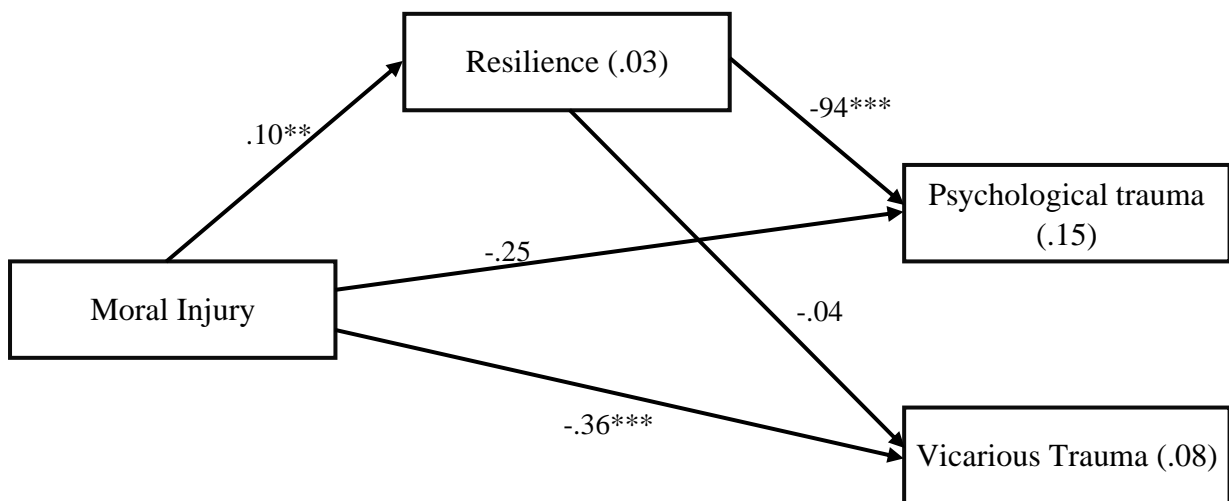


Figure 5: Females estimated mediation analysis with unstandardized path coefficients. R-Square values are presented in parentheses (nb. All endogenous variables are associated with errors, which for simplicity are not shown in this figure). ** = $p < .05$; *** $p < .001$

In the *male* mediation model, no significant direct effects were found between moral injury and psychological trauma (unstandardised effect = $-.49$, 95% CI [$-.93, .19$]). Furthermore, no direct effect was found between moral injury and vicarious trauma (unstandardised effect = $-.38$, 95% CI [$-.89, .16$]). Therefore, no mediation of moral injury via resilience on psychological trauma and/or vicarious trauma was found in *males*. Figure 7 presents the *male* mediation analysis.

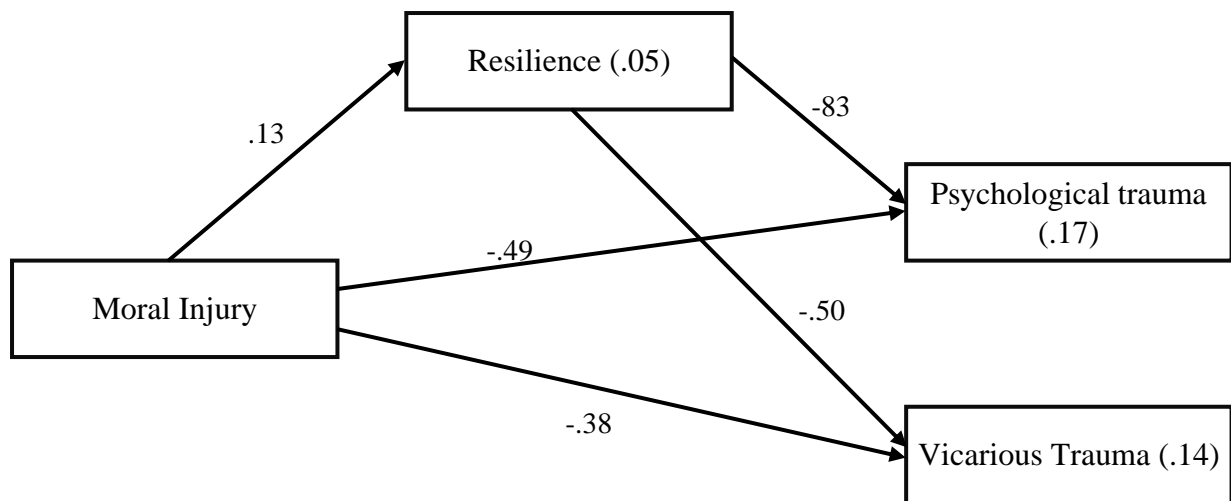


Figure 6: Males estimated mediation analysis with unstandardized path coefficients. R-Square values are presented in parentheses (nb. All endogenous variables are associated with errors, which for simplicity are not shown in this figure). ** = $p < .05$; *** $p < .001$

8.5 Discussion

The current findings demonstrate that front-line workers and their families experienced psychological trauma, vicarious trauma and moral injury during the COVID-19 pandemic. Moderate to moderately high levels of trauma, alongside moderate levels of moral injury were reported as a result of the COVID-19 pandemic. Front-line workers and their families also reported moderate levels of resilience. A significant predictive model of resilience was found in female front-line workers and family members, indicating that subjective wellbeing was a significant predictive factor of resilience. Furthermore, a significant predictive model of resilience was found in female front-line workers and family members, whereby levels of PTSD negatively predicted resilience. In contrast, no predictive models of resilience were found in male front-line workers or male family members. The relationships between exposure to trauma (direct and indirect) and negative symptoms (trauma, moral injury) were also examined, demonstrating via mediation analyses that the effect of moral injury on psychological trauma was mediated via resilience in females. However, no mediation was found in males. Thus, suggesting an indication of gender differences may be present.

The majority of front-line workers reported experiencing moderate levels of vicarious trauma and psychological trauma. Furthermore, those who reported moderate to high levels of PTSD experienced higher levels of vicarious trauma, in contrast to those who experienced some or little to no levels of PTSD. Thus, hypothesis 1). **Front-line workers will experience psychological trauma and vicarious trauma in response to providing support during the COVID-19 pandemic** was supported. The levels of vicarious trauma reported were consistent between the moderate to high severity symptoms indicative of PTSD. It is likely front-line workers were exposed to traumatic events and stressors specific to public health crises (e.g., infected patients, high patient numbers), while working on the front-line during COVID-19.

The levels moderate to high levels of symptoms indicative of trauma reported within this study are similar to those reported within the emerging COVID-19 literature. Carmassi et al., (2021), indicated that 23.5% of health care front-line workers ($N = 514$), reported severe levels of post traumatic stress after providing care to patients during COVID-19. In addition, Greene et al., (2021) stated 22% of health care workers met the clinical threshold for PTSD. However, the levels obtained within this study are higher than those reported by Carmassi et al., (2021) and Greene et al., (2021). It is possible the higher levels of trauma suggested in this study may be due to the front-line sectors that were examined. This study measured levels of trauma in all front-line sectors, in comparison to Carmassi et al., (2021) and Greene et al., (2021) who examined health care front-line workers only. This may account for the higher levels of trauma reported in this study. Furthermore, it can be speculated that the increased levels found may be due to continued exposure to potentially traumatic events, as the present study was conducted between September 2022 to February 2023, in comparison to Carmassi et al., (2021) and Greene et al., (2021), which were conducted in 2020. Thus, it is possible continued exposure may have increased the susceptibility to developing symptoms indicative of psychological trauma.

The levels of trauma reported also provide support towards the findings of the British Medical Association and Scott et al., (2023). The British Medical Association reported that 50% of front-line workers reported difficulties with their mental health during COVID-19 (BMA, 2023). Furthermore, Scott et al., (2023) reported 53.9% of participants screened positive for presence of mental disorders (including PTSD). Thus, the findings of this study provide support towards the reported levels of trauma within the literature base and further suggest that psychological trauma is likely to have developed in front-line workers during the COVID-19 pandemic. In spite of this, the present study did not measure other clinical aspects that may have impacted levels of trauma. For example, clinical distress and other mental disorders (e.g., depression, anxiety). As such, the levels of trauma reported should be considered with caution as other factors that were not measured may have influenced or contributed towards the severity of symptoms indicative of trauma that were reported.

When comparing levels of reported trauma pre and post pandemic in front-line workers, the levels of reported trauma are lower pre-pandemic however, levels of reported stress are similar (see Burke & Greenglass, 2002 and Elshaer et al., 2018). It can be theorised that additional factors (e.g., increased patient numbers, fear), may have contributed to the development of trauma during the pandemic, and resulted in the increased levels of reported psychological trauma. For example, Greene et al., (2021) reported increased levels of fear, poor coping and limited access to PPE was reported to increase the likelihood of PTSD. The current study did not investigate levels of fear or perceptions regarding access to PPE. Nevertheless, did measure how individuals cope with levels of stress. The findings suggested that as severity of symptoms indicative of PTSD increased, the ability to cope with stress increased. Moreover, those reporting high PTSD symptoms held higher levels of coping ability. This finding is different from that reported by Greene et al., (2021). However, it is possible this may be due to measures obtained to capture coping. Whereby the present study used the Brief COPE scale

and Greene et al., (2021) did not utilise a specific coping scale. In spite of this, research that considered the factors that may underpin coping and the impact this may have upon levels of trauma in front-line workers is of clear value. For example, it is possible a reduction in the mitigating factors of stress and trauma in the workplace (e.g., job satisfaction), may have influenced levels of coping in front-line workers and affected the levels of reported trauma in the literature and within this study.

The impact of the exposure to trauma may have been amplified by the levels of emotions experienced, for example fear, as suggested by The Cognitive Appraisal Theory of Emotion (Moors, 2013, 2104). This may have influenced the levels of traumatic stress experienced and resulted in the moderate to high levels of reported trauma found and is consistent with the findings of Ouyand et al., (2022) and Yuan et al., (2021). The literature on vicarious trauma during COVID-19 is limited, however the levels of vicarious trauma reported, for example by Wang, Wu & Chen, (2021) are lower than those found in this study. It is possible the variation in results is partially due to the differences in the measures administered¹⁴ (Wang, Wu & Chen, 2021). Regardless, the differences in results obtained in front-line workers indicates a clear impact occurred. As such, further research would be beneficial in the understanding of the psychological impact of public health crises on front-line workers.

The current findings suggest that families were also impacted as a result of COVID-19. In families, higher levels of trauma were reported, in comparison to front-line workers, which was a surprising finding. However, lower levels of vicarious trauma were found in families across the symptom severity range of PTSD. Thus, hypothesis, 4). **Family members of front-line workers will experience psychological trauma and vicarious trauma in response to providing care to front-line workers during the COVID-19 pandemic** was supported. Speculatively, it is possible families were exposed to traumatic events during COVID-19 that

¹⁴ Wang, Wu & Chen (2021) utilised the Vicarious Traumatization questionnaire developed by Hans (2009).

provoked negative emotional reactions, for example fear. It is further possible the fear experienced may have impacted their cognitive appraisals of the events experienced, as suggested by Cognitive Appraisal Theory of Emotion (Moors, 2013, 2104) and resulted in the levels of trauma reported. Moreover, it is possible families vicariously developed trauma after witnessing front-line workers display traumatic stress, as proposed by Emotional Contagion Theory (Hatfield et al., 1994, 2014). To date, no quantitative research is currently available that reports the levels of psychological trauma and vicarious trauma experienced by the families of front-line workers during a public health crisis. Nevertheless, the current findings are consistent with a qualitative study conducted by Tekin et al., (2022).

The current findings indicated that front-line workers reported experiencing morally injurious events during the COVID-19 pandemic. Overall, front-line workers experienced moderate levels of moral injury, with those reporting little to no trauma severity experiencing higher levels of moral injury. As such, hypothesis 2). **Front-line workers will experience moral injury in response to providing support in public facing roles during the COVID-19 pandemic** was supported. Moral injury has not been well documented in front-line workers who are not employed within military roles, or in those who have not experienced war or combat environments. Nevertheless, it is possible front-line workers developed moral injury after witnessing and/or participating in acts that contradicted their own personal or professional codes of acceptable conduct (Cartolovni et al., 2021; Shay, 2011). The results of this study suggest that moral injury was experienced in front-line workers and provides support to the emerging COVID-19 literature. For example, Nieuwsma et al., (2022) compared the development of moral injury between 9/11 veterans ($N = 618$) and health care workers who provided care during COVID-19 ($N = 2099$). Nieuwsma et al., (2022) reported that 46.1% of 9/11 veterans and 50.7% of COVID-19 health care workers reported experiencing potentially morally injurious events. Moral injury has also been reported in healthcare workers during

COVID-19 by Nelson et al., (2022). Nelson et al., (2022) reported 41% of participants ($N=328/595$) experienced moderate to high levels of moral injury during COVID-19. Thus, the findings pertaining to moral injury in this study align with those reported by Nelson et al., (2022) and Nieuwsma et al., (2022). Furthermore, that moral injury may develop in front-line workers following exposure to potentially morally injurious events during public health crises.

However, the percentage of those who reported to have experienced morally injurious events was lower in the present study in comparison to those reported by Nieuwsma et al., (2022) and Nelson et al., (2022). It is possible this is due to demographic differences, (e.g., job role, sector etc.) or may be due to methodology or location. This study was conducted using social media and was advertised within the UK whereas, Nieuwsma et al., (2022) obtained participants from the USA. Moreover, the differences may also be due to the different measures used to capture moral injury. For example, Nieuwsma et al., (2022) used the Deployment Risk and Resilience Inventory-2 to measure moral injury, whereas the present study used the Moral Injury Events Scale (Nash et al., (2013). New scales are being introduced to measure moral injury in health care workers for example, The Moral Injury and Distress scale and The Identifying Moral Injury in Healthcare Professionals scale. Thus, continued investigation that considers the most appropriate measure to capture moral injury in individuals outside of the military is of clear value.

The current findings suggest that families also experienced moderate levels of exposure to morally injurious events. In contrast to front-line workers, the levels of reported moral injury varied across trauma severity. The levels of moral injury found in families was unexpected as the understanding of moral injury to date considers its development to occur in response to experiencing events in person and not vicariously (Litz et al., 2009; Meador, 2018). Nevertheless, the results obtained clearly present that moral injury developed in those who did not work on the front-line. It can be speculated that families were exposed to events that

violated their personal codes of acceptable conduct. Alternatively, families may have vicariously developed moral distress following exposure to disclosure from front-line workers, as suggested by Emotional Contagion Theory (Hatfield et al., 2014). Nevertheless, there is currently no literature available that has examined the impact of experiencing morally injurious events in families. Thus, continued investigation into the cause and development of moral injury in non-front-line personnel during public health crises is of clear value.

Gender differences in the impact of COVID-19 were also found and as such, hypothesis 6). **Differences will be found in the levels of psychological trauma, moral injury and vicarious trauma reported by gender in front-line workers and in families** was partially found. Results revealed that female front-line workers who reported little to no PTSD severity reported higher levels of vicarious trauma, in contrast to males. However, male front-line workers reported experiencing higher levels of trauma and moral injury in comparison to females. Nevertheless, no significant results were found in males in the regression or mediation analyses. As such, the findings that pertain to gender must be considered with caution. In addition, the sample of males obtained was small making any confirmed conclusion not possible with regards to gender. They are speculative at most.

Differences by gender have been reported when considering the impact and levels of PTSD symptom severity (Charak et al., 2014; van der Meer et al., 2017). For example, in a sample of natural disaster trauma survivors (Total: $N = 313$; Males: $N = 138$; Females: $N = 175$), findings suggested that 19.4% females and 13.8% of males met the DSM diagnostic criteria for PTSD, with a score of 50 or higher using the PCL-CV (Charak et al., 2014). Furthermore, females experienced higher levels of symptoms in Criterion B (re-experience of events), and Criterion C (avoidance of trauma related stressors) in comparison to males (Charak et al., 2014). In addition, Christiansen and Hansen (2014), examined the impact of exposure to trauma in the workplace (e.g., robbery) in a sample of bank employees ($N = 450$). Results

indicated that 19 females (8.4%) and 4 males (2.8%) met a probable diagnosis of PTSD using the Harvard Trauma Questionnaire (Mollica et al., 1992). Moreover, 56 females (24.9%), and 11 males (7.7%), had subclinical PTSD symptoms. In both cases, the gender differences were significant. The results of a mediation analysis also suggested that risk factors (e.g., fear, depression, anxiety etc.), significantly mediated the relationship between gender and PTSD severity proposing that gender significantly predicted PTSD severity (Christiansen & Hansen, 2014).

PTSD can develop in any gender. However, it is a subjective experience that is not unique to one group (van der Kolk, 2014). It is possible there are risk factors that may impact genders differently and result in different levels of severity in PTSD. Therefore, despite the limited sample size of males in this study, it can be speculated that the results may indicate differences by gender that warrant attention by future research, either to confirm and/or disconfirm.

In families, males reported lower levels of trauma and vicarious trauma but reported higher levels of moral injury in contrast to females. It is possible the suggested differences found by gender may have occurred in response to appraisal, as suggested by The Cognitive Appraisal Theory (Lazarus, 1966; Lazarus & Folman, 1984). For example, males may have not cognitively appraised their experiences during COVID-19 as traumatic, and instead perceived the events as morally distressing. In contrast, it is possible the suggested differences by gender found may be due to traumatic stress developed after exposure to fear, as suggested by Emotional Contagion Theory (Hatfield, 1992; Hatfield et al., 2014). Females may have experienced increased levels of fear in response to becoming ‘emotionally contaminated’ by front-line workers, that was then manifested as traumatic stress. Alternatively, it is possible any differences were a consequence of the protective factors adopted to reduce the psychological impact of COVID-19. For example, differences were found in reported coping

by gender, whereby adaptive coping levels were lower in males in contrast to females. It is possible that mechanisms used to cope (e.g., problem focused), by females were more effective. Then again it is possible if a large sample of males was captured no differences would be found. There is currently no research other than the current study which has investigated gender differences in the families of front-line workers during a public health crisis making the interpretations of this finding speculative. Furthermore, these findings should be considered with caution due to the small sample of males obtained, therefore these results are speculative.

Front-line workers and their families reported moderate levels of resilience, with no differences occurring in resilience between front-line workers and families when accounting for gender. Thus, hypothesis 3). **Front-line workers will display moderate to high levels of resilience in response to their experiences during the COVID-19 pandemic** and 5). **Families of front-line workers will display moderate to high levels of resilience in response to their experiences during the COVID-19 pandemic** were supported. The levels of resilience reported in this study are alike with those reported by Brown et al., (2022) and Labrague et al., (2020), who both reported moderate levels of resilience in front-line workers during the COVID-19 pandemic. However, differences were found between the current study, Brown et al., (2022) and Labrague et al., (2020), in regard to the factors that may promote resilience. Brown et al., (2022) reported that organisational and social support was helpful in promoting levels of resilience during COVID-19. Likewise, Labrague et al., (2020) reported that social support, organisational support, and resilience negativity predicted COVID-19 anxiety (Labrague et al., 2020). However, this study did not measure organisational support, and the findings suggested that perceptions of social support were not associated with resilience. It is possible this may be due to the difference scales adopted to measure perceptions of social support. The current study used the Interpersonal Support Evaluation List (Choen et al., 1985) to measure perceptions of social support whereas, Labrague et al., (2020) utilised the

Perceived Social Support Questionnaire. It is possible this may account for why social support did not impact levels of reported resilience in this study. However, further research is needed to confirm or disprove this.

Resilience was reported by Labrague et al., (2020) to assist in reducing levels of psychological stress and trauma in front-line workers. The results of this study also suggested resilience may reduce levels of psychological trauma. However, the levels of resilience reported during COVID-19 are similar to those reported before the pandemic (Pollock et al., 1996; Sumner et al., 2021). Whereby, levels of resilience reported by front-line workers varied (Pollock et al., 1996; Sumner et al., 2021). Therefore, it is possible that levels of resilience did not change in front-line workers during the COVID-19 pandemic. Furthermore, that the levels of resilience found may have been impacted by factors that were not investigated in this study (e.g., organisational support). As such, continued research is needed to confirm the factors that may impact levels of resilience during public health crises.

In this study, in females subjective wellbeing was identified as a positive predictor of resilience. It is certainly possible that engaging in activities that boosted positive mood and promoted life satisfaction influenced subjective wellbeing (Heintzelman et al., 2019; Tootle et al., 2018), thereby, resulting in increased levels of resilience. In addition, it is feasible females developed resilience in response to overcoming adversity during COVID-19, although a longitudinal enquiry would be needed to confirm this. Despite the moderate levels of reported resilience in males, no significant predictive model of resilience was found, indicating other, unmeasured variables may be of value.

The current findings suggest that front-line workers and their families were able to adapt to the challenges faced during COVID-19, as suggested by The Resilience Process and Outcome Model (Ungar, 2018). Moreover, this was promoted by subjective wellbeing. However, the factors that were hypothesised to influence resilience (e.g., nature relatedness,

connectedness to nature, coping, interpersonal support) did not significantly contribute towards the development of resilience in front-line workers and their families.

The literature available suggests spending time in nature, coping and interpersonal support contribute to resilience within the remit of everyday life (Ruiz-Fernandez et al., 2021). However, it is possible these factors were insufficient to promote resilience during COVID-19. Thereby, suggesting value in considering if there is a point at which resilience becomes overwhelmed by adversity. As such, hypothesis 7). **Identifying with and feeling connected with nature will serve to increase perceptions of available social support, connectiveness with nature, subjective wellbeing and coping, and will be associated with increased levels of resilience in front-line workers and their families** was not supported. There is no available literature to date that has captured these factors on promoting resilience in front-line workers or their families during public health crises. It is possible that these factors were not found to promote resilience due to coping strategies other than nature that were not measured. For examples, factors that may contribute towards subjective wellbeing, such as motivation may impact levels of resilience in front-line workers during public health crises. As such, the factors that underpin the development of resilience requires further investigation to enable the promotion of resilience in any potential future public health crises. In spite of this, resilience was found to mediate the effects of moral injury on psychological trauma, noting its value as a concept.

Overall, moral injury was found to have a significant negative direct effect on psychological trauma; increased exposure to morally injurious events during COVID-19 appeared to result in lower levels of psychological trauma. The direct effect was partially mediated by resilience, demonstrating that resilience increased this effect, further reducing trauma. When accounting for gender, no direct effects were found for males. However, in females, as exposure to morally injurious events increased, the severity of psychological

trauma decreased. Moreover, this effect was fully mediated by resilience, indicating that resilience arguably increased the effect of moral injury on psychological trauma. It can be speculated that during a public health crisis (e.g., COVID-19) moral injury may serve to protect and/or mitigate the severity of psychological trauma in females. However, this finding has not been reported in the literature to date. Moral injury has, instead been proposed to overlap with trauma (Farnsworth et al., 2017) and/or has been reported to predict greater symptoms of traumatic stress (see Hagerty et al., 2022 and Williamson, et al., 2023). Thereby promoting the importance of moral injury, potentially as a factor facilitating trauma symptoms. However, there is currently no available literature that investigated the effects of moral injury on the severity of psychological trauma. Thus, the current results provide a potentially novel understanding of the causal relationship between exposure to morally injurious events and psychological trauma.

8.6 Limitations

The current study is not without limitations, however which need to be accounted for. This study did not consider the nature, severity, or number of exposure/s to potentially traumatic events experienced by the participants. This limits this studies ability to determine what accounted as a traumatic event during the COVID-19 pandemic. Nevertheless, psychological trauma is argued to be a subjective experience (van der Kolk, 2011), and therefore the nature of exposure was not a necessary component of this study. However, gaining data that pertains to exposure to trauma will enable a greater understanding of how trauma can develop in front-line workers and their families in any possible future public health crisis.

The measure administered to capture moral injury, the Moral Injury Events Scale (Nash et al., 2013), was originally designed for use in a different population than applied here.

Therefore, validation of this measure on front-line workers during public health crises would be advantageous. Furthermore, the measures administered to measure predictive factors of resilience were also originally designed for use on the general public however, have not been validated for use during public health crises. For example, the Brief COPE (Carver, 1997) may have been unable to capture specific coping styles that may be adopted by front-line workers and their families during times of crisis (e.g., during lockdowns). Additionally, the Interpersonal Support Evaluation List (Cohen et al., 1995) may be unable to capture the interpersonal support that was attainable by remote means only during COVID-19, due to lockdowns. This may account for why interpersonal support did not emerge as a significant predictor.

It is important to note how resilience was measured in this study. This study aimed to examine the levels of resilience during COVID-19 and if levels of resilience mitigated against levels of trauma. Although this study requested participants to complete the questionnaires while considering their lived experiences during the COVID-19 pandemic, it is difficult to ascertain the accuracy of these results. This study did not measure pre-existing levels of resilience and if any pre-existing level increased or decreased throughout the pandemic. As such, this limits the ability of this research to determine if the levels of resilience reported are a direct result of the COVID-19 pandemic or as a result of lifetime development. Therefore, the levels of resilience reported may not accurately represent those developed *only* during the pandemic and may not be a true reflection of protection against the development of psychological trauma during public health crises.

Another limitation of this study is the methods used to recruit participants. This study only utilised online social media sites to advertise. As such, it is possible this study was unable to reach individuals who did not have access to the internet. In addition, a number of individuals did not complete the questionnaire (drop out: $N = 138$). It can be speculated that individuals

may have become bored and chose not to complete the questionnaires. Alternatively, the questions may have induced negative affect and individuals dropped out in response. However, it is not possible to determine why individuals chose not to participate as data was not collected regarding reasons for non-completion.

The sample population obtained within this study was also limited, with a small sample of males obtained. As such, this limits generalisability and validity of the findings and may not fully represent male front-line workers or male family members. Furthermore, this study did not obtain large number of front-line workers and did not recruit large numbers across sectors (e.g., health care, education, public services etc.). As such, this further limited the validity and generalisability of results and thus may not adequately represent front-line workers or their families.

It is further possible self-selection bias may have impacted the validity of results. The sample self-selected after reading the information sheet. Thus, it can be argued that they may have wanted to report any impacts experienced. In contrast, individuals who read the information sheet may feel they coped well and therefore did not wish to contribute to the study. Thus, the sample may be characteristic more of those not feeling they coped well.

8.7 Concluding comments.

This study established that front-line workers and their families endured psychological trauma, vicarious trauma and moral injury as a result of working and/or providing care to those working on the front-line during the COVID-19 pandemic. Families in particular, were found to have developed moral injury, despite being unlikely to having been directly exposed to morally injurious events. This finding has not been reported in the literature to date, thus, continued investigation into the causality of moral injury in non-front-line personnel would be of notable value.

Resilience was identified to have a causal effect on moral injury and psychological trauma and was shown to reduce the severity of psychological trauma. This finding appears unique, with no theories yet offered that could provide an understanding of this. As such, research that provides an understanding of the factors that contribute towards this relationship may be beneficial in reducing the risk of psychological harm during future public health crises.

CHAPTER NINE

GENERAL DISCUSSION

Front-line workers and their families experienced psychological trauma, vicarious trauma and moral injury while providing essential public facing services throughout the COVID-19 pandemic. Despite the negative impact of the COVID-19 pandemic, front-line workers and their families developed resilience. Resilience was captured in this thesis as the ability to be resistant, mitigate against or the absence of distress following exposure to potentially traumatic experiences (Cicchetti et al., 1993; Luthar & Cicchetti, 2004; Masten, 2006; Rutter, 2006). Resilience was speculated to be promoted by engaging in subjective wellbeing, seeking social support and spending time in nature. These protective factors assisted coping and enabled individual and family resilience to develop.

9.1 The impact of the COVID-19 pandemic on front-line workers.

Findings indicate that front-line workers may have experienced several vulnerability factors that exposed them to psychological trauma in the workplace during COVID-19. Findings indicated that this may have included, proximity to infected patients, increased patient numbers, staff shortages, increased workloads, limited PPE, and unfamiliarity with the virus, as identified in Study One and Two. These factors may have elevated the levels of stress experienced, which is consistent with the findings of Bennett et al., (2020) and Wright et al., (2021). Furthermore, it is possible this may have promoted the intense levels of fear reported in Study Two. As a result, perceptions of self-efficacy surrounding workplace capabilities may have been impacted and may have contributed to the significant levels of distress reported in Study Two, potentially creating vulnerabilities to burnout and compassion fatigue.

It is possible that in an attempt to cope with the increased distress and stress reported front-line workers appear to have adopted unhelpful coping strategies, such as increased

alcohol consumption to alleviate the negative impact of their experiences, as found in Study Two. Similar findings have been reported by Hoffart et al., (2022), Pilch et al., (2021) and Wong et al., (2023). It can be argued that the stress reported was a manifestation of traumatic stress developed after repeated exposure to traumatic events (Soloman & Heide, 2005; van der Kolk, 2015). Furthermore, it is certainly possible that stress and fear exacerbated pre-existing vulnerabilities of trauma in the workplace, which resulted in the levels psychological trauma found in Study Three (Berlanda et al., 2020; Vagni et al., 2020; Wild et al., 2016).

The findings of Study One and Two suggest that organisations provided additional resources to mitigate the increase in experienced stress, such as services to promote wellbeing. Nevertheless, these resources did not appear to effectively reduce the severity of stress, traumatic stress, moral distress, and psychological trauma experienced by front-line workers, as demonstrated in Study Three. This suggests that the Jobs Demands-Resources Model (Bakker et al., 2003; Demerouti et al., 2001), may not adequately explain the increased levels of stress, as the increased availability of resources arguably did not offset the job-placed demands. However, it may not be appropriate to use this model to explain the levels of stress in the workplace during the COVID-19 pandemic for several reasons. Firstly, the model was designed to be used on ‘typical’ work environments, whereas the pandemic was speculated to amplify pre-existing stressors, subsequently reducing the model’s ability to explain the *additional* stress. Secondly, it can be speculated the resources provided by organisations were insufficient towards counteracting the stress and moral distress experienced. Lastly, the levels of stress reported may be more indicative of traumatic stress (Ford & Courtois, 2020), as opposed to general stress.

It is also possible the levels of stress suggested in Study Two were a manifestation of traumatic stress developed after repeated exposure traumatic events (Soloman & Heide, 2005). The findings of Study Two and Three suggest that prolonged exposure to COVID-19 resulted

in the elevated levels of trauma in front-line workers, which is consistent with Wright et al., (2021) and Ouyand et al., (2022). Furthermore, the emotions experienced, for example fear (Study Two), can be theorised to have interfered with, and exacerbated a front-line workers appraisal of events they experienced during COVID-19. It is further possible that the levels of fear may have amplified vulnerabilities to developing traumatic stress, and instigated psychological trauma, as suggested by The Cognitive Appraisal Theory of Emotions (Moors, 2013, 2014). Whereby, negative emotions, such as fear may have been developed during exposure to traumatic events at work (e.g., patient deaths, as reported in Study Two). It is possible that this was then followed by a primary appraisal of the event as stressful, which may assist in explaining the levels of stress reported in Studies One and Two. Furthermore, as reported in Study Two, front-line workers reportedly held perceptions of personal accountability towards patient care and recovery, which possibly induced negative emotions and influenced the levels of traumatic stress experienced (Moors, 2013, 2014). It is possible this occurred during secondary appraisal of the event (Lazarus, 1991). Additionally, any further exposure to similar trauma likely triggered the levels of fear, stress and resulted in similar appraisal of events, and resulted in the levels of trauma reported in Study three.

Alongside exposure to trauma during public health crises, the current findings suggest that front-line workers also experienced morally injurious events (Studies One, Two and Three). Moral distress was suggested to be found following exposure to events, which may have violated personal perceptions of what was morally acceptable. It is possible this included, staff shortages, delayed treatments, and unethical procedures, alongside experiencing personal perceptions of others committing moral transgressions, as reported in Study Two. This may have resulted in stress of conscience, regrets and guilt without fault. Consistent with the findings of French, Hanna & Huckle, (2021) and Rushton et al., (2022), these experiences appeared to instigate moral distress and induced perceptions of personal failure while providing

care to patients. It is certainly possible these perceptions developed during the appraisal of the event, as suggested by the Cognitive Theory of Appraisal (Lazarus, 1966; Lazarus & Folkman, 1984). Whereby, during secondary appraisal of the event an evaluation of personal responsibility was derived following evaluation of who should be held accountable. Nevertheless, this has not been captured in the literature to date, and as such, should be considered with a degree of scepticism.

The current findings also suggest evidence regarding what may be vulnerability factors of moral injury during public health crises (as reported in Study Two). Increased patient numbers, limited access to PPE, staff shortages, and a disconnect between workers and higher management were identified as vulnerability factors for moral distress, as reported in Studies One and Two. The literature identifying the vulnerability factors of moral injury during public health crises is limited. However, the current findings show similarity to French, Hanna & Huckle, (2021), Rushton et al., (2022) and Zerach & Levi-Belz, (2022), in terms of the prevalence of reported disconnect between staff and higher management, and the impact of increased workloads and limited equipment on levels of moral distress.

9.2 The impact of the COVID-19 pandemic on the families of front-line workers.

Findings suggest that families were likely to have experienced psychological trauma, vicarious trauma and moral injury in response to their lived experiences, but also as a result of providing care to front-line workers as shown in Study Two and Three. A number of unique factors, specifically derived as a result of living through a public health crisis (e.g., COVID-19), appeared to instigate stress and distress, as shown in Study Two. The enforced lockdowns instigated immediate changes to daily life, for example, home-schooling, home-working and reduced face-to-face social support. Similarly, to Feng et al., (2020), families experienced extreme emotions, such as fear, which resulted in increased levels of distress. Study Two

suggested that families struggled to counteract the distress experienced, which resulted in maladaptive coping, such as increased alcohol consumption and over-eating. In parents, the role of being an educator possibly produced significant stress and may have feelings of inadequacy, perceptions of an inability to teach, and difficulties managing workloads of homeschooling and housework. These findings were consistent with the emerging COVID-19 literature (Bhamani et al., 2020; Nayir & Sari, 2021). It can be speculated that the changes to daily life, emotions experienced (e.g., fear, concern for safety, worry) combined with the reduction in face-to-face support and an amplification of any pre-existing stress may have instigated vulnerabilities to families, thereby developing psychological stress and trauma.

The current findings suggest that families experienced moral injury during the COVID-19 pandemic, as shown in Studies Two and Three. Moral injury in non-front-line personnel has not been captured in the literature to date, with no theory available to explain how this concept may apply within families. However, it can be speculated that moral injury developed vicariously from witnessing moral distress displayed by front-line workers. Moreover, it is possible it developed in response to the families' personal experiences and perceptions during the COVID-19 pandemic, whilst they were experiencing enhanced vulnerabilities as suggested by Study Two. Therefore, continued research in this area is of clear value.

Findings of Studies Two and Three speculate that families of front-line workers may have also experienced vicarious trauma and a psychological impact as a direct result of providing care to front-line workers. It was suggested that families witnessed their loved ones in distress, displaying the symptoms indicative of traumatic stress and psychological trauma (see Studies Two and Three), which is consistent with Tekin et al., (2022) who found families experienced emotional burdens due to anxiety about their family members at work. This resulted in the families becoming 'emotionally contaminated' and instigated vulnerabilities in families developing vicarious trauma (Figley & Kiser, 2013; Hatfield, 1992; Hatfield et al.,

2014). It is possible the contamination of emotions was promoted by the emotional bonds connecting families, furthermore it is possible the strength of the emotional and empathetic bonds perceived by families increased the susceptibility to developing vicarious trauma as suggested by Study Two and Three.

It is possible during times of distress, pre-existing emotional bonds may have certainly created vulnerabilities to families vicariously developing trauma through emotional contagion (Hatfield, 1992, Hatfield et al., 2014). This provides support towards Emotional Contagion Theory (Hatfield, 1992; Hatfield et al., 2014). As the display of emotional distress displayed by front-line workers was mimicked and developed by family members, resulting in the levels of vicarious trauma reported in Study Three. It is conceivable that this finding is novel since a connection between vicarious trauma and Emotional Contagion Theory (Hatfield, 1992; Hatfield et al., 2014) in families has not been reported within the literature to date. Furthermore, this finding presents a novel understanding of how the support systems of those working on the front-line may be affected during public health crises, by presenting how family units as a collective group respond to and develop distress.

Front-line workers did not communicate the difficulties and trauma they experienced at work to their families, as reported in Study Two. Nevertheless, the distress was clearly noticed, with families attempting to reduce the distress in front-line workers, as further suggested by Study Two. However, families were unable to *protect* their loved ones from harm in the workplace. It is possible the inability to reduce or mitigate the distress, combined with the lack of communication, vicarious distress and trauma resulted in family members becoming emotionally overwhelmed when attempting to care for front-line workers. Furthermore, it can be theorised that the stronger the family members perceptions of their emotional bonds within their family the more susceptible they were to the ‘psychological cost of caring’. This cost refers to the emotional burden of attempting to reduce, ease and /or remove the distress of

family members, as suggested in Study Two. However, this concept not been captured in the literature to date, and should be considered with scepticism, but it does suggest a unique aspect of coping may have developed during a pandemic.

The findings of this thesis provide support towards the findings presented in some key COVID-19 studies. For example, Scott et al., (2023), conducted a cross-sectional two-phase study on a sample of front-line health care workers ($N = 11136$) during COVID-19. The first phase consisted of questionnaires and in the second phase health care workers ($N = 243$) were invited to attend a diagnostic interview. Overall, 54% of participants screened were reported to show symptoms indicative of a mental disorder (Scott et al., 2023). Furthermore, of those who participated in a diagnostic interview for PTSD ($N = 94$), 25% screened positive for PTSD (Scott et al., 2023). Thus, the levels of symptoms indicative of trauma suggested in Study Two further support the possible presence of trauma in front-line workers during COVID-19. In similarity to this thesis, a high dropout rate was reported by Scott et al., (2023), whereby over 13000 participants were removed due to non-completion. It is possible the impact of the COVID-19 pandemic may be different from what had been reported, with levels either high or lower than those reported. Therefore, future research should aim to understand factors that underpin participant drop out in rates as this may enable improvements in methodologies and improve future recruitment.

Padmanathan et al., (2023) conducted a longitudinal study that investigated the prevalence of suicidal thoughts and behaviours in front-line health care workers ($N = 22501$) during COVID-19. The results suggested that in those who did not report suicidal behaviours at the baseline, 11.3% ($N = 2542$) reported suicidal behaviours six months later. Moreover, 3.9% ($N = 878$) reported attempting suicide for the first time (Padmanathan et al., 2023). Padmanathan et al., (2023), reported exposure to morally injurious events, concerns regarding safety and feeling unsupported by management directly impacted mental health. Similar

findings surrounding feeling unsupported by management were reported within this thesis as shown in Study Two. However, the findings of Padmanantham et al., (2023), may be due to additional factors that were not captured, for example reduced social support, or loss of loved ones, as suggested in the findings of this thesis (Study Two). Thus, the findings presented in this thesis may support and provide additional understanding towards the psychological impact that possibly occurred in those working on the front-line during COVID-19 occurred.

It is also possible that this thesis may provide support to the review submitted by Rabin et al., (2023), which explores the experiences, possible impacts and factors that may reduce the impact of moral injury in health care settings. Rabin et al., (2023) did not investigate moral injury or provide any primary data regarding moral injury in health care settings. Nevertheless, Rabin et al., (2023) asserted that moral injury is likely to develop in those providing care to patients during public health crises. Furthermore, Rabin et al., (2023) estimates that a third of health care workers may have experienced potentially morally injurious events during COVID-19. The findings of Study Two and Three provide possible evidence of this as it suggested that front-line workers and their families experienced morally injurious events. Rabin et al., (2023), assert that individual (e.g., prolonged contact), team (e.g., perceived lack of empathy), and systemic (e.g., increased patient numbers), factors are likely to contribute to the development of symptoms indicative of moral injury. The findings of this thesis provide support towards the factors predicted by Rabin et al., (2023). Whereby, increased patient numbers, increased workloads, and an inability to rest were speculated to increase the susceptibility to moral injury (as suggested in Study Two).

Further support has been provided by Williamson et al., (2023) who reported health care front-line workers with direct access with COVID-19 patients were more likely to reach the threshold for moral injury. Furthermore, experiencing a lack of support from peers, family and management was negatively associated with moral injury (Williamson et al., 2023). This

was also suggested to be found in Study Three. Whereby interpersonal support was negatively associated with moral injury. Moreover, the findings of Study Three may expand upon this and provide an additional understanding of moral injury. The findings of Study Three speculated that families of front-line workers experienced moral injury as well. However, further research is required to confirm this.

Rabin et al., (2023) stated that an effective method to reduce the systemic factors that may promote moral injury in the workplace may be to ensure adequate staffing levels, alongside encouraging staff to rest and recharge. The findings of this thesis support Rabin et al., (2023). Study One and Two suggest that increased workplace support may assist in mitigating moral injury. Furthermore, Rabin et al., (2023), suggested that PTSD symptoms are similar, but are distinct from moral injury. The findings of this thesis (Study Two and Three) also speculated that moral injury and psychological trauma are different concepts that can develop concurrently. Furthermore, the findings of this thesis also suggested a potential relationship between moral injury and trauma via resilience may exist (Study Three). Therefore, it was theorised that moral injury may assist in the mitigation of psychological trauma. However, this must be considered with skepticism until further investigation is completed.

Scott et al., (2023), Padmanathan et al., (2023) and Williamson et al., (2023) did not consider the psychological impact on those who worked in other front-line sectors (e.g., retail, public services, funeral etc.) during COVID-19 or in non-front-line workers (E.g., families). The results obtained within this thesis may assist in explaining the wider impact on all front-line sectors as suggested in Study Two and Three. Moreover, this thesis captured the psychological impact on the families of front-line workers. The findings of Study Two and Three speculated that families were impacted while providing care and support to their loved ones. Thus, the findings of this thesis present an understanding of the potential impact on other

front-line services and their families. Furthermore, may substantiate the findings of Padmanantham et al., (2023), Williamson et al., (2023), and Scott et al., (2023), alongside providing primary evidence that supports Rabin et al., (2023).

9.3 Protective and vulnerability factors of psychological trauma.

With regards to vulnerability factors, intense levels of fear were suggested to be experienced throughout the COVID-19 pandemic in response to transmission and contagion of the virus (Study Two). The fear was suggested to be exhibited through preventive behaviours, such as frequent hand washing, changing clothes and increased personal hygiene (Studies One and Two). Similar to existing COVID-19 literature, individuals who reported elevated levels of fear were more likely to engage in extreme and repeated preventive behaviours and hygiene routines, as found by Olapegba et al., (2022). It is possible the high levels of fear towards the unknown factors of the virus instigated vulnerabilities to psychological distress (Almutairi et al., 2017). It is certainly possible that the fear reported in Study Two represented a traumatic emotional response to the pandemic that was exhibited through avoidance and hyperarousal to transmission and contagion of the virus (Trnka et al., 2020).

However, the levels of fear suggested in Study Two, were reported to assist in protecting individuals from psychological harm, which is consistent with Green & Yildirim (2022), who reported that higher levels of fear were linked with greater adherence to COVID-19 preventative behaviours, and in turn associated with higher levels of satisfaction. It is possible that individuals who engaged in preventive behaviours were able to gain a sense of perceived control, which may have assisted in reducing fear. Furthermore, findings of Study Two suggested that individuals attempted to prevent transmission in order to protect and shield loved ones from harm. Cleaning routines (e.g., sanitising hands) were also encouraged to minimise transmission and prevent further infection (Ayenigbara et al., 2020). In similarly to

Šuriņa et al., (2021), the current findings indicated that the actions taken to reduce transmission assisted in reducing the concerns of front-line workers and assisted in alleviating stress and fear in families. This could be speculated to be a product of perceived control and autonomy over certain aspects of their lifestyles being obtained, and ultimately promoted by fear of infection.

However, as a result of the lockdowns, front-line workers and their families may have experienced a significant reduction in their ability to utilise face-to-face social support, as reported in Study One and Two. The social isolation from wider social groups, namely friends and wider family groups, appeared to instigate distress (Study Two). In families, the reduction in social support reduced the ability to cope emotionally with pandemic induced stressors. Furthermore, the reduced availability of social support may have instigated several psychological consequences such as, loneliness, increased stress and a reduction in life satisfaction (Figley & Kiser, 2013; Herrando & Constantinides, 2021), which suggests an absence of control over some aspects of their life.

Findings also suggest that the reduction in social support further decreased material support (e.g., childcare), limited the availability to gain appraisal, and/or release tension and emotional distress (Study Two). It is possible that in families, the inability to visit wider family members (e.g., grandparents, aunts, uncles) instigated feelings of loneliness, separation and longing. Furthermore, and consistent with Stearns et al., (2022) and Tindle et al., (2022), the inability to receive physical comfort during times of distress (namely a hug), may have induced distress and increased the susceptibility to psychological trauma during the COVID-19 pandemic as suggested in study Two and Three.

With regards to protective factors, social support was proposed as a protective factor for psychological trauma and moral injury in front-line workers, as shown in Studies One and Two. Front-line workers were able to gain social support in the workplace, which may have

assisted them to share difficulties, release stress, distress and gain appraisal from others (Greenberg et al., 2020; Labrague et al., 2020). The support gained may have boosted positive moods and fostered the development of resilience (Labrague et al., 2020). Furthermore, this may have enabled front-line workers to positively appraise their experiences, as suggested by the Cognitive Appraisal Theory (Lazarus, 1966; Lazarus & Folkman, 1984), assisting front-line workers to positively appraise their experiences, ultimately reducing distress. Front-line workers were also reported to be able to gain resources in the workplace, as shown in Study Two, which were beneficial in mitigating psychological distress (Labrague et al., 2020).

As reported in Studies One and Two, communication with social networks was suggested to be beneficial in protecting and/or mitigating against psychological distress and trauma. Front-line workers and their families were suggested to communicate with wider social networks throughout COVID-19 via online platforms such as, Messenger (Studies One and Two). Such support was reported to be beneficial in celebrating annual events (e.g., birthdays) and supporting wider family networks, as reported in Study Two. In parallel with the findings of Liu et al., (2021), online communication may have promoted belonging and assisted in reducing the fear associated with the unknown factors of the COVID virus. Likewise, as suggested in Study Two, communication was found to provide reassurance towards the loss of control over daily life and gave an avenue to release tension. Thus, it is possible this assisted in fostering resilience in front-line workers and their families while, mitigating moral distress and trauma, as shown in Study Three. Spending time in nature was also suggested to be beneficial in reducing stress and psychological distress (Study Two).

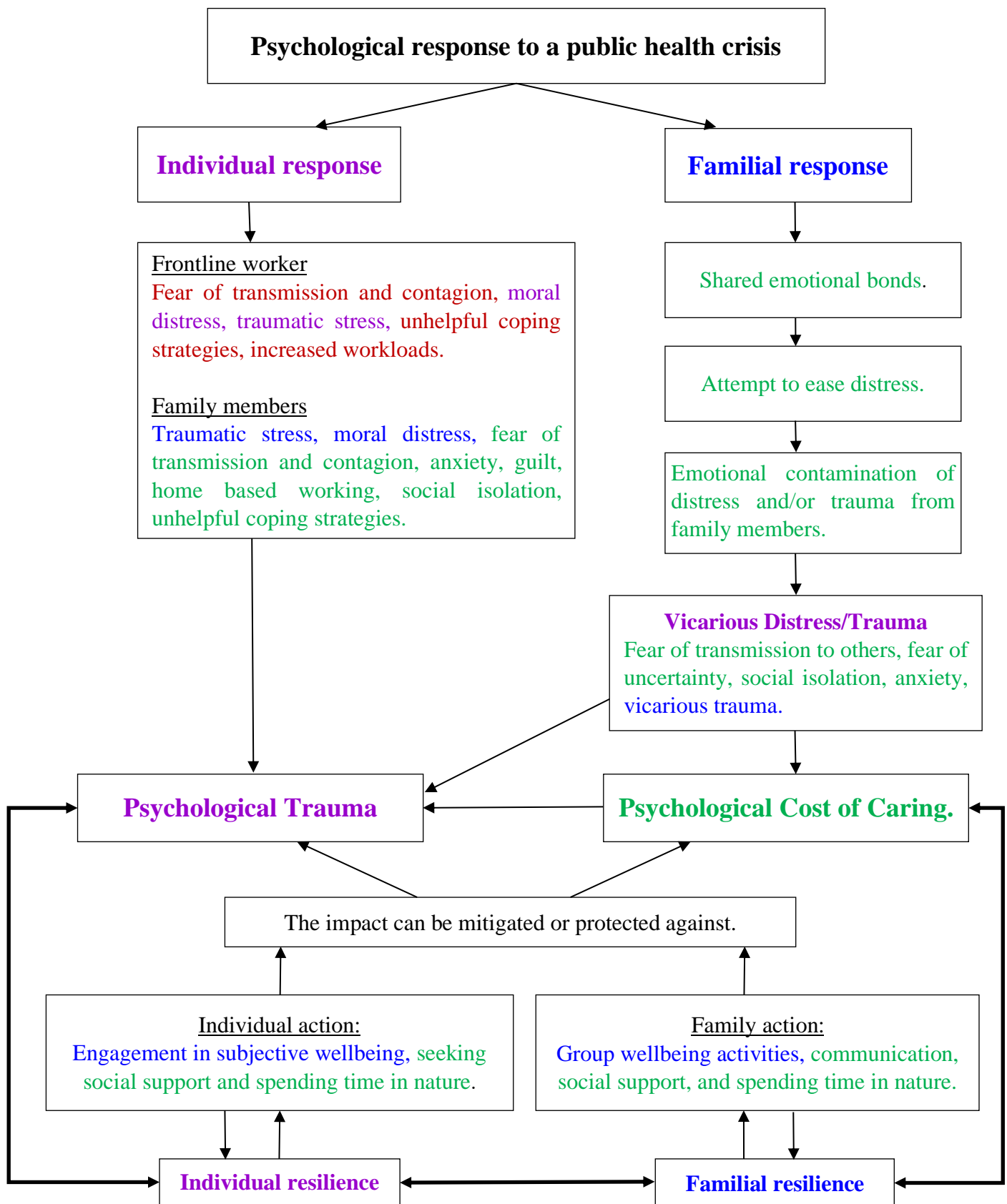
Spending time in nature was suggested to be beneficial to mental health and assisted in reducing stress and psychological distress, as reported in Study Two. As reported in Study Two when time spent in nature occurred as a group, for example walking, families may have vicariously benefited from a reduction in stress, which promoted a positive change in mood

(Study Two). Through emotional contagion, as suggested by Emotional Contagion theory (Hatfield et al., 2014), the alteration to mood was possibly then vicariously shared between all members, resulting in potential group recovery. Consistent with Jackson et al., (2021), daily exposure to nature also appeared to instigate immediate restorative impacts on subjective well-being, improve psychological health and promote resilience in front-line workers and their families (Studies Two).

Resilience was suggested as a protective factor of psychological trauma across Studies One, Two and Three. It can be speculated that front-line workers and their families engaged several practices that supported and boosted their subjective wellbeing. These included baking, gardening, crafts, watching television shows (e.g., Netflix) and exercising, as reported in Study Two. These activities may have been beneficial in promoting feelings of achievement and enabled individuals to utilise time productively (Capaldi et al., 2015; McManhan & Estes, 2015), arguably giving purpose. It is also possible that subjective wellbeing was also impacted by self-compassion, reflection and self-care (Study Two). The combination of engaging in hobbies and nature promoted hedonic and eudaemonic wellbeing, which may have contributed towards recovery from trauma (Study Two).

9.4 Conceptual model of trauma development during a public health crisis

Based on the findings of this thesis a conceptual model of the impact of the COVID-19 pandemic is proposed called the Health Crisis Impact Model (HCIM). This model proposes a two-way interconnected pathway that attends to the vulnerability factors of *pandemic induced stress* and how this can occur in individuals and families. Furthermore, it highlights the development of the psychological cost of caring in families. Lastly, it displays the factors that can protect against stress and promote resilience in front-line workers and their families. It is presented in Figure 8.



Note:- Colour codes are used to indicate the studies the findings are obtained from; Study One and Two, Study Two, Study Two and Three, All Studies.

Figure 7: A conceptual model to explain the impact of the COVID-19 pandemic on front-line workers and their families.

The conceptual Health Crisis Impact Model proposes an inter-connected pathway model that identifies the impact of stressors specific to a public health crisis on people as individuals, and as members of a family. The individual response is differentiated by factors specific to being a front-line worker or a non-front-line worker. In front-line workers, fear of contagion and transmission, moral distress, traumatic stress, compassion fatigue, increased workloads and unhelpful coping instigate vulnerabilities to psychological trauma (Ablofotouh et al., 2017; Chan et al., 2022; Fiksenbaum et al., 2007; Hyun et al., 2021; Wu et al., 2023). Likewise, in non-front-line workers, social isolation, fear of contagion and transmission, home based working and/or home-schooling initiate vulnerabilities to developing psychological trauma (Figley & Kiser, 2013; Panno et al., 2022; Šuriņa et al., 2021; Tenkin et al., 2022).

In families, the shared emotional bonds create vulnerabilities to being emotionally contaminated by the fear, distress and trauma displayed by group members (Hatfield, 2008, Hatfield et al., 2014; Tenkin et al., 2022). This can initiate the family sharing a response to a public health crisis that is influenced by social isolation, anxiety and fear of transmission and contagion of a virus (Tenkin et al., 2022). This creates vulnerabilities in family members developing trauma vicariously. This can further instigate a psychological cost of caring (Panksepp & Lahvis, 2011; Wu & Xu, 2020). This can induce feelings of guilt, which can be amplified by a lack of communication in families (Walsh, 2018).

The Health Crisis Impact Model also asserts that resilience can develop in response to exposure to public health crises in individuals and families. Individual resilience can be promoted and mitigate the impact of psychological trauma by engaging in wellbeing activities, seeking social support and spending time in nature (Capaldi et al., 2015; Makie et al., 2013; Rutter, 2011, Tam, 2013; Tootle et al., 2018). Furthermore, in families, engaging in group activities and spending time in nature can promote resilience in the group collectively (Sippel et al., 2021; Tselebis et al., 2020; Walsh, 2016). Lastly, this model displays that family

resilience and individual resilience are interactive. As a result of the emotional bonds, resilience can be vicariously developed in families (Figley & Kiser, 2013; Hernandez et al., 2014; Walsh, 2016). Whereby, members displaying resilience will emotionally contaminate other members within the group and assist in the development of individual resilience (Hatfield et al., 2014). As a result, individual resilience and familial resilience can protect and/or mitigate psychological trauma. Nevertheless, this model is not without limitations.

The Health Crisis Impact Model did not contain findings that were repeatedly confirmed, for example social support and engaging in nature. Nevertheless, these findings were captured in the model in response to the findings obtained in Studies One and Two. Additionally, a concept that was identified in the findings of Study Two, namely a psychological cost of caring, was captured in the model, despite not being confirmed in Study Three¹⁵ and not being reported in the literature to date. Furthermore, The Health Crisis Impact Model does not account for the differences in gender obtained in Study Three, as this finding requires further investigation in response to variations in the literature to date.

The Health Crisis Impact Model also does not attempt to elucidate the impact of moral injury on front-line workers or their families, nor attends to the causal relationship of moral injury on psychological trauma via resilience, as reported in Study Three. This is in response to the limited literature to date on moral injury in front-line workers, and the lack of literature in the families of front-line workers. Nevertheless, in response to the findings obtained in Studies Two and Three, moral distress was included as a vulnerability factor. Despite the limited confirmation of findings that were captured in the Health Crisis Impact Model, this conceptual model does provide a valuable insight into the factors that can instigate psychological trauma in individuals and their families during public health crises. Moreover,

¹⁵ The presence, impact or prevalence of a psychological cost of caring was not investigated in Study Three.

may be able to provide an understanding of how these factors can be reduced and/or mitigated against, while enabling resilience to foster.

9.5 Limitations

Though considerable thought was given to the planning of the studies conducted, this thesis is not without limitations and as such, must be considered. The empirical studies conducted utilised cross-sectional designs and data was collected at one time point thus, determining issues of causality is not possible. All studies were also reliant on self-report. Self-reported answers can be exaggerated, over reported or participants may be reluctant to disclose private information (Brenner & DeLamater, 2016). Moreover, social desirability bias can occur in response to a need to appear prosocial and/or attend to impression management (Brenner & DeLamater, 2016; Razavi, 2001). As such, the results obtained may be influenced by several factors. For example, in Study Two, participants may have disclosed organisational values instead of personal beliefs, thereby limiting applicability of the results found. Moreover, in Studies Two and Three, the findings may be influenced by bias selection. Participants were required to contact the researcher to participate (Study Two), or complete self-reported questions (Study Three). Thus, the results obtained may not fully represent all those working on the front-line or their families.

In addition, all studies completed were conducted online. This may have influenced the findings, for example online populations may not have fully represented the desired population, as a result of self-selection and availability of digital access. Likewise, it is possible the conducted studies were not fully advertised to all potential intended populations due to digital access issues. Thus, reliance on online data collection may have been a barrier for potential participants, who may not have had access.

Efforts were made to obtain equal representations of samples within all studies conducted in this thesis. However, the sample characteristics obtained within Studies Two and Three were limited to adults and did not collect information pertaining to ethnic demographics (e.g., race), with few men. This would represent a further limitation. The limited diversity in population arguably reduced generalisability of the results obtained. Additionally, the location of participants who completed the studies were not captured. Steps were taken to advertise the studies globally. However, participants were not asked to disclose where in the world they resided. As a result, the findings obtained were unable to consider any differences between impacts worldwide.

A further consideration is needed towards how the concept of moral injury was captured throughout the conducted studies. Moral injury had not been well captured within the literature to date, as such there was limited information available to utilise when designing the questions in Study Two. It is, therefore, possible the questions did not fully capture the complexities of moral injury in front-line roles during a public health crisis. Furthermore, moral injury was not investigated within the family element of Study Two, and thus its presence was unable to be confirmed within Study Three. Thus, the findings pertaining to moral injury captured within this thesis must be taken with a degree of scepticism.

9.6 Directions for future research and final conclusion

Overall, the findings obtained suggest that front-line workers and their families may have experienced psychological trauma, vicarious trauma and moral injury during the COVID-19 pandemic, as individuals and as members of a family. In terms of vulnerability factors, workplace stressors, fear, unhelpful coping, compassion fatigue and pandemic specific stressor, such as home-schooling may have instigated vulnerabilities to developing psychological trauma and moral injury. Furthermore, families may have been emotionally contaminated when

attempting to provide care to loved ones. This was further amplified by the shared emotional bonds in families and may have possibly resulted in vicarious trauma and a psychological cost of caring. However, several protective factors aided in the mitigation and reduction of psychological trauma and moral injury, while fostering resilience. Spending time in nature, engaging in subjective well-being, seeking social support and enhancing coping fostered resilience in individuals. Furthermore, engaging in group activities promoted resilience in family group collectively, and enabled recovery from psychological trauma.

As such, it is important that future research examines the psychological impact on those who act in caring roles to front-line workers during times of crises, and the impact this may have upon their ability to provide care. Furthermore, to ascertain how these individuals can be supported. Gaining further understanding in this area may enable factors to emerge that promote the development of resilience in front-line workers and their families. It is therefore, recommended that future research examines how family units integrate, support and share emotional reactions. This could be conducted by interviewing multiple members of a family unit to ascertain multiple perspectives of a family unit. This may provide an understanding of how emotions may be shared within family units. Moreover, this information may assist in the development of tailored interventions designed for family units to promote resilience and mitigate the development of psychological trauma.

It is also recommended that future research consider testing the validity and generalisability of the Health Crisis Impact Model. This model may be beneficial in aiding front-line workers and their families in any future health crisis. Furthermore, this model may be able to provide an understanding of how trauma may develop outside of a public health crisis. For example, it may be helpful in providing knowledge regarding how trauma develops in individuals and their families in possible disaster situations, or in events where families are exposed to any potentially traumatic events. Thus, it may be beneficial in explaining the

development of trauma and suggesting ways to promote natural healing following exposure to adversity.

Lastly, it is important that future research further investigates the presence, impact, and prevalence of moral injury in those who are not directly exposed to morally distressing events. The findings of this thesis suggest moral injury may have developed in those who were not directly exposed to morally injurious events. It is therefore recommended future research investigates if moral injury can develop in those who are not exposed to personal violations of moral codes, e.g., the general public. This will enable an understanding of if moral injury can develop vicariously and any subsequent impacts this may have as a result. Furthermore, the findings obtained in this thesis suggest that moral injury may have developed in front-line workers. Thus, continued research is required to also confirm if moral injury does develop, and to fully understand how it may develop. Likewise, the psychological impact this may have upon front-line workers and how it may impact their ability to provide care. Moral injury is a under investigated area that has a clear impact, thus research in this area is of clear value.

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APPENDICES

APPENDIX ONE: Materials used in the systematic review.

CASP Checklist –Qualitative studies

Paper for appraisal and reference:

Criteria	Yes	Can't tell	No
<i>Section A.</i>			
1. Was there a clear statement of the aims of the research?			
2. Is a qualitative methodology appropriate?			
3. Was the research design appropriate to address the aims of the research?			
4. Was the recruitment strategy appropriate to the aims of the research?			
5. Was the data collected in a way that addressed the research issue?			
6. Has the relationship between researcher and participants been adequately considered?			
<i>Section B.</i>			
7. Have ethical issues been taken into consideration?			
8. Was the data analysis sufficiently rigorous?			
9. Is there a clear statement of findings?			
<i>Section C.</i>			
10. How valuable is the research?			

Comments (Including reason for exclusion)

JBI Critical Appraisal Checklist for Analytical Cross Sectional Studies

Reviewer _____

Date _____

Author _____ Year _____

Record Number _____

Criteria	Yes	Unclear	No
1. Were the criteria for inclusion in the sample clearly defined?			
2. Were the study subjects and the setting described in detail?			
3 Was the exposure measured in a valid and reliable way?			
4. Were objective, standard criteria used for measurement of the condition?			
5 Were confounding factors identified?			
6. Were strategies to deal with confounding factors stated?			
7. Were the outcomes measured in a valid and reliable way?			
8. Was appropriate statistical analysis used?.			

Overall appraisal: Include Exclude Seek further info

Comments (Including reason for exclusion)

Quality Appraisal Totals

Table X: Total rating by article using the JBI and CASP quality appraisal tools.

Reference	Quality Appraisal Tool	Total Score
Arribas-Garcis et al., 2020	JBI Critical Appraisal Checklist	7
Austin et al., 2017	JBI Critical Appraisal Checklist	8
Berlanda et al., 2020	JBI Critical Appraisal Checklist	6
Bryan et al., 2018	JBI Critical Appraisal Checklist	7
Dellaney et al., 2018	CASP Checklist	8
	JBI Critical Appraisal Checklist	8
Forkus et al., 2019	JBI Critical Appraisal Checklist	7
Gibbons et al., 2013	CASP Checklist	9
Gonzalaz et al., 2019	JBI Critical Appraisal Checklist	7
Kang et al., 2018	CASP Checklist	9
Kaye-Kauder et al., 2019	JBI Critical Appraisal Checklist	8
Kirby et al., 2011	JBI Critical Appraisal Checklist	7
Lancaster, 2018	JBI Critical Appraisal Checklist	6
Lee et al., 2018	JBI Critical Appraisal Checklist	8
Lin et al., 2007	JBI Critical Appraisal Checklist	8
McAlonan et al., 2007	JBI Critical Appraisal Checklist	7
McKinley, 2020	JBI Critical Appraisal Checklist	7
Mottahi et al., 2020	JBI Critical Appraisal Checklist	6
Si et al., 2020	JBI Critical Appraisal Checklist	8
Sodeke-Gregson et al., 2013	JBI Critical Appraisal Checklist	7
Soffer et al., 2010	JBI Critical Appraisal Checklist	6
Son et al., 2019	JBI Critical Appraisal Checklist	7

Styra et al., 2008	JBI Critical Appraisal Checklist	7
Tam et al., 2004	JBI Critical Appraisal Checklist	8
Tzeng, 2004	JBI Critical Appraisal Checklist	8
Vagni et al., 2020	JBI Critical Appraisal Checklist	8
Wild et al., 2016	CASP Checklist	10

Note. CASP maximum score = 10, JBI maximum score = 8. For mixed method studies CASP was used for Qualitative sections and JBI for Quantitative sections.

Data extraction table.

Reference	Design	Sample	Findings	Implications
Arribas-Garcia et al., 2020	Quant	110	Compassion satisfaction was positively correlated with resilience and training.	Preventative measures can reduce compassion fatigue, promoting resilience and compassion satisfaction.
Austin et al., 2017	Quant	329	Presence of moral distress in physicians and nurses impacts turnover intent and professional quality of life.	Emotional wellbeing activities with ongoing monitoring is needed to identify maladaptive characteristics.
Barr, 2017	Quant	157	Work stress predicted compassion fatigue and compassion satisfaction. Social support controlled for work stress and predicted compassion satisfaction	Work stress can have a direct and indirect impact of perceived social support and compassion satisfaction.
Berlanda et al., 2020	Qual	795	Interactions, working conditions, emotional responses and competence are affected by working in healthcare.	Providing a work environment that fosters staff wellbeing will then enable better patient care.
Bryan et al., 2018	Quant	930	PTSD and moral injury display differently and have different signs and symptoms. But the combination can lead to suicidal behaviours.	Awareness is needed towards the signs and symptoms of PTSD and moral injury. Assistance is needed for post war veterans.
Dellaney et al., 2018	Mixed	13	Self-compassion reduced burnout and secondary trauma both pre and post trauma exposure.	Self-compassion training needed for nurses, especially for those who work in direct contact with trauma patients.
Forkus et al., 2019	Quant	203	Self-compassion moderates the role of morally injurious experiences.	Policy holders need to implement programmes designed to help support or encourage self-compassion in the work place.
Gibbons et al., 2013	Qual	20	Cognitive dissonance and psychosocial sequelae relate to moral injury and psychological stress.	Provide therapy to those who experience morally injurious events.

Reference	Design	Sample	Findings	Implications
Gonzalaz et al., 2019	Quant	70	No gender difference was found between men and women, suggesting that gender does not play a role in resilience.	Compassion fatigue and burnout are associated with higher levels of compassion satisfaction and resilience.
Kang et al., 2018	Qual – 7 Focus groups and 3 interviews	10	Burnout, high volumes of work and increased levels of fear for personal safety.	Staff need good quality PPE and improved communication to provide better quality of care during outbreaks.
Kaye-Kauder et al., 2019	Quant	579	Post-traumatic growth and greater overall resilience was found after exposure to trauma. It was also correlated with difficult emotions and resilience. Suggesting difficult emotions may promote resilience.	Medical students can be trusted to volunteer during disasters because the motivation to help, alongside experiencing the emotions promotes resilience, which enables them to be better future clinicians.
Kirby et al., 2011	Quant	125	Different coping styles were associated with positive and negative coping.	Provide training to manage trauma and promote wellbeing.
Lancaster, 2018	Quant	161	Moral emotions mediate the role of morally injurious events on the symptoms of PTSD.	Model may be useful in predicting outcomes beyond PTSD when moral injury is involved.
Lee et al., 2018	Quant	1800	Staff in closer proximity to MERS had an increased risk of PTSD, even after time had elapsed. Risk increased in home quarantine.	Psychiatric evaluation is needed in high mortality environments.
Lin et al., 2007	Quant	92	Considered the SARS outbreak to be traumatic. Staff did develop PTSD after exposure to experiences of SARS whilst at work. Emergency staff had more than psychiatric staff	Closer proximity to the outbreak increases the risk of developing trauma.
McAlonan et al., 2007	Quant	176	Staff who were in closer contact with SARS were more susceptible to developing higher levels of chronic stress, anxiety and depression.	Front-line staff could benefit from stress management courses.

Reference	Design	Sample	Findings	Implications
Mckinley et al., 2020	Quant - Cross sectional	1651	Doctors have high levels of burnout and secondary traumatic stress and low levels of compassion satisfaction.	Free text response may help doctors to help identify factors which play a role in high burnout and secondary traumatic stress.
Mottaghi et al., 2020	Quant	300	Omnipresent guilt, empathy and compassion fatigue mediated secondary traumatic stress. Empathy explains 77% of compassion fatigue through feelings of guilt and secondary traumatic stress.	Intervention and training required to target empathy based guilt and apathy based secondary traumatic stress to reduce compassion fatigue.
Si et al., 2020	Quant	863	PTSD was prevalent in staff. There was mild to severe depression, anxiety and stress. Passive coping was correlated with post-traumatic stress, depression, anxiety and stress.	Need to look for psychological impact during public health crises to mitigate long term adverse effects, and decrease negative psychological outcomes.
Sodeke-Gregson, et al., 2013	Quant	340	Therapists are at a high risk of being negatively impacted by their work. Exposure did not predict secondary traumatic stress. This is balanced by potential positive outcomes from trauma work and compassion satisfaction.	Case load can influence the development of secondary traumatic stress, burnout and compassion satisfaction.
Soffer et al., 2010	Quant	20	Staff endured negative effect, meaning of crisis was associated with PTSD and dissociative symptoms. Staff were overwhelmed dealing with the bodies.	Staff were able to get meaning. Recommends supporting staff during and immediately after the event.
Son et al., 2019	Quant	280	Different working conditions affect the development of resilience, varied by role.	Differences are needed when considering what builds resilience in healthcare and non-healthcare personnel when responding to an outbreak in a hospital.

Reference	Design	Sample	Findings	Implications
Styra et al., 2008	Quant	248	Impacted lives, depressive affect and risk to self, whilst working in close proximity to SARS. Treating SARS was not a mediating factor on distress. Those in closer proximity were less affected, this may be due to experience	Experience and support are needed when treating infections. Support wellbeing and resilience.
Tam et al., 2004	Quant	652	Staff reported high levels of stress and distress. This was underpinned by perceptions of personal vulnerability, stress and support in the workplace.	Need for awareness in the sources of distress during outbreaks.
Tzeng, 2004	Quant	172	Nurses' attitudes and willingness to treat patients was affected by their understanding of infection control and attitudes towards the infection, e.g. fear.	Encourage nurses to discuss working conditions and gain support. Provide in service education regarding infection aetiology and infection control.
Vagni et al., 2020	Quant	236	Difficulties in decision making, caused by fear and high levels of stress. The closer the exposure to covid, the greater degree of stress.	Control or perceived control helps mitigate against trauma development. Need to consider this in policy and decision making.
Wild et al., 2016	Qual	32	After two years, those with episodes of PTSD reported poor sleep, greater burnout and poor quality of life.	Need to identify the development of PTSD early. And need for resilience interventions.

Full search string.

“Psychological Trauma” or “Vicarious Trauma” OR “Secondary Trauma” Or “Mental health difficulties*” OR “Compassion fatigue” AND “Moral injury” AND “Resilience” AND “Protective factor*” Or “Vulnerability Factor*” Or “Risk Factor*” AND “Epidemic” OR “Pandemic” OR “Endemic” OR “SARS” OR “EBOLA” OR “Public health crisis”.

APPENIDX TWO: Study materials from study two part A.

Study two part A- Participant information sheet



1. Title of Study

Dealing with COVID-19: Understanding risk, building resilience.

2. Version Number and Date

Version Three, 03.12.2020

3. Invitation Paragraph

You are being invited to participate in a research study. Before you decide to participate, it is important that you understand why this research is being done and what it will involve. Please take the time to read the following information carefully and please feel free to contact us for more information or if there is any information that you do not understand. Please feel free to discuss this with your family and friends if you wish. We would like to stress that you do not have to accept this invitation and should only agree to take part if you want to.

4. What is the purpose of the study?

The Coronavirus Disease (COVID-19) is a current public health concern of international proportions (WHO, 2020) which is placing an increasing demand on front line/key workers. Front-line/key workers refer to anyone who delivered essential public services during the COVID-19 pandemic. This includes health and or social care, police, prison and probation, education, transport, food and goods provisions and armed forces. Research has shown that front-line health and/or care workers are at an increased risk of developing stress and/or psychological trauma within their normal work-related activities. During a pandemic it is possible that any pre-existing risks will also be increased.

Social support has been highlighted as a protective factor against the development of psychological trauma (Vaugh & Wade, 2020) and during the COVID-19 pandemic, front-line/key workers may need additional support from their family members to provide care, enhance active coping and promote resilience. Therefore, gaining an understanding of the lived experiences of family members of front-line/key workers will allow for a greater understanding of trauma, social support and how a public health crisis may affect family units and front-line/key workers.

5. Who can participate in this study?

Anyone aged 18 years and over who have family members who were front-line/key workers during the COVID-19 pandemic.

6. Do I have to take part?

No, you do not have to take part in this study, and you are free to withdraw, without explanation, before and/or during the interview. However, after the interview has finished you will not be able to remove your contribution as this study will not collect any identifiable information.

7. What will happen if I take part?

If you agree to take part, you will be sent an email from the researcher (Caroline Mead) that will contain a link to a Microsoft Teams meeting and you will be asked to attend a virtual semi-structured interview. It will last around 45-60 minutes. Before the meeting begins, you will be shown this information sheet again and will have the opportunity to ask any questions.

The interview will be audio recorded using Microsoft Teams. During the interview you will be asked a series of open-ended questions about how you may have supported your family and your lived experiences during the COVID-19 pandemic. After the interview you will be asked to complete three short questionnaires. If you agree, the links will be posted in the chat function. Please ensure that you have a quiet and undisturbed space for the interview to take place.

Your name or name of anyone you mention will be replaced by a pseudonym to protect you and your family's identity. Moreover, to protect your identity you will be asked to keep your camera turned off at all times during recording. You are also asked not to mention the organisation for which your family member works.

8. How will my data be used?

The data collected in the interview will be solely used for the research aims described above. This study will not ask for any identifiable personal information. The responses you provide during the interview will be stored on a password protected system on the University of Central Lancashire server.

The University processes personal data as part of its research and teaching activities in accordance with the lawful basis of 'public task', and in accordance with the University's purpose of "advancing education, learning and research for the public benefit".

Under UK data protection legislation, the University acts as the Data Controller for personal data collected as part of the University's research. The University privacy notice for research participants can be found on the attached link https://www.uclan.ac.uk/data_protection/privacy-notice-research-participants.php

Further information on how your data will be used can be found in the table below.

How will my data be collected?	<i>Audio recording online using Microsoft teams</i>
How will my data be stored?	<i>Once the audio recording has been transcribed, it will be deleted, and the typed transcript will only be retained for the purposes of research. Your individual responses will only be seen by the research team.</i>
What measures are in place to protect the security and confidentiality of my data?	<i>The University of Central Lancashire uses a password protected secure network.</i>
Will my data be anonymised?	<i>Yes, to ensure all data provided is no identifiable information will be collected.</i>
How will my data be used?	<i>The data collected in the interview will be transcribed and analysed using a thematic analysis to look for common themes between participants</i>
Who will have access to my data?	<i>The researcher (Caroline Mead) and the principal investigator (Dr Carol Ireland) and the research team (Professor Jane Ireland and Dr Michael Lewis)</i>
Will my data be archived for use in other research projects in the future?	<i>Yes, however all personal information will be anonymised to ensure that your data cannot be identifiable</i>

Transferring data outside the EU

Your personal data will not be shared outside the EU.

9. Are there any risks in taking part?

This research has the potential to cause distress as you will be asked to discuss how you have coped during the COVID-19 pandemic. If you feel this study has the potential to do so, we recommend that you do not consent to participate, and we thank you for your interest.

At any time before or during the interview, if you begin to feel distressed, please tell the researcher and you will be offered a break. You will be supported and given advice on how to access additional support.

After the break, your consent will be sought again to continue with the interview. If at any point you do not feel comfortable or a question causes upset, we can move onto the next question or end the interview.

10. Are there any benefits from taking part?

There is no likely benefit to yourself. However, participation in this study will help guide future understanding on how individuals are affected during a pandemic, and how we may support others.

11. What will happen to the results of the study?

The data you provided will be transcribed and examined together with the data collected from other interviews to look for themes. The overall results will be used as part of a larger PhD project and may be published to inform future research in this area. These publications may use participant quotes to support themes etc., but the research team will ensure these remain anonymous and non-identifiable.

12. What will happen if I want to stop taking part?

You are not obliged to participate. Moreover, we do not want you to feel pressured to consent if you have already agreed to; you can leave this study at any time before and during the interview. You do not need to provide an explanation for why you wish to withdraw.

You can choose to withdraw at any time by requesting the interview to be stopped, leaving the meeting by pressing the leave button, or closing your browser. If you withdraw before the interview has finished, we will permanently delete any information you have provided. You will still be provided with the debrief sheet and made aware of the available support services. If you have left the interview unexpectedly (such as if your wi-fi connection has become disrupted), please just try to re-join the meeting, or contact the researcher within 24 hours. If not, the assumption will be that you have left the interview as you no longer wish to continue, and your data will be destroyed.

Please note, after the interview has been finished and you have been provided with the debrief sheet, we will not be able to remove your contribution as this study will not collect any identifiable information.

13. What if I am unhappy or if there is a problem?

If you are unhappy, or if there is a problem, please feel free to let us know by contacting [Caroline Mead – cmead@uclan.ac.uk or Dr Carol Ireland- caireland@uclan.ac.uk] and we will try to help. If you remain unhappy, or have a complaint which you feel you cannot come to us with, then please contact the Research Governance Unit at OfficerForEthics@uclan.ac.uk.

The University strives to maintain the highest standards of rigor in the processing of your data. However, if you have any concerns about the way in which the University processes

your personal data, it is important that you are aware of your right to lodge a complaint with the Information Commissioner's Office by calling 0303 123 1113.

14. Who can I contact if I have further questions?

Principal Investigator

Caroline Mead

cmead@uclan.ac.uk

Director of Studies

Dr Carol A. Ireland

caireland@uclan.ac.uk

Study two part A- Consent statement.

The following questions will be asked to participants before the interview begins to ensure consent is sought.

Have you read and understood the information sheet provided for this study and have you had the opportunity to consider the information and ask any questions?

Do you understand that your participation in this study is voluntary and you are free to withdraw at any point during the interview, without giving a reason?

Do you understand that once the interview has finished and you have provided final consent you will be unable to remove your contribution?

Do you understand that any personal identifiable information you provide will be removed from the transcript to protect your identity?

Do you understand that the information you may provide will be used by the research team in the future as part of a wider PhD programme and may be used for publication, reports or presentations?

Do you understand that your information will be stored according to GDPR guidance on the University of Central Lancashire secure server?

Do you consent to taking part in this study?

Study two part A- Interview questions

Please note: The first four questions are ‘starter questions’, to open a dialogue with the participant, and response will be followed up where possible with clarifying questions. Relative/s will refer to the front-line/key worker.

1. Can you tell me the job title and the sector of the front-line/key worker you are related to? *Please do not tell me the organisations name the person works within only the sector, i.e. health care, social care etc.*
2. Can you please tell me your age? *You do not need to answer if you prefer not to*
3. Can you please me your gender? *You do not need to answer if you prefer not to*
4. Can you describe yourself as a person? *How would you describe your self-esteem? Do you feel others value you? What do you feel are your strengths and what do you feel you're not as good at?*

I am going to ask you some questions about your understanding of trauma and the experiences of your relative/s.

5. What does the term ‘traumatic experience’ mean to you? *How would you define it?*
6. How would you define a traumatic reaction?
7. How do feel about the trauma front-line workers may have been exposed to during the COVID-19 pandemic?
8. During the pandemic, has your relative/s been exposed to trauma whilst at work? *Can you tell me about this?*
9. During the pandemic has your relative/s ever confided in you about their experiences at work? *If so, how did this make you feel? If not, can you tell me why?*
10. How do you think they have been affected by this pandemic? *Have they struggled? If not, why do you think this is? If they were able to cope, why do you think this was?*
11. What does the term ‘wellbeing’ mean to you? *How would you define it?*
12. Can you tell me how you have supported your relative/s during difficult times throughout the pandemic? *Has there been any difficulties? Have you found anything worked well?*
13. During the COVID-19 pandemic can you tell me about how you have supported or boosted your relative/s wellbeing? *Have you found anything worked well? Has there been any difficulties?*
14. Have you used any form of technology to communicate and support your front-line/key

worker during the pandemic? *What did you use and why did you choose it?*

15. Do you feel front-line/key workers have been/are offered enough support during the pandemic? *If so, what support do you think they got, if not why?*

I am now going to ask you some questions about your personal experiences during the COVID-19 pandemic.

16. During the pandemic, have you had any personal experiences with stress or trauma? *If yes, how did you cope with the stress or trauma? If no, why is this, how you protected yourself from harm? -If not move onto Q20*
17. Thinking back over the last year to the beginning of the COVID-19 pandemic, which traumatic events have caused you the most distress? *Why did this cause you the most distress?*
18. What do you remember of this event? How do you feel about it now? How have you come to understand this experience?
19. How much do you think this event impacted your life? *Positively? Negatively? Can you tell me how you have coped with this?*
20. During the COVID-19 pandemic have you sought emotional support from those around you? From another family member? Or the relative/s working on the front line? *If so, what support did you receive? If not, why did you not seek support?*
21. Can you tell me about the type of things you have done to support yourself and your wellbeing during the pandemic? *Did the things work? If not, why?*
22. During the COVID-19 pandemic have you been fearful towards your relative/s catching the virus? Or fearful towards them passing it to you? *If yes, can you tell me what made you afraid. If no, why?*
23. During the COVID-19 pandemic, how do you feel you coped during the first and second lockdowns? *If you coped well, can you tell me what you did that helped you? If not, can you tell me why you think you did not cope well.*

I am now going to ask you a few questions about resilience

24. What does the term 'resilience' mean to you? *How would you define it?*
25. Do you feel you coped better or worse with day to day life as a result of the COVID-19 pandemic? Have your experiences affected your ability to cope with daily stress or trauma? *If so, why do you think this? If not, can you tell me why you think this?*
26. How do you think your experiences with the COVID-19 pandemic have affected your ability to cope with new stress or trauma in the future?
27. Thinking back to the second lockdown which began in November 2020, did you feel prepared to handle another lockdown as a result of your experiences in the first

lockdown? *If so why? If not, can you tell me why?*

28. Before we end, is there anything else you would like to say that you feel has been missed?

This is the end of our questions; we would like to thank you very much for your time and we really appreciate your responses.

Study two part A- Debrief



Dealing with COVID-19: Understanding risk, building resilience

Thank you for participating in this research.

This research aimed to explore the lived experiences of front-line throughout the COVID-19 pandemic. During the interview you were asked questions about your experiences, how you were supported, how you coped and how you have developed resilience in yourself and your family members.

Social support has been highlighted as a protective factor against the development of psychological trauma (Vaugh & Wade, 2020) and during the COVID-19 pandemic, front-line workers will need to seek support in the workplace and from wider social networks to provide care, enhance active coping and promote resilience. Gaining an understanding of the lived experiences of family members of front-line/key workers during a pandemic will allow for a greater understanding of psychological trauma and social support in public health crises.

We hope you have found this research interesting and have not been distressed by any of the topics discussed. However, if this research has caused distress, please consider seeking support from any of the following agencies:

Support services:

The Samaritans

www.samaritans.org

This service offers a confidential and non-judgmental listening service which supports people in moments of crisis. It also helps to prevent crisis through providing coping skills

Free phone: 116 123

COVID19 Online Psychological Support Hub

psychologicalsupport@uclan.ac.uk

This is a support service for front-line workers and their families, care home workers and military support personnel

Together for mental wellbeing

<https://www.together-uk.org/about-us/>

This service offers a range of support to help people deal with the personal and practical impacts of mental health issues

Contact details:

If you have any queries or concerns, please contact either the researcher, Caroline Mead or the Director of Studies, Dr Carol A. Ireland.

Principal Investigator

Caroline Mead
cmead@uclan.ac.uk

Director of Studies

Dr Carol A. Ireland
caireland@uclan.ac.uk

Thank you again for taking part!

APPENDIX THREE: Study materials from study two part B.

Study two part B- Participant information sheet



1. Title of Study

Psychological Trauma: Understanding risk, building resilience.

2. Version Number and Date

Version One, 03.12.2021

3. Invitation Paragraph

You are being invited to participate in a research study. Before you decide to participate, it is important that you understand why this research is being done and what it will involve. Please take the time to read the following information carefully and please feel free to contact us for more information or if there is any information that you do not understand. Please feel free to discuss this with your family and friends if you wish. We would like to stress that you do not have to accept this invitation and should only agree to take part if you want to.

4. What is the purpose of the study?

The Coronavirus Disease (COVID-19) is a current public health concern of international proportions (WHO, 2020) which is placing an increasing demand on front line/key workers. Front-line/key health and or social care workers refer to anyone who delivered essential public services during the COVID-19 pandemic in the medical or social care sectors. Research has shown that front-line health and/or care workers are at an increased risk of developing stress and/or psychological trauma within their normal work-related activities. During a pandemic it is possible that any pre-existing risks will also be increased. Therefore, gaining an understanding of the lived experiences of front-line/key workers will allow for a greater understanding of trauma, moral injury, social support and how a public health crisis may affect front-line health and/or social care workers.

5. Who can participate in this study?

Anyone aged 18 years and who was not able to work from home and was employed as a front-line worker in the health and/or social care sector in a public facing role during the COVID-19 pandemic.

6. Do I have to take part?

No, you do not have to take part in this study, and you are free to withdraw, without explanation, before and/or during the interview. However, after the interview has finished, and you have provided final consent you will not be able to remove your contribution as this study will not collect any identifiable information.

7. What will happen if I take part?

If you agree to take part, you will be sent an email from the researcher (Caroline Mead) that will contain a link to a Microsoft Teams meeting and the consent form. You will be asked to attend fill out the consent form and email it back to the researcher. You will then be asked to attend a virtual semi-structured interview. It will last around 45-60 minutes. Before the meeting begins, you will be shown this information sheet again and will have the opportunity to ask any questions.

The interview will be audio recorded using Microsoft Teams. During the interview you will be asked a series of open-ended questions about your lived experiences during the COVID-19 pandemic. Your name or name of anyone you mention will be replaced by a pseudonym to protect your identity. Moreover, to protect your identity you will be asked to keep your camera turned off at all times during recording. You are also asked not to mention the organisation you work for.

8. How will my data be used?

The data collected in the interview will be solely used for the research aims described above. This study will not ask for any identifiable personal information. The responses you provide during the interview will be stored on a password protected system on the University of Central Lancashire server.

The University processes personal data as part of its research and teaching activities in accordance with the lawful basis of ‘public task’, and in accordance with the University’s purpose of “advancing education, learning and research for the public benefit”.

Under UK data protection legislation, the University acts as the Data Controller for personal data collected as part of the University’s research. The University privacy notice for research participants can be found on the attached link https://www.uclan.ac.uk/data_protection/privacy-notice-research-participants.php

Further information on how your data will be used can be found in the table below.

How will my data be collected?	<i>Audio recording online using Microsoft teams</i>
How will my data be stored?	<i>Once the audio recording has been transcribed, it will be deleted, and the typed transcript will only be retained for the purposes of research. Your individual responses will only be seen by the research team.</i>
What measures are in place to protect the security and confidentiality of my data?	<i>The University of Central Lancashire uses a password protected secure network.</i>

Will my data be anonymised?	<i>Yes, to ensure all data provided is no identifiable information will be collected.</i>
How will my data be used?	<i>The data collected in the interview will be transcribed and analysed using a thematic analysis to look for common themes between participants</i>
Who will have access to my data?	<i>The researcher (Caroline Mead) and the principal investigator (Dr Carol Ireland) and the research team (Professor Jane Ireland and Dr Michael Lewis)</i>
Will my data be archived for use in other research projects in the future?	<i>Yes, however all personal information will be anonymised to ensure that your data cannot be identifiable</i>

Transferring data outside the EU

Your personal data will not be shared outside the EU.

9. Are there any risks in taking part?

This research has the potential to cause distress as you will be asked to discuss how you have coped during the COVID-19 pandemic. If you feel this study has the potential to do so, we recommend that you do not consent to participate, and we thank you for your interest.

At any time before or during the interview, if you begin to feel distressed, please tell the researcher and you will be offered a break. You will be supported and given advice on how to access additional support.

After the break, your consent will be sought again to continue with the interview. If at any point you do not feel comfortable or a question causes upset, we can move onto the next question or end the interview.

10. Are there any benefits from taking part?

There is no likely benefit to yourself. However, participation in this study will help guide future understanding on how individuals are affected during a pandemic, and how we may support others.

11. What will happen to the results of the study?

The data you provided will be transcribed and examined together with the data collected from other interviews to look for themes. The overall results will be used as part of a larger PhD project and may be published to inform future research in this area. These publications may use participant quotes to support themes etc., but the research team will ensure these remain anonymous and non-identifiable.

12. What will happen if I want to stop taking part?

You are not obliged to participate. Moreover, we do not want you to feel pressured to consent if you have already agreed to; you can leave this study at any time before and during the interview. You do not need to provide an explanation for why you wish to withdraw.

You can choose to withdraw at any time by requesting the interview to be stopped, leaving the meeting by pressing the leave button, or closing your browser. If you withdraw before the interview has finished, we will permanently delete any information you have provided. You will still be provided with the debrief sheet and made aware of the available support services. If you have left the interview unexpectedly (such as if your wi-fi connection has become disrupted), please just try to re-join the meeting, or contact the researcher within 24 hours. If not, the assumption will be that you have left the interview as you no longer wish to continue, and your data will be destroyed.

Please note, after the interview has been finished and you have been provided with the debrief sheet, we will not be able to remove your contribution as this study will not collect any identifiable information.

13. What if I am unhappy or if there is a problem?

If you are unhappy, or if there is a problem, please feel free to let us know by contacting [**Caroline Mead – cmead@uclan.ac.uk or Dr Carol Ireland- caireland@uclan.ac.uk**] and we will try to help. If you remain unhappy or have a complaint which you feel you cannot come to us with, then please contact the Research Governance Unit at **OfficerForEthics@uclan.ac.uk**.

The University strives to maintain the highest standards of rigor in the processing of your data. However, if you have any concerns about the way in which the University processes your personal data, it is important that you are aware of your right to lodge a complaint with the Information Commissioner's Office by calling 0303 123 1113.

14. Who can I contact if I have further questions?

Principal Investigator

Caroline Mead
cmead@uclan.ac.uk

Director of Studies

Dr Carol A. Ireland
caireland@uclan.ac.uk

Study two part B- Consent Sheet

Please read the following consent statements carefully and tick if you agree to the statements.

I read and understood the information sheet provided for this study and have you had the opportunity to consider the information and ask any questions.	Yes	No
I understand that my participation in this study is voluntary, and I am free to withdraw at any point during the interview, without giving a reason.	Yes	No
I understand that once the interview has finished and I have proved final consent I will be unable to remove my contribution.	Yes	No
I understand that any personal identifiable information I may provide will be removed from the transcript to protect my identity.	Yes	No
I understand that the information I may provide will be used by the research team in the future as part of a wider PhD programme and may be used for publication, reports or presentations.	Yes	No
I understand that your information will be stored according to GDPR guidance on the University of Central Lancashire secure server.	Yes	No
I consent to taking part in this study.	Yes	No

Study two part B- Interview questions

Please note: The first five questions are ‘starter questions’, to open a dialogue with the participant, and response will be followed up where possible with clarifying questions.

1. Can you tell me the job title and the sector you work in?
Please do not tell me the organisations name you work in, only the sector, i.e. health care, social care etc/
2. Can you please tell me your age? *You do not need to answer if you prefer not to.*
3. Can you please tell me your gender? *You do not need to answer if you prefer not to.*
4. Can you please tell me your relationship status? *You do not need to answer if you prefer not to.*
5. Can you describe yourself as a person? *How would you describe your self-esteem? Do you feel others value you? What do you feel are your strengths and what do you feel you're not as good at?*

I am now going to ask you about your understanding of trauma and some questions about your personal experiences during the COVID-19 pandemic.

6. What does the term ‘traumatic experience’ mean to you? *How would you define it?*
7. How would you define a traumatic reaction?
8. During the pandemic, have you had any personal experiences with stress or trauma in work? *If yes, how did you cope with the stress or trauma? If no, why is this, how did you protect yourself from harm?*
9. During the COVID-19 pandemic have you been fearful of catching the virus at work? *If yes, can you tell me what made you afraid. If no, why?*
10. During the pandemic did you ever seek emotional support from those around you in work? From your colleagues? Management? Or other services? *If so, how did this make you feel? Was it helpful? What support did you receive? If not, why did you not seek support? If not, can you tell me why?*
11. During the pandemic have you ever confided in your family/partner about your experiences at work? *If so, how did this make you feel? Did you find it helpful? If not, can you tell me why?*
12. Thinking back to the beginning of the COVID-19 pandemic, have there been any events that have caused you the most distress? *Why did this cause you the most distress? **If not, move onto Q15***

13. When you remember this event, how do you feel about it now? How have you come to understand this experience?
14. How much do you think this event impacted your life? *Positively? Negatively? Can you tell me how you have coped with this?*
15. During the COVID-19 pandemic, did you ever witness things you felt were morally wrong? *If so, how did this impact you? Can you tell me how you have coped with this?*
16. During the COVID-19 pandemic, were you ever troubled by something you felt you should have done, which you felt violated your own personal morals (that is, the principles and rules that you personally live by and believe to be morally right and sound)? *If so, how did this make you feel? How did you cope with this?*
17. During the COVID-19 pandemic, did you ever feel betrayed by your leaders, or colleagues who you trusted? *If so, how did this make you feel? How did you cope with this?*
18. While at work, do you trust that yourself, your leaders and those around you to live up to their own core values and moral codes? *If so, why, if not, why do you feel this way?*

I am now going to ask you about how you feel your family coped during the COVID-19 pandemic.

19. Do you think your family members have been affected by this pandemic? *Have they struggled? If not, why do you think this is? If they were able to cope, why do you think this was?*
20. During the COVID-19 pandemic, have you been fearful towards your relative/s catching the virus? Or, fearful towards them passing it to you, or you to them? *If yes, can you tell me what made you afraid. If no, why?*

I am now going to ask you a few questions about wellbeing.

21. What does the term 'resilience' mean to you? *How would you define it?*
22. Can you tell me what the term wellbeing means to you?
23. Can you tell me about the type of things you have done to support yourself and your wellbeing during the pandemic? *Did you go walking? Or do hobbies? Did the things work? If not, why?*
24. Can you tell me how you have supported or boosted your relative/s wellbeing during difficult times throughout the pandemic? *Has there been any difficulties? Have you found anything worked well?*

25. Did you use any form of technology to communicate and support your relatives during the pandemic? *What did you use and why did you choose it?*
26. During the COVID-19 pandemic, how do you feel you coped during the first, second and third lockdowns? *If you coped well, can you tell me what you did that helped you? If not, can you tell me why you think you did not cope well.*
27. What does the term ‘resilience’ mean to you? *How would you define it?*
28. Do you feel you coped better or worse with day-to-day life as a result of the COVID-19 pandemic? Have your experiences affected your ability to cope with daily stress or trauma? *If so, why do you think this? If not, can you tell me why you think this?*
29. How do you think your experiences with the COVID-19 pandemic have affected your ability to cope with new stress or trauma in the future?
30. Thinking back to the third lockdown which began in January 2021, do you feel prepared to handle another lockdown as a result of your experiences in the first, second and third lockdown? *If so, why? If not, can you tell me why?*
31. Before we end, is there anything else you would like to say that you feel has been missed?

This is the end of our questions; we would like to thank you very much for your time and we really appreciate your responses.

Dealing with COVID-19: Understanding risk, building resilience

Thank you for participating in this research.

This research aimed to explore the lived experiences of front-line workers throughout the COVID-19 pandemic. During the interview you were asked questions about your experiences, how you were supported, how you coped and how you have developed resilience in yourself and your family members.

Social support has been highlighted as a protective factor against the development of psychological trauma during the COVID-19 pandemic. Front-line workers will likely have needed to seek support in the workplace and from wider social networks to provide care, enhance active coping and promote resilience. Gaining an understanding of the lived experiences of front-line/key workers during a pandemic will allow for a greater understanding of psychological trauma, moral injury and social support in public health crises.

We hope you have found this research interesting and have not been distressed by any of the topics discussed. However, if this research has caused distress, please consider seeking support from any of the following agencies:

Support services:

The Samaritans

www.samaritans.org

This service offers a confidential and non-judgmental listening service which supports people in moments of crisis. It also helps to prevent crisis through providing coping skills

Free phone: 116 123

COVID-19 Online Psychological Support Hub

psychologicalsupport@uclan.ac.uk

This is a support service for front-line workers and their families, care home workers and military support personnel

Together for mental wellbeing

<https://www.together-uk.org/about-us/>

This service offers a range of support to help people deal with the personal and practical impacts of mental health issues

Contact details:

If you have any queries or concerns, please contact either the researcher, Caroline Mead or the Director of Studies, Dr Carol A. Ireland.

Principal Investigator

Caroline Mead
cmead@uclan.ac.uk

Director of Studies

Dr Carol A. Ireland
caireland@uclan.ac.uk

Thank you again for taking part!

APPENDIX FOUR: Study materials from study three.

Study Three- Information sheet



1. Title of Study

Psychological Trauma: Understanding risk, building resilience.

2. Version Number and Date

Version One, 07.07.2022

3. Ethical reference number

Science 0097

4. Invitation Paragraph

You are being invited to participate in a research study. Before you decide to participate, it is important that you understand why this research is being done and what it will involve. Please take the time to read the following information carefully and please feel free to contact us for more information or if there is any information that you do not understand. Please feel free to discuss this with your family and friends if you wish. We would like to stress that you do not have to accept this invitation and should only agree to take part if you want to.

5. What is the purpose of the study?

The Coronavirus Disease (COVID-19) is a current public health concern of international proportions (WHO, 2020) which is placing an increasing demand on front-line/key workers. Front-line/key workers refers to anyone who delivered essential public facing services during the COVID-19 pandemic. This includes health and or social care, police, prison and probation, education, transport, food and goods provisions and armed forces. Research has shown that front-line workers are at an increased risk of developing stress and/or psychological trauma within their normal work-related activities. During a pandemic it is possible that any pre-existing risks will also be increased. Therefore, gaining an understanding of the lived experiences of front-line/key workers will allow for a greater understanding of trauma, moral injury, social support and how a public health crisis may affect front-line health and/or social care workers.

Social support has been highlighted as a protective factor against the development of psychological trauma (Vaugh & Wade, 2020) and during the COVID-19 pandemic, front-line/key workers may need additional support from their family members to provide care, enhance active coping and promote resilience. Therefore, gaining an

understanding of the lived experiences of family members of front-line/key workers will allow for a greater understanding of trauma, social support and how a public health crisis may affect family units and front-line/key workers.

6. Who can participate in this study?

Anyone aged 18 years and who was employed as a front-line worker in a public facing role during the COVID-19 pandemic and anyone who is a close relative of a front-line worker in a public facing role.

7. Do I have to take part?

No, you do not have to take part in this study, and you are free to withdraw, without explanation, before and/or during the interview. However, after the interview has finished, and you have provided final consent you will not be able to remove your contribution as this study will not collect any identifiable information.

8. What will happen if I take part?

If you agree to take part, you will be asked to complete a series of self-administered questionnaires which will take approximately 45-50 minutes to complete.

9. How will my data be used?

The data collected i will be solely used for the research aims described above. This study will not ask for any identifiable personal information. The data provided will be stored on a password protected system on the University of Central Lancashire server.

The University processes personal data as part of its research and teaching activities in accordance with the lawful basis of ‘public task’, and in accordance with the University’s purpose of “advancing education, learning and research for the public benefit”.

Under UK data protection legislation, the University acts as the Data Controller for personal data collected as part of the University’s research. The University privacy notice for research participants can be found on the attached link https://www.uclan.ac.uk/data_protection/privacy-notice-research-participants.php

Further information on how your data will be used can be found in the table below.

How will my data be collected?	<i>Numerical data will be collected from the questionnaires</i>
How will my data be stored?	<i>Your data will be stored within a password protected file on the University of Central Lancashire secure server.</i>

What measures are in place to protect the security and confidentiality of my data?	<i>The University of Central Lancashire uses a password protected secure network.</i>
Will my data be anonymised?	<i>No identifiable information will be collected so your answers</i>
How will my data be used?	<i>The data collected in this study will be analysed using a SPSS to patterns in the data.</i>
Who will have access to my data?	<i>The researcher (Caroline Mead) and the principal investigator (Dr Carol Ireland) and the research team (Professor Jane Ireland and Dr Michael Lewis).</i>
Will my data be archived for use in other research projects in the future?	<i>Yes, however no identifiable personal information is collected to ensure that your data cannot be identifiable.</i>

Transferring data outside the EU

Your personal data will not be shared outside the EU.

10. Are there any risks in taking part?

This research has the potential to cause distress as you will be asked to complete questionnaires about how you have coped during the COVID-19 pandemic. If you feel this study has the potential to do so, we recommend that you do not consent to participate, and we thank you for your interest.

At any time before or while completing the questionnaires, if you begin to feel distressed, please take a break, or consider leaving the study by clicking the ‘leave this study now’ button at the bottom of the page. You will be directed to the debrief which will provide you with how to access support.

11. Are there any benefits from taking part?

There is no likely benefit to yourself. However, participation in this study will help guide future understanding on how individuals are affected during a pandemic, and how we may support others.

12. What will happen to the results of the study?

The data you provided will be used with data collected within this study to examine trauma, moral injury and resilience. The overall results will be used as part of a larger PhD project and may be published to inform future research in this area.

13. What will happen if I want to stop taking part?

You are not obliged to participate. Moreover, we do not want you to feel pressured to consent if you have already agreed to; you can leave this study at any time by clicking the 'leave this study now' button at the bottom of the page or by closing your browser. You do not need to provide an explanation for why you wish to withdraw.

If you withdraw before you finish the questionnaires, we will permanently delete any information you have provided. You will be provided with the debrief sheet if you click the 'leave this study now' button which will make aware of the available support services. If you have left the questionnaire unexpectedly (such as if your wi-fi connection has become disrupted), please just try to restart the study through the link you originally used, or contact the researcher within 24 hours. If not, the assumption will be that you have left the study as you no longer wish to continue, and your data will be destroyed.

Please note, after the final questionnaire is completed, you have submitted your responses and have been provided with the debrief sheet, we will not be able to remove your contribution as this study will not collect any identifiable information.

14. What if I am unhappy or if there is a problem?

If you are unhappy, or if there is a problem, please feel free to let us know by contacting [**Caroline Mead – cmead@uclan.ac.uk** or **Dr Carol Ireland- caireland@uclan.ac.uk**] and we will try to help. If you remain unhappy or have a complaint which you feel you cannot come to us with, then please contact the Research Governance Unit at **OfficerForEthics@uclan.ac.uk**.

The University strives to maintain the highest standards of rigor in the processing of your data. However, if you have any concerns about the way in which the University processes your personal data, it is important that you are aware of your right to lodge a complaint with the Information Commissioner's Office by calling 0303 123 1113.

15. Who can I contact if I have further questions?

Principal Investigator

Caroline Mead
cmead@uclan.ac.uk

Director of Studies

Dr Carol A. Ireland
caireland@uclan.ac.uk

Study Three- Consent statements

Project title: Psychological Trauma: Understanding risk, building resilience.

The following questions will be shown on screen to participants before the questionnaires begins to ensure consent is sought (and where they must indicate ‘yes’ to each question in order to proceed).

Statement	Yes	No
Have you read and understood the information sheet provided for this study and have you had the opportunity to consider the information and ask any questions?		
Do you understand that your participation in this study is voluntary, and you are free to withdraw at any point, without giving a reason?		
Do you understand that once you have finished the questionnaires have finished and you have proved final consent you will be unable to remove your contribution?		
Do you understand that the information you may provide will be used by the research team in the future as part of a wider PhD programme and may be used for publication, reports or presentations?		
Do you understand that your information will be stored according to GDPR guidance on the University of Central Lancashire secure server?		
Do you consent to taking part in this study?		

Study Three- Demographic information

Project title: Psychological Trauma: Understanding risk, building resilience.

The following demographic questions will be shown on screen to participants after they have provided consent.

Demographic information:

A front-line/essential worker refers to any individual who worked in a public facing role, who was unable to work from home throughout the COVID-19 pandemic. Front-line roles include those within the health and/or social care sectors, retail and food production and distribution, education and childcare, public safety, public services, utilities and communication and funeral services.

Were you a frontline worker throughout the COVID-19 pandemic?

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

If YES, please indicate the sector you worked in during the COVID-19 pandemic. If you held multiple roles, or changed roles throughout the pandemic, please select as many boxes as necessary to indicate your role/s.

	Please tick the appropriate box
Health care e.g., Doctors, Nurses, Midwives, Paramedics, other staff required to maintain the health care sector	<input type="checkbox"/>
Social care e.g., Social workers, care workers, other staff required to maintain the health care sector	<input type="checkbox"/>
Public services e.g., Prison and probation staff, religious staff, funeral sector, journalists and broadcasters	<input type="checkbox"/>
Education and childcare e.g., Teachers, support staff, childcare providers	<input type="checkbox"/>
Food and retail e.g., Production, distribution and/or sale of food and goods in supermarkets and/or other essential retailers.	<input type="checkbox"/>
Public safety and national security e.g., Police, Ministry of defence, fire and rescue, border control	<input type="checkbox"/>

Transport, Utilities, communication and financial services e.g., oil, gas, and water sectors, information technology and data infrastructure sector, telecommunications	
Local and national government e.g., COVID response	

Do you have a loved one (close family member, spouse/partner or close friend) who was a front-line worker throughout COVID-19 pandemic?

Yes	No

If YES, please indicate the sector your loved one worked in during the COVID-19 pandemic. If you have multiple loved ones who were front-line workers, or they changed roles throughout the pandemic, please select as many boxes as necessary to indicate thier role/s.

	Please tick the appropriate box
Health care e.g., Doctors, Nurses, Midwives, Paramedics, other staff required to maintain the health care sector	
Social care e.g., Social workers, care workers, other staff required to maintain the health care sector	
Public services e.g., Prison and probation staff, religious staff, funeral sector, journalists and broadcasters	
Education and childcare e.g., Teachers, support staff, childcare providers	
Food and retail e.g., Production, distribution and/or sale of food and goods in supermarkets and/or other essential retailers.	
Public safety and national security e.g., Police, Ministry of defence, fire and rescue, border control	
Transport, Utilities, communication and financial services e.g., oil, gas, and water sectors, information technology and data infrastructure sector, telecommunications	
Local and national government e.g., COVID response	

If YES, what is your relationship to the front-line worker?

	Please tick the appropriate box
Spouse e.g., boyfriend/girlfriend, husband/wife, partner	
Family e.g., Parent, child, sibling, grandparent aunt/uncle, cousin	
Friend	

Which gender do you identify as:

	Please tick the appropriate box
Female	
Male	
Non-binary	
Other (please state)	
Prefer not to say	

What is your age?

	Please tick the appropriate box
18-24	
25-34	
35-44	
45-54	
55-64	
65-74	
75+	
Prefer not to say	

Please can you select your relationship status:

	Please tick the appropriate box
Single	
In a relationship, but living separately	
Living with a partner	
Married	
Separated	
Divorced	
Other (please specify):	

Prefer not to say	
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Did your relationship status change throughout the COVID-19 pandemic?

Yes	No

If YES, what was your relationship status before the pandemic began (before March 2020)

	Please tick the appropriate box
Single	
In a relationship, but living separately	
Living with a partner	
Married	
Separated	
Divorced	
Other (please specify):	
Prefer not to say	

Study Three- Questionnaire battery

1. Brief-COPE (Caver, 1997)

Instructions:

The following questions ask you about how you have sought to cope with a hardship in your life. Read the statements and indicate how much you have been using each coping style, using the scale from 1 (I haven't been doing this) to 4 (I've been doing this a lot), as shown below. Please think about your lived experiences during the COVID-19 pandemic while completing this questionnaire.

	Statement	I haven't been doing this at all (1)	A little bit (2)	A medium bit (3)	I've been doing this a lot (4)
1	I've been turning to work or other activities to take my mind off things.				
2	I've been concentrating my efforts on doing something about the situation I'm in.				
3	I've been saying to myself "this isn't real".				
4	I've been using alcohol or other drugs to make myself feel better.				
5	I've been getting emotional support from others.				
6	I've been giving up trying to deal with it.				
7	I've been taking action to try to make the situation better.				
8	I've been refusing to believe that it has happened.				
9	I've been saying things to let my unpleasant feelings escape.				
10	I've been getting help and advice from others.				
11	I've been using alcohol or other drugs to help me get through it.				
12	I've been trying to see it in a different light, to make it seem more positive.				
13	I've been criticising myself.				
14	I've been trying to come up with a strategy about what to do.				
15	I've been getting comfort and understanding from someone.				

16	I've giving up the attempt to cope.				
17	I've been looking for something good in what is happening.				
18	I've been making jokes about it.				
19	I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping or shopping.				
20	I've been accepting the reality of the fact that it has happened.				
21	I've been expressing my negative feelings.				
22	I've been trying to find comfort in my religion or spiritual beliefs.				
23	I've been trying to get advice or help from other people.				
24	I've been learning to live with it.				
25	I've been thinking hard about what steps to take.				
26	I've been blaming myself for things that happened.				
27	I've been praying or meditating.				
28	I've been making fun of the situation.				

2. Brief Resilience Scale (BRS) (Smith et al., 2008)

Instructions:

Please think how you are feeling at the present time and respond to each statement by marking one box per row, using the scale from 1 (strongly disagree) to 5 (strongly agree), as shown below.

		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
1	I tend to bounce back quickly after hard times.					
2	I have a hard time making it through stressful events.					
3	It does not take me long to recover from a stressful event					
4	It is hard for me to snap back when something bad happens.					
5	I usually come through difficult times with little trouble.					
6	I tend to take a long time to get over set-backs in my life.					

3. Moral Injury Events Scale (original version) (Nash et al., 2013).

Please note: item nine has been omitted and ‘military’ was changed to ‘COVID-19’.

Instructions:

Please indicate the degree in which you agree or disagree with the following statements regarding your experiences at any time during the COVID-19 pandemic, using the scale from 1 (strongly agree) to 6 (strongly disagree) as shown below.

No.	Question	Agree strongly (1)	Moderately agree (2)	Slightly agree (3)	Slightly disagree (4)	Moderately disagree (5)	Strongly disagree (6)
1.	I saw things that were morally wrong						
2.	I am troubled by having witnessed others immoral acts						
3.	I acted in a way that violated my own moral code or values						
4.	I am troubled by having acted in ways that violated my own moral codes or values						
5.	I violated my own morals by failing to do something that I felt I should have done						
6.	I am troubled because I violated my morals by failing to do something I felt I should have done						

7.	I feel betrayed by leaders who I once trusted						
8.	I feel betrayed by other service members who I once trusted						
9.	I trust my leaders and fellow service members to always live up to their core values						
10.	I trust myself to always live up to my own moral code						

4. Nature Relatedness Scale (NR-6) (Short Form) (Nisbet & Zelenski, 2013).

Instructions:

For each of the following, please rate the extent to which you agree with each statement, using the scale from 1 (strongly disagree) to 5 (agree strongly) as shown below. Please respond as you really feel, rather than how you think “most people” feel.

		Disagree Strongly (1)	Disagree (2)	Neither (3)	Agree (4)	Agree Strongly (5)
1	My ideal vacation spot would be remote, wilderness area.					
2	I always think about how my actions affect the environment.					
3	My connection to nature and the environment is a part of my spirituality.					
4	I take notice of wildlife wherever I am.					
5	My relationship to nature is an important part of who I am.					
6	I feel connected to all living things and the earth.					

5. PTSD Checklist- Civilian Version (PCL-C) (Weathers et al., 1994).

Instructions:

Below are a list of problems and complaints that people sometimes have in response to stressful life experiences. Please read each one carefully, pick the answer that indicates how much you have been bothered by that problem in the last month.

No.	Response	Not at all (1)	A little bit (2)	Moderately (3)	Quite a bit (4)	Extremely (5)
1	Repeated, disturbing <i>memories, thoughts or images</i> of a stressful experience from the past?					
2	Repeated, disturbing <i>dreams</i> of a stressful experience from the past?					
3	Suddenly <i>acting or feeling</i> as if a stressful experience were happening again (as if you were reliving it)?					
4	Feeling <i>very upset</i> when <i>something reminded</i> you of a stressful experience from the past?					
5	Having a <i>physical</i> reaction (e.g., heart pounding, trouble breathing or sweating) when <i>something reminded</i> you of a stressful experience from the past?					
6	Avoid thinking about or talking about a stressful experience from the past or avoid having feelings related to it?					
7	Avoid activities or situations because they <i>remind you</i> of a stressful experience from the past?					
8	Trouble <i>remembering important</i> parts of a stressful experience from the pas?					
9	Loss of <i>interest in things</i> that you used to enjoy?					

10	Feeling <i>distant</i> or <i>cut off</i> from other people?					
11	Feeling <i>emotionally numb</i> or being unable to have loving feelings to those close to you?					
12	Feeling as if your <i>future</i> will somehow be <i>cut short</i> ?					
13	Trouble <i>falling</i> or <i>staying asleep</i> ?					
14	Feeling <i>irritable</i> or having <i>angry outbursts</i> ?					
15	Having <i>difficulty concentrating</i> ?					
16	Being " <i>super alert</i> " or watchful on guard?					
17	Feeling <i>jumpy</i> or easily startled?					

6. BBC Subjective well-being scale (BBC-SWB) (Pontin et al., 2013).

Instructions:

For each of the following, please rate the extent to which you agree with each statement, using the scale from 1 (not at all) to 5 (extremely) as shown below. Please respond as you really feel, rather than how you think “most people” feel.

		Not at all (1)	A Little (2)	Moderately (3)	Very much (4)	Extremely (5)
1	Are you happy with your physical health?					
2	Are you happy with the quality of your sleep?					
3	Are you happy with your ability to perform daily living activities?					
4	Do you feel depressed or anxious?					
5	Do you feel able to enjoy life?					
6	Do you feel like you have a purpose in life?					
7	Do you feel optimistic about the future?					
8	Do you feel in control of your life?					
9	Do you feel happy with yourself as a person?					
10	Are you happy with your looks and appearance?					
11	Do you feel able to live your life the way you want?					
12	Are you confident in your own opinions and beliefs?					
13	Do you feel able to do the things you choose to do?					
14	Do you feel able to grow and develop as a person?					
15	Are you happy with yourself and your achievements?					
16	Are you happy with your personal and family life?					
17	Are you happy with your friendships and personal relationships?					
18	Are you comfortable about the way you relate and connect with others?					

19	Are you happy with your sex life?					
20	Are you able to ask someone for help with a problem?					
21	Are you happy that you have enough money to meet your needs?					
22	Are you happy with the opportunity for exercise/leisure?					
23	Are you happy with access to health services?					
24	Are you happy with your ability to work?					

7. Vicarious Trauma Scale (Vrklevski & Franklin, 2008)

Please note: ‘client’ has been changes to ‘people’ and ‘role’ has been changed to job and/or social support role.

Instructions:

Please read the following statements carefully and indicate on a scale of 1 (strongly disagree) to 7 (strongly agree) how much you agree with them.

		Strongly disagree (1)	Disagree (2)	Slightly disagree (3)	Neither agree or disagree (4)	Slightly agree (5)	Agree (6)	Agree strongly (7)
1	My job and/or social support role involves exposure to distressing material.							
2	My job and/or social support role involves exposure to traumatised or distressed people.							
3	I find myself distressed by listening to other people’s stories.							
4	I find it difficult to deal with the content of my job and/or social support role.							
5	I find myself thinking about distressing material at home.							
6	Sometimes I feel helpless							

	to assist people in the way I would like.							
7	Sometimes I feel overwhelmed by the workload involved in my job and/or social support role.							
8	It is hard to stay positive and optimistic given some of the things I encounter in my job and/or social support role.							

8. Connectedness to nature scale (Mayer & McPherson Frantz, 2004)

Instructions:

Please answer each of these questions in terms of the way you generally feel. There are no right or wrong answers. Using the following scale, in the space provided next to each question simply state as honestly and candidly as you can what you are presently experiencing.

		Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
1	I often feel a sense of oneness with the natural world around me.					
2	I think of the natural world as a community which I belong to.					
3	I recognise and appreciate the intelligence of other living organisms.					
4	I often feel disconnected with nature.					
5	When I think of my life, I imagine myself to be part of a larger cyclical process of living.					
6	I often feel a kinship with animals and plants.					
7	I feel as though I belong to the Earth equally as it belongs to me.					
8	I have a deep understanding of how my actions affect the natural world.					
9	I often feel part of the web of life.					
10	I feel that all inhabitants of Earth, humans, and nonhumans, share a common 'life force'					
11	Like a tree can be part of a forest, I feel embedded within the broader natural world.					
12	When I think of my place on Earth, I consider myself to be a top member of the hierarchy that exists in nature.					
13	I often feel like I am only a small part of the natural world					

	around me, and that I am not more important.					
14	My personal welfare is independent of the welfare of the natural world.					

9. Interpersonal Support Evaluation List (Cohen et al., 1985).

This scale is a 12-item measure of perceptions of social support. It is a shortened version of the original 40 item ISEL version (Cohen & Hoberman, 1983)

Instructions: This scale is made up of a list of statements each of which may or may not be true about you. For each statement circle "definitely true" if you are sure it is true about you and "probably true" if you think it is true but are not absolutely certain. Similarly, you should circle "definitely false" if you are sure the statement is false and "probably false" if you think it is false but are not absolutely certain.

		Definitely False (1)	Probably False (2)	Probably True (3)	Definitely True (4)
1	If I wanted to go on a trip for a day (for example, to the country or mountains), I would have a hard time finding someone to go with me.				
2	I feel there is no one I can share my most private worries and fears with.				
3	If I were sick, I could easily find someone to help me with my daily chores.				
4	There is someone I can turn to for advice about handling problems with my family.				
5	If I decide one afternoon that I would like to go to a movie that evening I could easily find someone to go with me.				
6	When I need suggestions on how to deal with a personal problem, I know someone I can turn to.				
7	I don't often get invited to do things with others.				
8	If I had to go out of town for a few weeks, it would be difficult to find someone who would look after my house or apartment (the plants, pets, garden).				
9	If I wanted to have lunch with someone, I could easily find someone to join me.				
10	If I was stranded 10 miles from home, there is someone I could				

	call who would come and get me.				
11	If a family crisis arose, it would be difficult to find someone who would give me good advice about how to handle it.				
12	If I needed some help moving to a new home or apartment, I would have a hard time finding someone to help me.				

Study Three- Debrief



Dealing with COVID-19: Understanding risk, building resilience

Thank you for participating in this research.

This research aimed to explore the lived experiences of front-line workers and their families throughout the COVID-19 pandemic. During the study you were asked to complete questionnaires about your experiences, how you were supported, how you coped and how you have developed resilience in yourself and your family members.

Social support has been highlighted as a protective factor against the development of psychological trauma during the COVID-19 pandemic. Front-line workers will likely have needed to seek support in the workplace and from wider social networks to provide care, enhance active coping and promote resilience. Gaining an understanding of the lived experiences of front-line/key workers and their families during a pandemic will allow for a greater understanding of psychological trauma, moral injury and social support in public health crises.

We hope you have found this research interesting and have not been distressed by any of the topics discussed. However, if this research has caused distress, please consider seeking support from any of the following agencies:

Support services:

The Samaritans

www.samaritans.org

This service offers a confidential and non-judgmental listening service which supports people in moments of crisis. It also helps to prevent crisis through providing coping skills

Free phone: 116 123

COVID-19 Online Psychological Support Hub psychologicalsupport@uclan.ac.uk

This is a support service for front-line workers and their families, care home workers and military support personnel

Together for mental wellbeing

<https://www.together-uk.org/about-us/>

This service offers a range of support to help people deal with the personal and practical impacts of mental health issues

Contact details:

If you have any queries or concerns, please contact either the researcher, Caroline Mead or the Director of Studies, Dr Carol A. Ireland.

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