Effects of Coping Style, Social Relationships, and Support on New Zealanders Well-Being During the COVID-19 Pandemic

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Abstract

In early 2020 during the COVID-19 pandemic, the New Zealand Government implemented unprecedented measures such as lockdowns and social distancing. This research investigated the relationships between different coping styles, social support, social networks, social activity, and the impact on the mental health of adult New Zealanders during July and August 2020. At this point, New Zealand had successfully eliminated COVID-19 from the community (with the only cases being reported in quarantine facilities from arrivals to the country).

Adult participants' (18 years or above) were recruited in New Zealand through Facebook community groups and flyers placed in community locations such as medical centres, schools, and university campuses, to participate in an online survey between 13th July 2020 and 11th August 2020. The survey included: demographic questions, study-specific COVID-19 related questions, and seven standardised measures. We assessed three aspects of social support (perceived social support (Multidimensional Scale of Perceived Social Support (MPSS)), social network (Lubben Social Network Scale – revised (LSNR-R), social activities (Social Activity Log (SAL)), coping styles (Brief COPE), depression, anxiety, and stress (Depression, Anxiety and Stress Scale (DASS)), post-traumatic stress (The Abbreviated PCL-C - The Post-Traumatic Checklist), and post-traumatic growth (Post Traumatic Growth Inventory).

Our research investigated predictors of well-being and distress, including demographic variables (age group and gender), previous mental health diagnoses, coping styles, and social support. We hypothesised that higher scores in dysfunctional coping styles and lower scores on social support measures would be associated with higher distress and lower well-being. Our final sample contained 698 valid responses, consisting of 67% female (n=468), 31% male (n=217) and 2% other gender or did not specify (n=13).

Our models significantly predicted variance in depression (55%), anxiety (48%), stress (52%), PTSD (56%), and post-traumatic growth (41%). Mean scores for depression, anxiety, stress, and dysfunctional coping styles were significantly higher for the youngest age group (18- to 24-year-olds) compared to older age groups. In addition, 18- to 24-year-olds experienced the biggest loss of perceived social support and size of social networks since the COVID-19 pandemic. However, in our regression models, the dysfunctional coping styles of behavioural disengagement and self-blame and a previous mental health diagnosis were consistently among the most common predictors for depression, anxiety, stress, and PTSD. Higher perceived social support was associated with lower levels of depression and PTSD, and higher social activity was associated with lower depression and stress scores.

Furthermore, significant common predictors of distress included reduced perceived social support since the COVID-19 pandemic (for anxiety and stress) and social networks (for depression and PTSD). Social activity and adaptive coping styles (active coping, positive reframing, religion, emotional support) were significant predictors of post-traumatic growth. Overall, coping styles accounted for more variance (across all mental health outcomes) than age group, gender, previous mental health diagnoses or social support variables.

This research highlighted the disproportional effect that the COVID-19 pandemic was having on younger adults in New Zealand and stressed the need for strong social support and education on adaptive coping styles to reduce distress and improve well-being.

Acknowledgements

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Table of Contents

List of Figures

List of Tables

Introduction

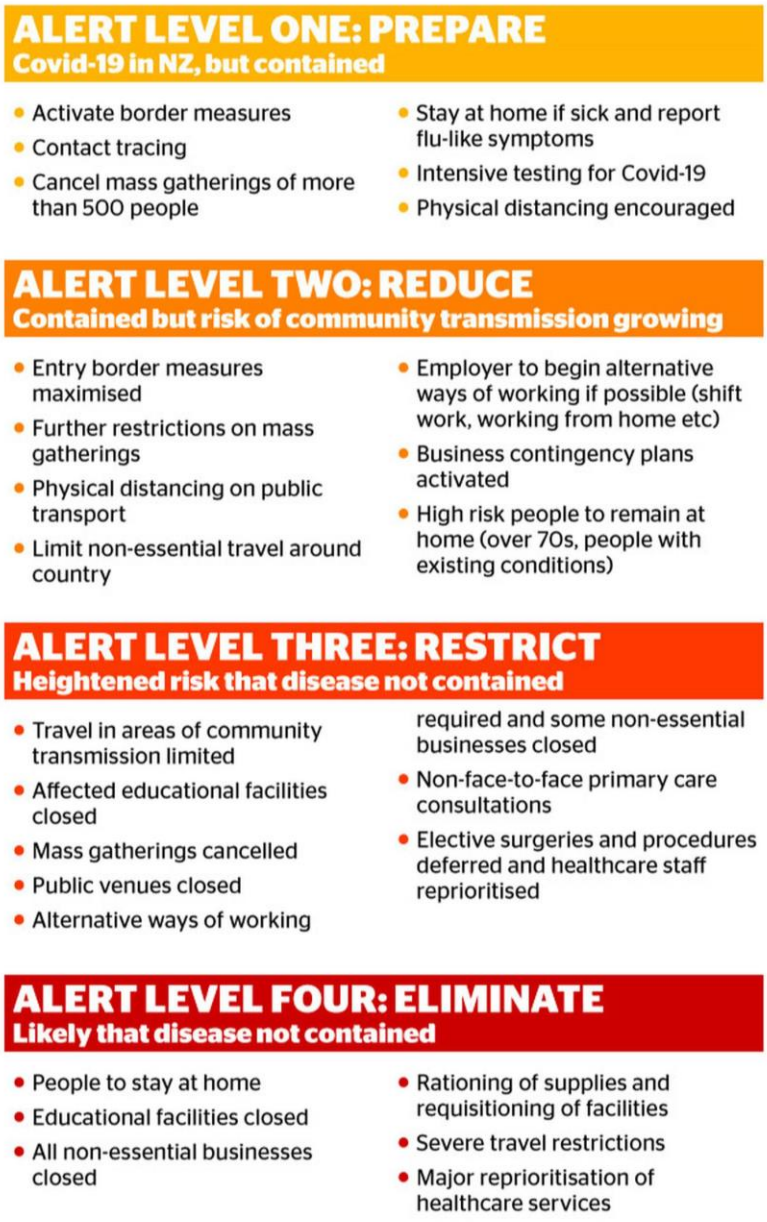
The first case of acute respiratory disease, known as Coronavirus disease 2019 (COVID-19), was documented in Wuhan City, China, on 8 December 2019 (Lu, Stratton, & Tang, 2020). Symptoms of COVID-19 include fever, cough, shortness of breath, confusion, fatigue, headache, sore throat, gastrointestinal problems, and loss of smell. Most patients have mild symptoms, however, some develop more severe complications. The elderly and those with comorbid conditions are most at risk of a poor prognosis. COVID-19 rapidly spread throughout the world, and a "Public Health Emergency of International Concern" was announced by the World Health Organisation (WHO) on 30 January 2020 (WHO, 2020). To reduce the spread of COVID-19, many countries began implementing border and travel restrictions.

The COVID-19 pandemic in New Zealand

In New Zealand (NZ), the government implemented border restrictions ahead of the first COVID-19 case identified on 28 February 2020 (Jefferies et al., 2020). The NZ strategy was to suppress the virus (stop the spread) rather than mitigate (slow the spread). To achieve this goal, an alert level system restricting movement was implemented on 21 March 2020 (Level 1), resulting in Level 4 restrictions (including stay-at-home orders) from 26 March 2020 to 26 April 2020. Restrictions began easing with Level 3 introduced from 28 April to 13 May, Alert Level 2 on 14 May 2020, and Level 1 on 9 June 2020. At this point, NZ had effectively 'eliminated' COVID-19 within the community, meaning that it had reduced cases to 'very low numbers detected at the border' (see Figure 1 and Figure 2) (Ministry of Health, 2020).

Figure 1

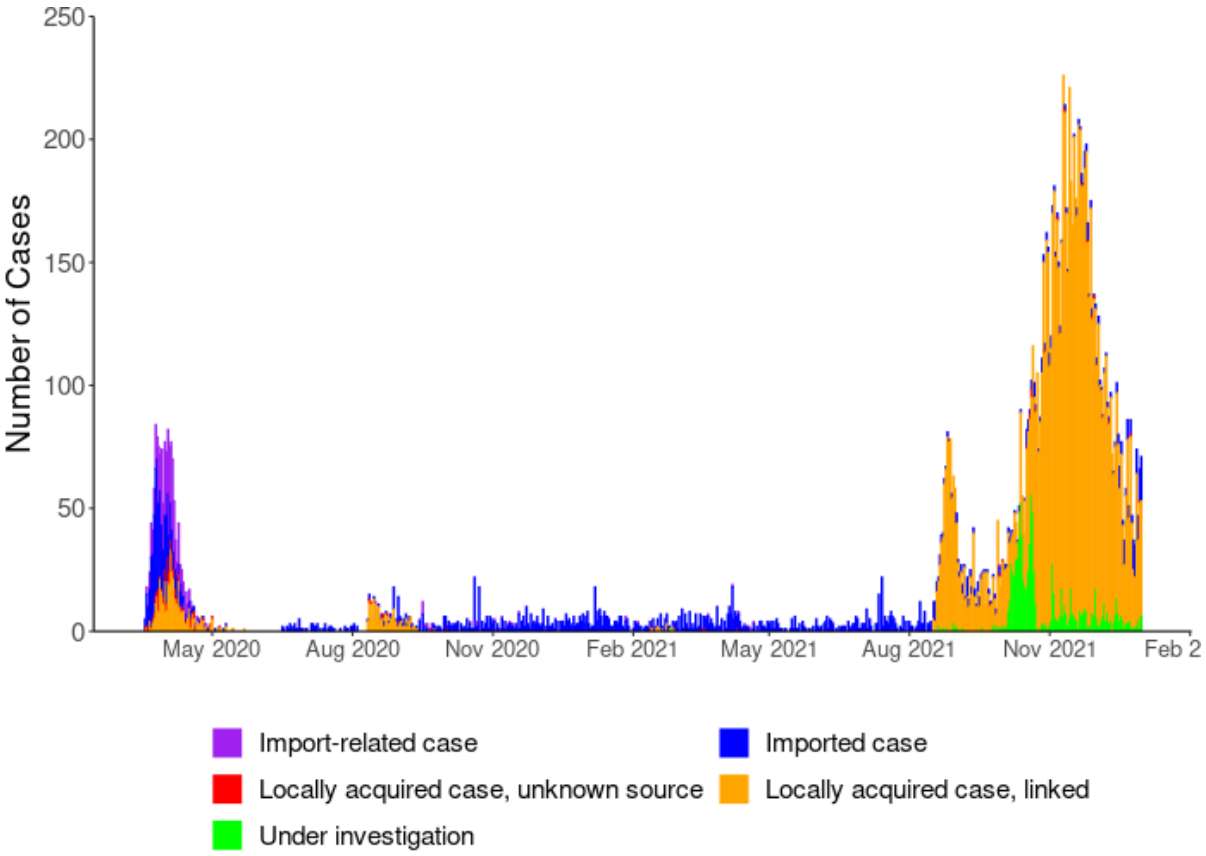
New Zealand COVID-19 Alert Level system



Note. This figure was produced by the NZ Herald, summarising the NZ COVID-19 Alert Level system. From "Coronavirus: What Covid-19 alert levels 3 and 4 mean for you and your family", by Luke Kirkness, 23 March 2020. https://www.nzherald.co.nz/nz/coronavirus-what-covid-19-alert-levels-3-and-4-mean-for-you-and-your-family/X7Q76QIHX5LFRAIEDELT3EECG4/

Figure 2

Daily cases during the New Zealand COVID-19 pandemic



Note. This figure was produced by the NZ Ministry of Health, summarising the NZ COVID-19 daily cases during 2020 and 2021. https://www.health.govt.nz/covid-19-novel-coronavirus/covid-19-data-and-statistics/covid-19-source-cases-2020-and-2021

The psychological impact of past pandemics

The impact of the COVID-19 pandemic and related restrictions has taken its toll on both the physical and mental health of the global population (Bueno-Notivol et al., 2021). Past infectious diseases may have played a considerable role in shaping our thoughts and responses to the current outbreak. During the 1918 flu epidemic, around 20 million people were thought to have died over two years (Simonsen et al., 1998). However, the 1918 flu outbreak led to the first scientific studies and a greater understanding of infectious diseases

(Morens, Taubenberger & Fauci, (2008). In addition, populations developed a long-lasting fear of death due to the unpredictability of such outbreaks. Modern-day air travel means that similar influenza-type infectious diseases can spread faster and more widely (Morens, Folkers & Fauci, 2008).

Historically, infectious diseases such as COVID-19 elicit fear in the population more than other ailments or illnesses (Pappas et al., 2009). Although the factors that predispose us to conditions such as heart disease have remained relatively stable, the threat of infectious diseases (such as COVID-19) are transmissible and invisible (Pappas et al., 2009).

During the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003, "fear, denial and frustration" were experienced by patients or those quarantined (Person et al., 2004). Anxiety around infectious disease also extends beyond the health implications to issues such as stigma, as witnessed by Asian residents in New York during the SARS outbreak (Eichelberger, 2007). Psychosocial effects were seen at individual, community, and international levels in the wake of the Ebola outbreak from 2013 to 2016. Initiatives to provide psychological support were recommended as part of a pandemic response (Van et al., 2016). Those who were part of the community but had not contracted the SARS virus were found to overestimate the chance of contracting the virus and the likelihood of dying from it (Koh et al., 2005). Others found that the wider community (who did not have SARS) had higher than baseline levels of psychiatric morbidities, indicating that for those who did not contract SARS their mental health was still negatively impacted, including feelings of: "anxiety, depression, somatic symptoms, fear of contagion, losing control" (Sim et al., 2010).

Social distancing, lockdowns, isolation measures, and quarantines have been implemented worldwide to reduce the spread of COVID-19. Policymakers during past pandemics also used similar measures to reduce the transmission of infectious diseases

(Hawryluck et al., 2004). However, these measures to slow the spread of illness can have adverse mental health outcomes. For example, in Canada, a substantial proportion of those who had entered voluntary quarantine (within their own homes) during the SARS outbreak displayed PTSD (28.9%) and depression symptoms (31.2%), with extended periods of quarantine being associated with higher levels of PTSD. Participants did not necessarily have SARS but were considered at risk after an exposure event (Hawryluck et al., 2004).

The psychological impact of the COVID-19 pandemic around the world

Recent research investigating mental health outcomes during the current COVID-19 pandemic has also found a decrease in well-being world-wide. Several meta-analyses/ systematic reviews have been undertaken on the mental health effects of the COVID-19 pandemic. Bueno-Notivol et al., (2020) found the incidence of depression ranged from "7.45% to 48.30%", an increase of 3.44% from 2017. However, the type of criteria, measures, and how each country dealt with the pandemic differed among the 12 studies from China, India, Italy, the United Kingdom, Denmark, and Vietnam (from January to May 2020), so caution is needed when interpreting these results and may explain the wide variation in depression outcomes.

Salari et al. (2020) review found that the incidence of stress was 29.6% (five studies), depression was 33.7% (14 studies), and anxiety was 31.9% (17 studies) during the COVID-19 pandemic. This review included research in Asia and Europe up until May 2020. Pappa et al. (2020) also investigated the incidence of depression and anxiety in health workers from China and Singapore (13 studies up until April 2020.) Anxiety showed a pooled prevalence of 23.2% and depression was 22.8%. Rates of depression and anxiety were comparable with the general population of China at the same time during the COVID-19 pandemic. Females (compared to males) experienced higher scores of depression and anxiety.

Xiong et al. (2020) review included 19 cross-sectional studies (conducted during the first half of 2020) on the general population over eight different countries (China, Spain, Italy, Iran, the US, Turkey, Nepal, and Denmark). Although they found differences in measurement tools and reporting patterns, 6.33% to 50.9% reported high levels of anxiety, 14.6% to 48.3% increased levels of depression, and 7% to 53.8% of PTSD, 34.43% to 38% of psychological distress. They found that the female gender, those under the age of 40, students and a history of medical or mental health issues and excessive exposure to media relating to COVID-19, were the most at risk of adverse mental health outcomes. In addition, those under 40 may be facing increasing financial pressure due to job losses and "caregiving roles" in families (children and parents).

In addition, Liu et al. (2020) conducted a cross-sectional online study with 898 American participants aged 18 to 30 years old (during April and May 2020 when stay-at-home restrictions were still in place). They found high levels of depression symptoms (43.3%), anxiety symptoms (45.4%), and PTSD symptoms (31.8%) amongst participants. High family support seemed to be protective against high depression and PTSD scores. Notably, most participants reported that they had instrumental support and social support from friends and family but low rates of perceived support (37% reported low levels of family support.

Wang et al. (2020) is one of the few longitudinal studies investigating mental health during the COVID-19 pandemic. The first survey was conducted in China in January 2020 (n=1210), with the second a month later in February 2020 (n=861), with 333 respondents completing both surveys. During the second survey period, COVID-19 cases had increased exponentially since the first survey. They found a statistically significant decrease in PTSD-related symptoms from the initial outbreak to four weeks later. However, the mean scores during both surveys were still high, indicating that the population surveyed showed high

PTSD symptoms at both times. However, there were no significant long-term changes in stress, anxiety, or depression (based on DASS-21 scores) between the two samples.

Mazza et al. (2020) online survey was completed by 2766 Italian people in March 2020 during the initial phase of the COVID-19 outbreak. Associations between socioeconomic factors, mental health (depression, anxiety, and stress), and personality traits were investigated. They found that "female gender, negative affect, and detachment" were associated with higher levels of mental health distress during this time.

Pre-pandemic research has found that females (compared to males) experience higher depression, anxiety, and stress (Altemus et al., 2014). Therefore, several studies have investigated whether females also experienced higher levels of distress during the COVID-19 pandemic. Gurvich et al., (2021) found in a study of Australians (in April and May 2020, during the pandemic) that females experienced higher levels of depression, anxiety, and distress compared to males. In addition, research from Wang et al. (2020), and Mazza et al. (2020) found that being female and young were predictors of poorer mental health during the COVID-19 pandemic. Salman et al. (2020) also found significantly higher anxiety and depression amongst females (compared to males) and significantly higher depression scores in those under 30 years old (compared to those over 30 years) during the COVID-19 pandemic between April and May 2020 for students in Pakistan.

The "paradox of ageing" theory (Mroczek & Kolar, 1998) suggests that 'older' adults generally report lower distress levels overall than younger age groups, despite older age being associated with a cognitive and physical decline. Heid et al. (2021) found that older people struggled with poor well-being in the early stages of the pandemic, however, no comparison was made to younger people. In contrast, Birditt et al. (2021) found that younger people experienced greater stress and that, potentially, the social impact of COVID-19 measures had

taken a higher toll on their well-being than older groups, similar results were also found by Li et al. (2021).

Overall, worldwide studies have found that mental wellbeing has decreased since the start of the COVID-19 pandemic, in particular, females (compared with males) and younger age groups (compared with older age groups) generally have higher levels of distress.

The psychological impact of the COVID-19 pandemic in New Zealand

By July 2020, community transmission of COVID-19 was eliminated in New Zealand. However, there were still small numbers of cases in those quarantined on return to the country. Breaches and the possibility of COVID-19 entering the community again were ever-present, as was the likelihood of the re-introduction of lockdowns and stay-at-home measures if community transmission was to occur again.

Several empirical studies looked at well-being during the early stages of the COVID-19 pandemic in New Zealand in 2020. Beaglehole et al. (2022) conducted a cross-sectional survey with 3487 New Zealand residents in April 2020 during strict lockdown conditions. The World Health Organization Well-Being Index (WHO-5) was used to investigate factors of wellbeing, together with general demographic and other lifestyle questions. Their multivariable analysis found that ‘excellent’ well-being was significantly associated with increasing age (65 years plus, compared to15 to 24-year-olds), male gender, and Maori and Asian ethnicity. In contrast, smoking, poor health (physical and mental), and previous trauma were negatively associated with ‘excellent’ wellbeing. Only 9% of participants reported excellent well-being.

Bell et al. (2021) compared the well-being of New Zealanders with and without a previous mental health diagnosis. The Kessler Psychological Distress Scale (K10), General Anxiety Disorder scale (GAD-7), and the WHO-5 were utilised to survey 3389 adults during

the April 2020 lockdown in New Zealand. Those with a previous mental health diagnosis were around twice as likely to report moderate to high levels of distress, moderate levels of anxiety, and poor well-being. In addition, they were four times as likely to experience suicidal thoughts.

Every-Palmer et al. (2020) surveyed 2010 New Zealanders in April 2020 using the K10, the GAD-7, and the Well-Being Index. They found that 30% of the participants were experiencing "moderate to severe psychological distress", 16% "moderate to high levels of anxiety", and 39% "low wellbeing". However, 62% also reported "silver linings" during the lockdown period, such as more time with family, working from home, and a quieter environment.

A cross-sectional study was conducted with 681 New Zealanders between May and June 2020, investigating depression, anxiety, and stress (Gasteiger et al., 2021). The GAD-7, Patient Health Questionnaire 9 (PHQ-9), and the Perceived Stress Scale 4 (PSS-4) scales were utilised, and it was found that mean scores for depression and anxiety were significantly higher than previously reported population norms (no significant differences for stress). Women reported higher scores than men for depression, anxiety, and stress. Being younger and most at risk of a poor outcome from COVID-19 was independently significantly related to higher levels of depression, anxiety, and stress in their multivariable models. Lower perceived loneliness was a protective factor against distress.

Prickett et al. (2020) conducted an online survey from 15 to 18 April 2020 with 2002 New Zealand participants (48.9% female) during the third week of the Level 4 lockdown period. Although no standardised measures were used to measure mental health, their questions focussed on the economic, employment, social, wellbeing, family, and work-life impact of the COVID-19 public health measures. Unemployment had doubled (from 5.3%

before lockdown to 10.3%). For those employed during the lockdown period (68% of participants), 32% were classed as “essential workers”, 32% were working from home, whilst 28% retained their jobs but were unable to work (7% lost their jobs during the lockdown). Of those who lost their jobs, 30% described feelings of depression. Twenty-six per cent experienced a loss of income, despite keeping their jobs. Those who lost their jobs were more likely to be of low income (24% with $30,000 or less pay per annum) and Pacific (11%) or Asian (10%) ethnicity. Almost half (44%) resided in a home where someone had experienced a loss of income or job. In addition, during the COVID-19 pandemic in New Zealand, personal well-being was lower for those who had lost income or employment, in lower-income households, and for young people (18 to 24 years old). Those over 65 years were least impacted economically during the lockdown.

In addition, Prickett et al. (2020) found that family demands increased for around half of all parents (with working mothers experiencing double the demands compared to fathers). Work-family conflict (reported by around 50% of participants) was associated with lower well-being and increased partner conflict and was higher for mothers (compared to fathers). Material hardship was reported by 8% of participants, with families on low incomes or single parents making up the majority of this group. Younger people (18 to 24 years) were less likely to experience positive emotions and more likely to experience decreased well-being than older groups. The individual economic loss was felt more acutely by men than women.

Anderson et al. (2020) wrote an evidence-based review between March and April 2020 which identified at-risk groups in New Zealand due to the COVID-19 pandemic and subsequent government measures to stop transmission. Their key conclusions were the likely disproportionate impact the pandemic would have on Maori and Pacific populations (due to already present health and social inequalities which may be exacerbated), those socially disadvantaged, young people (higher risk when labour conditions change), older people

(social isolation and higher risk of poor outcome from COVID-19), refugees and immigrants (may lack community resources or trauma from the country of origin), disabled people (services disrupted, existing higher risk for abuse and poor social outcomes), those with pre-existing health conditions (higher risk of poor outcomes, services disrupted), essential workers (increased stress, often low paid, stigma from the public) and women (at risk for poorer wellbeing due to higher caregiving load, higher representation in healthcare, and potential for an increase in family violence).

Overall, the COVID-19 pandemic in New Zealand and around the world has resulted in unprecedented measures such as social distancing and enforced stay-at-home measures to curb the spread of the disease. The limited surveys and research indicate New Zealanders have experienced a decline in well-being and increased mental health difficulties. However, we can only hypothesise the contributing factors to these outcomes.

Coping styles and strategies

Past research has shown that people are more likely to suffer distress and reduced well-being during stressful events, such as the COVID-19 pandemic if they have not developed adaptive coping strategies (Duncan, 2020). Coping can be defined as "cognitive and behavioural efforts to master, reduce, or tolerate the internal and/or external demands that are created by the stressful transaction" (Muller & Spitz, 2003). However, much of the research on coping styles lacks consensus on how to categorise or define measures of coping, therefore, it is difficult to compare research on this topic.

Carver (1997) defined 14 coping styles, and further research has consolidated these scales into broader categories. Overall, the 14 coping styles can be classified as problem-focused (active coping, planning, instrumental support, religion), emotion-focused

(acceptance, emotional support, humour, positive reframing, religion) and avoidant/dysfunctional (behavioural disengagement, denial, self-distraction, self-blame, substance use, venting) (Carver et al., 1989). However, there is a lack of consensus in the broader literature on categorising each of the 14 coping styles identified by Carver (1997). In general, adaptive coping skills can be a protective factor to well-being during difficult times and includes both problem-focussed and emotional-focused coping styles. Dysfunctional coping styles can be linked to increased distress (Carver, 1997).

Research before the COVID-19 pandemic by Eisenbarth (2019) found that the coping styles of 'self-blame', venting' 'disengagement' and 'self-distraction' were associated with poorer mental health outcomes in an Australia study (using the BRIEF Coping Orientation to Problems Experienced Inventory (Brief COPE) scale). In addition, denial and self-blame were significant predictors of stress in female college (university) students.

Further research has found that females traditionally score higher in 'emotional' coping styles (positive reframing, acceptance, religion) and social support (instrumental and emotional support). Conversely, males traditionally score higher in action-oriented styles such as planning (Matud, 2004). However, literature on coping has not examined differences in coping between genders to a large extent. There is little consistency in measures used or agreement on what constitutes a 'coping style' (Eisenbarth, 2019; Porter & Stone, 1995).

Coping styles during the COVID-19 pandemic

Coping strategies used by people to deal with the stressors of the COVID-19 pandemic have been relatively well researched around the world. A Master's thesis by Stoop-Maigret, (2020) investigated coping styles amongst 242 New Zealanders during the COVID-19 pandemic (May 2020 survey) and found that self-blame, disengagement, self-distraction,

venting, and planning (Brief COPE scale) predicted higher perceived stress. In addition, emotional support and acceptance predicted lower perceived stress (Stoop-Maigret, 2020).

Gurvich et al., (2021) reported similar findings during the pandemic in Australia (April to May 2020 survey) using the Brief COPE and DASS scales, with 'positive reframing, acceptance, and humour' associated with better mental outcomes and 'self-blame, venting, behavioural disengagement, and self-distraction' being associated with higher distress rates. Dawson & Golijani-Moghaddam (2020), who also used the Brief COPE for a survey of UK residents in May 2020, found that 'avoidant' coping styles were associated with depression and anxiety. They also found that psychological flexibility was an independent predictor of well-being. It could be described as a 'high-order' response strategy that may help select the most appropriate coping strategy when faced with stressors such as the COVID-19 pandemic.

In addition, Munsell et al. (2020) found that college (university) students (mean age of 26 years) were more likely to use 'maladaptive' coping styles, compared with the general population, during the COVID-19 pandemic in the United States of America. Salman et al., (2020) found that young Pakistani students utilised the coping styles of religion and acceptance the most.

Social support as a coping style

Social support is an adaptive coping style and protective factor for mental health. Social support can be defined as "support accessible to an individual through social ties to other individuals, groups, and the larger community" (Ozbay et al., 2007). Social support is multi-faceted and at a high level, includes our social network (the number of people we interact with), social activity (the number of times we interact with those in our social

network), and perceived social support (our perception of the positive quality of our relationships).

During the 1980s and 1990s, social support became a popular research topic. However, due to a lack of consensus in academic research, defining social support and comparing outcomes of the many studies published has proved difficult. In general, theoretical models of social support include two dimensions. Firstly the 'functional' aspect consists of instrumental support (received support such as helping with childcare) and emotional support (receiving care such as love and empathy). Secondly, social support includes the 'structural dimension', which involves the size of a person's social network and the number of interactions (social activity) (Barrera, 1986). The quality of a person's relationships (perceived social support) rather than the size of their network or how socially active they are, is a stronger predictor of positive mental health outcomes. Schwarzer & Leppin (1991) proposed a similar theoretical model that separated types of social support from the structure and size of a social network to the kind of support provided within that network (i.e., cognitive, or behavioural support). They also found that social support was complicated to quantify but could be seen as "a stress-protective" factor.

Furthermore, when studying the construct of social support, it is essential to consider the impact of other variables such as personality attributes, coping style and age (Ozbay et al., 2007). For example, the "socioemotional selectivity theory" predicts that as we age, our social networks diminish in size and become more selective, focussing on the quality of relationships rather than quantity (Carstensen, 1995; English & Carstensen, 2014). Younger people also tend to be more socially active than older generations (Cornwell et al., 2008).

Coventry's et al. (2004) research with Australian participants found marginally higher perceived social support for females than males using the Kessler's Perceived Social Support

scale. In addition, males' and females' social networks often look different, with female networks often based on cooperation and are more intimate. Conversely, males' networks are often built around sports or work activities and competition and less on emotional connection and trust. The perceived social support is usually lower in males' social networks than in females (Barbee et al., 1993). However, research surrounding gender differences in social support variables is inconsistent, with some studies showing no differences and others finding women receive greater support than men (Coventry et al., 2004).

Social support as a protective factor for wellbeing

Two predominant models have been proposed to explain the relationship between social support and positive mental health outcomes. Firstly, the buffering hypothesis suggests that adequate social support can 'buffer' individuals from stress and negative impacts of the experience during a crisis or stressful event. In contrast, the main effects (or direct effects) hypothesis suggests that people with high levels of social support are already in a position of more robust mental health, regardless of environmental outside stressors or crises (Cohen & Wills, 1985).

Social support as a construct is complicated with variables such as perceived social support, social network size, and social activity considered in research. However, seeking social support from our social networks is regarded as an adaptive way to cope with life stressors. Schwarzer & Leppin's (1989) meta-analysis claimed that research into social support lacked consensus, and measures of social support varied widely amongst the 55 studies in their review.

Wang's et al. (2003) meta-analysis investigated the relationship between social support and mental health. Their investigation included 182 cross-sectional studies from Taiwan (all questionnaires) covering a range of social support factors such as social network

size, perceived support, and positive connections. They found that high social support (different social support variables were not investigated separately) was associated with a higher quality of life and wellbeing and less depression, and stress. However, more recently, Harandi et al. (2017) conducted a meta-analysis of 64 studies in Iran (from 1996 to 2015) on the association between perceived social support and mental health outcomes. They found a high association of perceived social support and positive mental health outcomes overall (fixed effect model 0.356 and random-effect model .0330), with a higher impact on women.

Social support during past pandemics

When we consider historical pandemics, there is little research on the association between mental health and social support. Mak et al. (2009) conducted structured interviews with SARS survivors (18 months post-recovery), asking about the perceived social support from hospital staff, family, and friends. They concluded that social support was related to more positive well-being and mental health outcomes for previous SARS patients. They hypothesised that through social support, a patient's confidence in coping is enhanced so they can get through and have a positive outcome despite having the disease.

Social support during the COVID-19 pandemic

Since the beginning of the COVID-19 pandemic in early 2020, numerous studies have looked at the impact of social support on our well-being worldwide. However, consistent with past research, there is little consensus or consistency in how social support is measured, researched, and reported. To date, most of the research relating to social support and wellbeing during the COVID-19 pandemic only looks at the variable of perceived social support, with little information on how the multiple factors of social support interact (social networks and social activity) and the impact of changes to these social dynamics.

El-Zoghby et al. (2020) conducted a cross-sectional observational study in May 2020 with 500 Egyptian participants. They investigated the impact of the COVID-19 pandemic on wellbeing and social support. They reported that there was an increase in social support among participants. However, associations between mental health and level of social support were not investigated.

Skalski et al. (2021) investigated the association between "resiliency, perceived social support, anxiety, and trauma" with 515 participants in Poland (using the Coronavirus Anxiety Scale and MPSS) during April and May 2020 (58% female). They found both high resilience and social support were associated with lower levels of anxiety and PTSD symptoms. However, the association between social support and lower anxiety was stronger.

Özmete & Pak (2020) carried out a cross-sectional, community-based questionnaire with 630 participants in Turkey during March and April 2020 (73% female) to examine the relationship between social support and anxiety. They found that higher perceived social support was associated with lower anxiety levels ($p<.01$) during the COVID-19 pandemic.

Grey et al. (2020) conducted an online cross-sectional survey with 2020 participants to investigate the relationship between perceived social support and mental health during the COVID-19 pandemic. They found that higher levels of perceived social support were associated with a 63% less chance of elevated depressive symptoms and a 52% lower risk of reduced sleep quality. A positive but non-significant relationship was also found between high perceived social support and lower anxiety symptoms. In addition, longitudinal studies throughout the pandemic were recommended to determine the relationship between social support and mental health outcomes as the pandemic progresses.

Zysberg & Zisberg (2020) investigated the association between emotional intelligence, social support, and worry during the COVID-19 pandemic in Israel (275

participants) with an online questionnaire in March and April 2020. Interestingly they found that perceived support was protective against worry, but instrumental support was not. Bauer et al. (2020) surveyed 4271 German participants in April 2020. Questions included anxiety, depression, sleep, exercise, and perceived social support. They found in their sample that 31.4% displayed elevated depression symptoms, 5.7% had panic disorder, 7.4% had other anxiety disorders, and 58.3% had sleep challenges. Perceived social support was significantly associated with lower anxiety, depression, and insomnia.

In addition, Li et al. (2021) found that across age groups, all experienced a reduction in social support and that despite the oldest age group having the highest risk of a poor outcome from COVID-19, they had slightly higher wellbeing scores than all younger age groups. There is little research on social activity and its relationship to mental health during the COVID-19 pandemic. Still et al. (2021) found that Canadian residents (aged 45 to 85 years) who had experienced a reduction in social activity since the COVID-19 pandemic had higher depression and anxiety scores than those who didn't experience a decline. Finally, Grey et al., (2020) suggested investigating further dimensions of social support such as received support and personality attributes such as resilience and coping styles.

Introduction summary

Research has shown that adaptive coping styles, including utilising high-quality relationships within our social networks, were protective against adverse mental health outcomes during the initial stages of the COVID-19 pandemic. Public health measures have impacted people's ability to socialise, however, most studies have only looked at the population's perceived social support, and few studies have looked into how changes in our social networks and social activity have impacted our wellbeing in New Zealand. There is a lack of consensus in the literature over the theoretical models of social support and the

relationship with mental health outcomes, especially during times of crisis such as the current pandemic. Considering the anti-pandemic measures which require people to stay home for long periods and socially distance, we wanted to explore if these models were relevant in the current pandemic.

In addition, there is little consensus in past research over how to define coping styles and social support, with many studies only examining one dimension of social support. Previous research has found that even when quarantine periods were over (during the SARS outbreak), social distancing and isolation were still practised, and mental health suffered.

Hypotheses

Unprecedented measures, such as lockdowns and social distancing, were first implemented in early 2020, by the New Zealand government, during the COVID-19 pandemic. This research investigated the relationships between different coping styles, in particular, social support, social networks, social activity, and the mental health of New Zealanders during July and August 2020. At this point, New Zealand had successfully eliminated COVID-19 from the community (with the only cases being reported in quarantine facilities from arrivals to the country).

Our research investigated a combination of predictor variables to determine which accounted for overall wellbeing and distress (depression, anxiety, stress, PTSD, and post-traumatic growth). We hypothesised that females and younger age groups would experience higher levels of distress. Secondly, higher levels of perceived social support, more extensive social networks, and higher social activity would be associated with lower levels of distress. In addition, we hypothesised that those who experienced a reduction in these three variables since the COVID-19 pandemic would have poorer mental health outcomes. We predicted that high perceived social support would have a stronger association with well-being than large

social networks or high social activity. Finally, we anticipated that adaptive coping styles would be associated with lower levels of distress, and dysfunctional coping styles would be associated with higher levels of distress.

Methods

Study context

This research used an online survey available between 13th July 2020 and 11th August 2020. Participants were asked to rate perceived social support, social networks, social activity (and changes to these variables since the COVID-19 pandemic), their coping strategies during the pandemic, and levels of distress (depression, anxiety, stress, and PTSD symptoms). Finally, we asked participants to consider aspects of growth they had experienced since the COVID-19 pandemic.

During the survey period, New Zealand was at Alert Level 1, meaning that COVID-19 had essentially been eliminated from the community (with only small numbers of cases in quarantine facilities at the border). Please see Appendix B for the full details and questions from the survey. Ethics approval was received from the University of Waikato (Health) Ethics Committee (reference number HREC(Health)2020#43).

Participants

Participants were recruited through Facebook community groups and flyers (see Appendix C for flyer) placed in community locations such as medical centres, schools, and university campuses. Participants were required to be aged 18 years and over and currently reside in NZ.

Of the 1195 people who started the survey, 698 met the criteria and were included in the final analysis. The excluded responses included no answer to the consent question (n=65), did not consent to continue the survey (n=6), no age group provided (n=13), under 18 years old (n=7), did not answer the question about residing in NZ (n=1), did not live in NZ (n=9),

did not answer the gender question (n=346), a large number of missing items (n=9), and finally inappropriate and inconsistent responses (n=1).

Responses received after the survey completion date (11th August 2020) were not included (due to the change in COVID-19 Alert Level in Auckland, NZ). Where there was an item missing from a standardised scale, this item was replaced with the mean of the remaining scale items. Where there was more than one item missing from a scale, the scale was deleted, but the rest of the participant's response was retained.

Sample characteristics

See Table 1 for details of participant characteristics. The final sample consisted of 468 females (67%), 217 males (31.1%), 7 (1%) identified as gender diverse and 6 (.9%) participants preferred not to specify or disclose a gender. In the 18 to 24 year age brackets were 73 people (10.5%), 25 to 34 years (138 people, 19.8%), 35 to 44 years (153 people, 21.9%), 45 to 54 years (171 people, 24.5%), 55 to 64 years (112 people, 16.0%), 65 to 74 years (45 people, 6.4%) and 75 to 84 years (6 people, .9%).

Nearly ¾ of participants defined themselves as NZ European (n = 510, 73.3%), with those identifying with Maori ethnicity comprising 12.8% (n = 89) of participants. Participants were given the option to select from one or more ethnicities that applied to them. To obtain a single ethnicity (if a participant chose more than one ethnicity), priority was given in this order to: Māori, Pacific, Asian, Middle Eastern/Latin/African, 'other' ethnicity and finally European. This is in line with the procedures described in the Ministry of Health, Ethnicity New Zealand Standard, developed to ensure that different ethnic groups are considered in research and the development of new health treatments (MOH, 2021).

All participants were living in New Zealand at the time of the survey, with over half (382 people, 54.7%) residing in the Waikato region, followed by the Auckland (72 people, 10.3%) and the Bay of Plenty (n = 70, 10.0%) region.

Table 1

Sample characteristics of survey participants

Variables		n (%)
Gender		
	Female	468 (67.0%)
	Male	217 (31.1%)
	Gender diverse	7 (1.0%)
	Prefer not to say	6 (.9%)
Age		
	18-24 years	73 (10.5%)
	25-34 years	138 (19.8%)
	35-44 years	153 (21.9%)
	45-54 years	171 (24.5%)
	55-64 years	112 (16.0%)
	65-74 years	45 (6.4%)
	75-84 years	6 (.9%)
Ethnicity		
	NZ European	510 (73.3%)
	Maori	89 (12.8%)
	Pacific	9 (1.3%)
	Asian	15 (2.2%)
	Other	73 (10.5%)
Region		
	Northland	30 (4.3%)
	Auckland	72 (10.3%)
	Waikato	382 (54.7%)
	Bay of Plenty	70 (10.0%)
	Gisborne	3 (.4%)
	Hawkes Bay	33 (4.7%)
	Taranaki	14 (2.0%)
	Manawatu/Wanganui	15 (2.1%)
	Wellington	22 (3.2%)
	Tasman	7 (1.0%)
	Nelson	6 (.9%)
	Marlborough	1 (.1%)
	West Coast	6 (.9%)
	Canterbury	24 (3.4%)
	Otago	4 (.6%)
	Southland	8 (1.1%)

Measures

The survey data was collected via an anonymous online questionnaire (94 questions) hosted on the Qualtrics platform. The survey included: demographic questions, study-specific COVID-19 questions, and seven standardised measures. Three of the standardised measures assessed different facets of the construct of social support. Firstly, perceived social support (Multidimensional Scale of Perceived Social Support (MPSS)), social network (Lubben Social Network Scale – revised (LSNR-R), and social activities (Social Activity Log (SAL)). The remaining four standardised measures assessed coping mechanisms (Brief COPE), depression, anxiety, and stress (Depression, Anxiety and Stress Scale (DASS)), post-traumatic stress (The Abbreviated PCL-C - The Post-Traumatic Checklist), and post-traumatic growth (Post Traumatic Growth Inventory).

Demographic information

Participants were asked to provide demographic information relating their gender, age group, country of residence, ethnicity, region of residence, living situation, pet ownership, relationship status, financial situation, and mental and physical health conditions (see Appendix B for the full list of survey questions).

Study-specific questions relating to the COVID-19 pandemic

Ten study-specific questions asked about their views on the COVID-19 government response, if they or someone close them had been diagnosed with COVID-19, if they had experienced changes to employment, and additional life stressors during the pandemic.

Social support measures

Previous research has indicated that positive social relationships and social support can be a protective factor against the development of mental health problems during times of high stress, uncertainty, or disaster (Harandi et al., 2017). However, the measurement of social support is complicated. Past studies have found that social support includes both the

structure of social relationships (e.g., size of social network, type, and frequency of social contacts, dyadic or group) and the social processes within these structures (e.g., positive, or negative social support, emotional, informational, or instrumental aid) (House et al., 1988). Therefore, we have used three different scales to encompass many aspects of a participant's social support network and the processes that operate within their social network. These include standardised scales to investigate, perceived social support (the quality of social relationships), social network (number of people within network) and social activity (number of interactions within social networks).

Multidimensional Scale of Perceived Social Support (MPSS). This measure was originally designed in America to measure social support in adolescents and has evolved to be one of the most extensively used scale to measure social support outcomes (Zimet et al., 1988). This scale measures the perceived quality of emotional social support that is available from three sources: friends, family and significant other. Participants were asked *'We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.'* and answered 12 items relating to perceived social support, by selecting one of six response options (from 1 'very strongly disagree' to 7 'very strongly agree'). Scores ranged from 12 to 84, the higher the score, the higher the perceived social support. A total score and three subscale scores are provided (significant other/special person, family, and friends, each with four items). Subscale scores are the mean of the responses to the four items.

The internal reliability for this scale is good with a Cronbach's alpha of 0.88 for the entire scale (.91 for the significant other scale, .87 for the family scale and .85 for the friend's subscale). This instrument also has good test-retest reliability (0.85) (Zimet et al., 1988). The MPSS has been used in many studies around the world and translated into many languages

(Hong et al., 2010). Additional studies have also found the scale to demonstrate good internal reliability, together with factorial and subscale validity (Zimet et al., 1990).

Lubben Social Network Scale – revised (LSNS-R) (12-item version). This scale measures self-rated social engagement with friends and family by measuring the number and frequency of social interactions and the perceived social support received. This scale is relatively quick to administer and easy to score and provides a quantitative measure of structural social support (not many scales do this). This measure was originally designed in 1988 to measure social isolation in the elderly and is commonly used in both health care and social research situations (Lubben, 1988). The original scale (LSNS) consisted of 10 questions and has been used widely due to its simple scoring and short completion time. In 2002 a revised version (LSNR-R) was developed consisting of 12-items. The 12-item scale more clearly distinguished social networks with six questions relating to family networks and six for friend networks.

Participants were shown at the beginning of the survey, '*FAMILY/WHĀNAU: Considering the people to whom you are related by birth, marriage, and adoption (including those who you live with)'* and answered six questions relating to their family social networks, Participants were then shown, '*FRIENDSHIPS: Considering all of your friends including those who live in your neighbourhood…'* and answered a further six questions regarding their friendship social networks. Participants selected 1 of 6 response options (from 0 to 5). Scale scores ranged from 0 to 60, the higher the score the larger a person's social network (Lubben, 1998).

The internal reliability of the LSNS-revised scale is very good with a Cronbach Alpha value of .70 (.84 to .89 for the 'family' items and .80 to .82 for the 'friends' items) (Lubben, 1998). This scale is used widely throughout the world in both clinical and research conditions and has been translated into many languages (Ceria et al., 1999).

Social Activity Log (SAL). This scale measures the number and variety of social activities people participate in (not including daily responsibilities), and focusses on voluntary social activities rather than work, family and/or solitary activities. The SAL was originally designed to measure social activity and/or behaviour in cancer survivors (Syrjala et al., 2010) and was adapted from The Pleasant Events Schedule (Logsdon & Teri, 1997).

Participants were shown the statement *'THINK OF THE PAST WEEK: In the past WEEK, please select how many times you:"* and answered 13 items relating to their level of social activity by selecting one of seven response options (from '0' to '6 or more'). The higher the score the greater the number and frequency of social activity. The original SAL scale asked participants to answer questions relating to the past month, however due to the COVID-19 pandemic we considered it more relevant to change the time scale to the past week. Furthermore, two questions were altered to include 'social media messages' to reflect current realities in online communication. For example, "Got (and sent) emails, letters, cards, or notes from people" Was changed to "Got (and sent) emails, social media messages, letters, cards, or notes from people"

The internal reliability of this scale is very good with a Cronbach alpha value of 0.82. Convergent validity was demonstrated by the moderate correlation with social function. Content validity was also found to be supported (Syrjala et al., 2010).

Changes in social support, networks, and activity since the COVID-19 pandemic. Three study specific questions were asked directly after each of the three standardised social support measures. The aim of these questions was to determine to what degree (if any) participants had experience a change in perceived social support, social network, and social activity since the COVID-19 pandemic (see Table 2).

Table 2

Following standardised scales, study specific questions on social support, social network, and social activity about changes to these variables since the COVID-19 pandemic.

Scale name	Study-specific question	Response options
Multidimensional Scale of Perceived Social Support (MPSS):	*'In general, has the social support available to you from a partner, family and/or friends changed since the COVID-19 pandemic began (if applicable)? Please think about the past 7 days. Compared to before the COVID-19 pandemic',*	I have significantly less social support I have slightly less social support My social supports have stayed the same I have slightly more social support I have significantly more social support
Lubben Social Network Scale – revised (LSNR-R)	'*In general, has your social network (i.e., people you see or talk to on a regular basis including family, friends, workmates, neighbours, etc.) changed since the COVID-19 pandemic began? Please think about the past 7 days. Compared to before the COVID-19 pandemic, I now see or talk to those in my social network',*	Significantly less Slightly less The same amount Slightly more Significantly more
Social Activity Log (SAL)	'*Now think about how socially active you were before the COVID-19 pandemic. Please think about the past 7 days, compared to before the COVID-19 pandemic'*:	I now do significantly fewer social activities I now do slightly fewer social activities I do the same number of social activities I now do slightly more social activities than usual I now do significantly more social activities than usual

Coping style measure

Coping Orientation to Problems Experienced Inventory (Brief COPE). The Brief COPE was originally developed to assess different coping strategies of a group of 168 hurricane survivors (Carver, 1997). This measure uses 14 scales (2 questions for each scale),

to assess 14 different coping strategies (for example, positive reframing, denial, acceptance, humour) and is a shortened version of the full 60-item COPE scale (Carver et al., 1989).

Participants were asked at the beginning of the survey *"The following questions ask how you have sought to cope with the COVID-19 pandemic. Read the statements and indicate how much you have been using each coping style."* Participants answered 28 items relating to different coping styles by selecting one of four response options (from 1 '*I haven't been doing this at all'* to 4 '*a lot').* Scores for each subscale ranged from two to eight, the higher the score, the more the participant has been using that coping style.

Internal reliability of the scale is good with Cronbach alpha scores, for the 14 subscales, range from .50 to .90. Nine of the scales were equal to or greater than .65 (Carver, 1997). The Brief COPE is considered one of the most validated and commonly used measures to investigate coping approaches and has been translated into several languages (Spanish, French, German, Greek, and Korean). There are many attempts (but little consensus) in the overall literature around consolidating the 14 subscales into overall coping categories. However, in general, some subscales are considered more adaptive (such as active coping, planning, positive reframing, acceptance, humour, religion, emotional support, and instrumental support). Other coping styles are considered more dysfunctional (such as self-distraction, denial, venting, substance abuse, disengagement, and self-blame).

Mental health outcome measures

Depression, Anxiety and Stress Scale (DASS-21). This measure was originally designed by the University of New South Wales, Australia, and is widely used internationally to measure levels of distress (Lovibond & Lovibond, 1995). Participants answered 21 items relating to depression, anxiety, and stress by selecting one of four response options (from zero, 'never' to 3 'almost always'). Total scores ranged from 0 to 63, the higher the score the higher the distress. Three subscale scores for depression, anxiety, and stress are calculated

(each subscale consists of seven items). Subscale scores indicate the severity rating for each subscale. There are five severity ratings for each scale – normal, mild, moderate, severe, and extremely severe – severity ratings are compared to the general population (not someone with a mental illness). The DASS-21 has high discriminant and convergent validity when compared to other measures for anxiety and depression. The DASS-21 also displays high reliability and sufficient construct validity (Henry & Crawford, 2005).

The Abbreviated PCL-C, The Post-Traumatic Checklist, 6-item Civilian Version. The Abbreviated PCL-C is a brief screening tool for post-traumatic stress disorder (PTSD). It is based on the original PCL-C (which had 17 items and was part of the DSM-IV) by Weathers et al. (1993). The participants were asked at the beginning of the survey ‘‘*These questions are about problems and complaints that people sometimes have in response to stressful life experiences. Please indicate how much you have been bothered by each problem in the past month”.* Participants answered six items relating to PTSD symptoms by selecting one of five response options (from one “not at all” to five “extremely”. Scores ranged from six to 25, the higher the score the higher the PTSD symptoms. A score of 14 or more indicates that a participant could be having difficulties with post-traumatic stress.

The Abbreviated PCL-C retained good psychometric properties and strongly correlated with the full (17 item, PCL-C) version (r = .971), (Lang & Stein, 2005). Further research by Lang et al. (2012), established the internal reliability of the PCL-6 was good with a Cronbach Alpha value of α=.78. This scale is suitable for research where a diagnostic tool is not required and is used widely in research and general medical establishments (Lang & Stein, 2005; Lang et al., 2012).

Post Traumatic Growth Inventory (PTGI). This measure was developed to assess positive outcomes following traumatic experiences and is one of the most widely used scales to measure this construct (Tedeschi & Calhoun, 1996). Participants were asked at the

beginning of the survey *"Indicate for each of the statements below the degree to which this change occurred in your life as a result of the COVID-19 pandemic, using the following scale."* and answered 21 items about factors of post-traumatic growth, such as relating to others, new possibilities, personal strength, spiritual change, and appreciation of life. Participants selected one of six response options (from 0 *"I did not experience this change"* to 5 *"a very great deal")*. Total scores ranged from 0 to 105, the higher the score the higher the post-traumatic growth.

The Post Traumatic Growth Inventory has good internal validity and internal reliability with a Cronbach's alpha score of 0.90. The internal reliability of the five subscales was between 0.67 and 0.85. Test-retest reliability of the total scale was 0.71 (Steffans and Andrykowski, 2015).

Statistical analyses

SPSS (version 27 and 28) was used to undertake quantitative analyses. The first stage of data analysis reported the frequency and percentages of demographic information such as, living situation, mental/physical health, employment, life stressors and responses relating to the COVID-19 outbreak.

To determine overall wellbeing and distress by gender and age group, the second stage of results presented descriptive and inferential statistics of mental health outcomes, by age group and gender. This included the depression, anxiety, stress (DASS-21 scales), PTSD (Abbreviated PCL-C scale) and post-traumatic growth (PTGI) scores. Two-way ANOVA and post-hoc tests were conducted to determine significant differences in these scales between males and females and by age group. In addition, chi-squared tests were carried out to investigate associations between gender and age group for the severity (scores exceeding a cut-off score) of depression, anxiety, stress (DASS-21 scale), and PTSD (Abbreviated PCL-C

scale). Pearson's correlations were conducted to measure the strength of relationships between the mental health variables.

To examine if coping styles were related to higher distress and wellbeing, the third set of analysis presented the descriptive and inferential statistics of coping styles. Two-way ANOVA and post-hoc tests, were used to determine significant differences in coping styles between males and females and by age group. In addition, Pearson's correlations examined the relationships between the 14 coping styles and the mental health outcomes.

To investigate if there were differences in social support variables by gender and age group, the fourth set of analysis presented the descriptive and inferential statistics of perceived social support, social network, and social activity scales. Two-way ANOVA and post-hoc tests, were used to determine significant differences between gender and age groups for each of these three variables. In addition, Pearson's correlations examined the relationships between the three variables of perceived social support, social network, and social activity. Finally, the frequencies and percentages (by age and gender) of changes to perceived social support, social network, and social activity since the COVID-19 pandemic were reported.

To determine if higher scores in the three social support variables would be related to lower distress, the fifth set of analysis examined the relationship between mental health outcomes and social support variables (perceived support, network, and activity) using Pearson's correlations (by gender and age group). One-way ANOVA and post-hoc tests were then conducted to determine significant differences (by gender and age group) between groups who experienced 'less', 'no change' or 'more' social support, social network, and social activity since the COVID-19 pandemic. One way ANOVA and post hoc tests were also conducted to determine significant differences in mental health outcomes (depression,

anxiety, stress, PTSD, and post-traumatic growth) for the groups that experienced less support, a reduced social network and less social activity since the COVID-19 pandemic.

Finally, in order to investigate which variables predicted overall wellbeing and distress, we conducted several multiple variable regression analyses. The predictor variables were selected based on our research questions, analyses to date, and past published literature. Various models were run until we determined the best fit model for our data. Hierarchical multiple regression was used to explore the predictive influence of different variables on mental health outcomes. Predictors were added in four separate blocks.

Notes regarding all analyses

Effect sizes for ANOVA tests were calculated using Cohen's 'd' (.2 = small effect; .5 = medium effect and .8 = large effect) (Cohen, 1998). Pearson's correlation sizes were identified as negligible (<.3), low/small (.3 to.49), moderate/medium (.5 to .69) and high/strong correlation (>.7) (Mukaka, 2012).

Due to small sample sizes in other groups, only participants who identified as male or female were included in analyses by gender. As noted previously scales were removed if there was more than one item missing Scales which had a response deleted were the MPSS (1 response), Brief COPE (3 responses), DASS-21 (1 response), PGTI (2 responses).
The age groups were consolidated into four groups to simplify analysis and reporting. In addition, the changes to social support, social network and social activity were consolidated into three groups from the five in the initial survey, for the same reason.

Results

The results will firstly detail the descriptive statistics of our participants living situation, mental/physical health, employment, life stressors and responses relating to the COVID-19 outbreak. We will then present the descriptive and inferential statistics of their

mental health outcomes, social support variables and coping styles by age group and gender. Next will be an analysis of how the variables of social support, social networks and social activity impact mental health outcomes using ANOVA and chi square analysis by age group and gender. Finally, we present multiple regression analyses modelling to determine if the social support variables (and other predictor variables) significantly predicted the mental health outcomes (depression, anxiety, stress, PTSD symptoms and post traumatic growth) in our participants.

Housing, health, employment, and COVID-19 pandemic experience

Living situation characteristics

Over two-thirds of participants (68%) were either married or living with their partner (see Appendix A, Table A.1). Forty two percent of participants were living with family, 37% were living with a partner(s), 9% were living with others (who were not family) and 10% were living alone. Nearly one third of participants (31%) did not have children. For those that did have children, 12% had one child, 30% had two children and 26% had three or more children.

Within those living situations 53% felt they had either adequate or completely adequate personal space, 26% had somewhat adequate personal space and 21% somewhat or totally inadequate personal space. Around two thirds (66%) of participants had a pet, with 77% describing their pet(s) as either very or extremely important to them. Over half of participants (57%) defined themselves as being comfortable financially. However, 32% had just enough money to get along and a further 7% did not feel they had enough money to make ends meet.

Health characteristics

Around one quarter of participants (26%) had received a mental health diagnosis in the past. In addition, 33% had a medical or health condition (other than a mental health

diagnosis). Just over half (55%) had participated in activities to support their mental health, such as, exercise, accessed support services or taken medication (see Appendix A, Table A.2).

COVID-19 questions

Seven study-specific questions were asked regarding the participants experience of the COVID-19 pandemic (see Appendix A, Table A.3). Participants' survey responses were collected from 13/07/2020 to 11/08/2020. Half (50%) of participants did not know anyone with COVID-19, cold or flu symptoms. However, 14% knew someone who had been diagnosed with COVID-19, with only two (0.3%) participants residing with another person who had contracted COVID-19. Three participants (0.4%) had been diagnosed with COVID-19. An additional 14 (2%) participants suspected they had contracted COVID-19 at some stage during the pandemic. The majority of our survey participants (98%) had not been diagnosed with COVID-19.

Over half (59%) of respondents 'strongly' supported the government response to the COVID-19 pandemic, with a further 28.2% selected 'somewhat agree'. In contrast, 11% did not agree with the government response. Over two thirds of participants (68%) were confident that widespread transmission of COVID-19 would be prevented in New Zealand. In contrast, 21% were not confident that COVID-19 could be contained.

Employment

Due to the Level 4 Lockdown in New Zealand, 73% of participants experienced an impact or change to their employment (see Appendix A, Table A.4). Twenty three percent of participants were in a role classed as an 'essential worker', who continued to work during the

Level 4 lockdown (e.g., healthcare and food supply chains). Students made up 12% of participants and 7% had lost their job due to the impact of the COVID-19 pandemic.

Additional life stressors during the COVID-19 pandemic

Thirty one percent of participants experienced one or more of the stressful life events listed in Table A.5 (Appendix A). For example, some felt unsafe in their own home (2%) and 13% experienced an increase in interpersonal conflict within their home environment. Some were unable to access basic essentials such as accommodation (1%), sufficient food (5%) or medication (3.1%). Other participants suffered injury or illness (3%), or someone close to them was ill (5%) or had died (8%) since the COVID-19 pandemic began in New Zealand.

Mental health outcome measures – depression, anxiety, stress, PTSD, and post-traumatic growth

Mental health outcome measures (by gender and age group)

The next analyses focused on the descriptive and inferential statistics of the participants' mental health outcomes (depression, anxiety, stress, PTSD, and post-traumatic growth), reported by gender and age group (see Table 3). We conducted a series of two-way ANOVA tests and found no significant interactions between gender and age group, for any of the mental health outcome variables. The main effect of gender indicated that females had statistically significant higher mean scores for both PTSD and post traumatic growth. No main effect of gender on depression, anxiety or stress was found. The main effect of age group indicated that there was a statistically significant difference in mean depression, anxiety, stress, and PTSD scores across age groups. No main effect of age group on post traumatic growth was found.

Bonferroni post hoc test results indicated that the mean depression, anxiety, and PTSD scores were significantly higher for the ‘emerging’ adult’s group (18 to 24 years) compared with all other older age groups.

In addition, mean depression, and anxiety scores for ‘young’ adults (25 to 44 years) were significantly higher than for ‘middle-aged’ adults (45 to 64 years). Mean stress scores in ‘emerging’ and ‘young’ adult groups were significantly higher than for the ‘middle-aged’ and ‘older’ adults (65 to 84 years) age groups. Finally, mean PTSD scores for ‘young’ adults were higher than both ‘middle-aged’ and ‘older’ adults. Effect sizes for these analyses ranged from small to medium ($p<.05$).

Table 3

Descriptive and inferential statistics of mental health measures for males and females by age group

	Emerging adults (18-24 years) M (SD)		**Young adults (25-44 years) M (SD)**		**Middle-aged adults (45-64 years) M (SD)**		**Older adults (65-84 years) M (SD)**		**Two-way ANOVA**		
	Males (n=18)	**Females (n=51)**	**Males (n=102)**	**Females (n=185)**	**Males (n=82)**	**Females (n=196)**	**Males (n=15)**	**Females (n=35)**	**Gender (F, p, ηp^2)**	**Age group (F, p, ηp^2)**	**Age group x Gender (F, p, ηp^2)**
Depression	6.00 (6.24)	6.57 (5.73)	5.02 (5.21)	4.55 (4.69)	3.64 (3.91)	4.42 (4.60)	4.13 (3.62)	2.66 (2.41)	$F(1,676) = 0.08$, $p=.777$, $\eta p^2<.001$	**$F(3,676) = 4.43$, $p=.004$, $\eta p^2=.02$**	$F(3,676) = 1.16$, $p=.325$, $\eta p^2=.005$
Anxiety	4.56 (4.91)	5.40 (4.49)	3.32 (3.63)	3.51 (3.89)	1.80 (2.34)	2.71 (3.22)	3.13 (3.20)	2.09 (2.74)	$F(1,676) = 0.31$, $p=.580$, $\eta p^2<.001$	**$F(3,676) = 10.38$, $p<.001$, $\eta p^2=.04$**	$F(3,676) = 1.13$, $p=.335$, $\eta p^2=.005$
Stress	6.50 (5.58)	8.61 (5.16)	6.08 (4.25)	6.99 (4.52)	4.30 (3.40)	5.63 (4.26)	5.60 (4.29)	3.51 (3.42)	$F(1,676) = 1.36$, $p=.244$, $\eta p^2=.002$	**$F(3,676) = 9.47$, $p<.001$, $\eta p^2=.04$**	$F(3,676) = 2.20$, $p=.086$, $\eta p^2=.01$
PTSD	13.61 (6.43)	16.24 (6.60)	11.98 (5.64)	13.21 (6.14)	9.70 (4.22)	11.60[a] (4.94)	10.13 (4.19)	9.89 (3.40)	**$F(1,677) = 5.11$, $p=.024$, $\eta p^2=.007$**	**$F(3,677) = 12.76$, $p<.001$, $\eta p^2=.05$**	$F(3,677) = 0.72$, $p=.541$, $\eta p^2=.003$
Post-trauma growth	28.56 (19.79)	35.80 (24.14)	21.86 (22.94)	31.05 (22.93)	23.95[b] (20.15)	28.89 (22.28)	24.07 (19.81)	34.66 (22.85)	**$F(1,675) = 10.04$, $p=.002$, $\eta p^2=.015$**	$F(3,675) = 1.20$, $p=.310$, $\eta p^2<.01$	$F(3,675) = 0.44$, $p=.72$, $\eta p^2=.002$

Note. [a]n=197, [b]n=81, [c]=higher score indicates better functioning.

Mental health outcome severity (by gender and age group)

Our next set of analyses focused on the severity of the participants' depression, anxiety, stress, and PTSD, based on the published cut-off scores for each of the measures. Chi-square tests of independence were performed to examine the association between gender and age group, and the severity of depression, anxiety, stress, and PTSD symptoms. Two categories of severity were created by collapsing firstly the 'normal' and 'mild' groups together and secondly the 'moderate', 'severe' and 'extremely severe' groups for depression, anxiety, and stress (see Table 4 and 5).

Table 4 shows that there was a significant association between gender and both stress and PTSD severity. A significantly greater proportion of women than men experienced PTSD symptoms and 'moderate' to 'extremely severe' stress. There was no significant association between gender, and the severity of depression and anxiety.

Table 5 shows that there was also a significant association between age group and the severity of all mental health outcomes (depression, anxiety, stress, and PTSD). A significantly greater proportion of 'emerging adults' than all other age groups experienced PTSD symptoms, together with 'moderate' to 'extremely severe' depression, anxiety, and stress. In addition, as the age groups got older the proportion of participants experiencing PTSD symptoms and 'moderate' to extremely severe depression, anxiety, stress reduced. The one exception was a slightly higher proportion of 'older' adults experienced 'moderate' to 'extremely severe' anxiety than 'middle-aged' adults.

Table 4

Chi square of relation between the severity of mental health measures and gender

	Severity	Female n (%)	Male n (%)	Chi-square
Depression	Normal to mild	348 (74.6)	159 (73.3)	X^2(1, n=684)=.120, p=.729
	Moderate to Ext severe	119 (25.4)	58 (26.7)	
Anxiety	Normal to mild	369 (87.8)	181 (83.4)	X^2(1, n=684)=1.82, p=.178
	Moderate to Ext severe	98 (12.2)	36 (16.6)	
Stress	Normal to mild	372 (79.6)	190 (87.6)	**X^2 (1, n=684)=6.31, p=.012**
	Moderate to Ext severe	95 (20.4)	27 (12.4)	
PTSD	Normal	313 (66.9)	169 (77.9)	**X^2(1, n=685)=8.60, p=.003**
	PTSD symptoms	155 (33.1)	48 (22.1)	

Table 5

Chi square of relation between the severity of mental health measures and age group

	Severity	Emerging adults n (%)	Young adults n (%)	Middle-aged adults n (%)	Older adults n (%)	Chi-square
Depression	Normal to mild	43 (58.9)	211 (72.5)	216 (76.6)	45 (88.2)	**X^2(3, n=697)=15.30, p=.002**
	Moderate to Ext severe	30 (41.1)	80 (27.5)	66 (23.4)	6 (11.8)	
Anxiety	Normal to mild	45 (61.6)	227 (78.0)	245 (86.9)	43 (84.3)	**X^2(3, n=697)=25.31, p<.001**
	Moderate to Ext severe	28 (38.4)	64 (22.0)	37 (13.1)	8 (15.7)	
Stress	Normal to mild	48 (65.7)	234 (80.4)	244 (86.5)	47 (92.2)	**X^2(3, n=697)=21.20, p<.001**
	Moderate to Ext severe	25 (34.3)	57 (19.6)	38 (13.5)	4 (7.8)	
PTSD	Normal	33 (45.2)	195 (67.0)	214 (75.6)	45 (88.2)	**X^2(3, n=698)=34.77, p<.001**
	PTSD symptoms	40 (54.8)	96 (33.0)	69 (24.4)	6 (11.8)	

Pearson correlations were conducted to measure the strength of relationships between mental health variables (see Table 6). Statistically significant, moderate to strong, positive correlations between the three DASS subscales (depression, anxiety, and stress) and PTSD were found. The post traumatic growth scale showed weak correlations with all other variables.

Table 6

Pearson correlations among mental health variables

	Depression r(n)	Anxiety r(n)	Stress r(n)	PTSD r(n)	Post-traumatic growth r(n)
Depression	-				
Anxiety	.671**(697)	-			
Stress	.736**(697)	.782**(697)	-		
PTSD	.738**(697)	.716**(697)	.757**(697)	-	
Post-traumatic growth	-.034(695)	.160**(695)	.087*(695)	.125**(696)	-

Note. **. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Coping styles

The next set of analyses focus on the Brief COPE scale. We were interested in examining a wide range of coping styles before carrying out a more detailed analysis on how aspects of social support were utilised by our participants to cope during the COVID-19 pandemic. Of all the coping styles ‘acceptance’ was the most utilised by all age/gender groups (except the ‘emerging’ group) ‘Emerging’ females scored highest in ‘humour’ and ‘emerging’ males in ‘acceptance’ and ‘self-distraction’ equally) (see Table 7).

We conducted a series of two-way ANOVA tests (see Table 7) for each of the COPE subscales and found a significant interaction between the effect of gender and age group for the denial coping scale. Females in the ‘emerging’ adults age group, had statistically

significantly higher mean scores as compared to all other groups. No other significant interactions were found.

There was a significant main effect of gender for the ‘positive reframing’, ‘acceptance’, ‘religion’, ‘emotional support’, and ‘instrumental support’. Females obtained statistically significant higher mean scores in these coping scales compared with males. Conversely, there was a significant main effect of gender for the ‘self-distraction’ scale, with males scoring higher than females for this scale.

There was a significant main effect of age group for the ‘humour’, ‘emotional support’, ‘instrumental support’, ‘self-distraction’, ‘venting’ and ‘self-blame’ scales. Bonferroni post hoc test results indicated that the mean instrumental support, self-distraction, and self-blame coping style scores were significantly higher for the ‘emerging’ adults age group compared with all other older age groups. In addition, the ‘emerging’ adults mean ‘humour’, ‘venting’, and ‘disengagement’ coping style scores were significantly higher compared with the ‘middle-aged’ and ‘older’ age groups. The emerging adult groups’ mean ‘emotional support’ coping style scores were significantly higher compared with the ‘young’ and ‘middle-aged’ groups.

The ‘young’ adult group obtained significantly higher mean scores in the emotional support, and disengagement scales (compared with the ‘middle-aged’ group) and the instrumental support scale (compared with the ‘middle-aged’ and ‘older’ age groups). Effect sizes for these analyses ranged from small to medium.

We then examined the relationships between the 14 coping styles and the mental health outcomes (see Table A.6). These Pearson correlations displayed small to moderate, positive correlations between the mental health variables of depression, anxiety, stress, and PTSD with the more ‘dysfunctional’ coping styles such as self-blame, disengagement, venting, denial, substance use and self-distraction. Higher levels of distress correlated with

higher scores in these coping styles. The coping style of self-blame showed the highest correlation with all four mental health measures. However, post traumatic growth demonstrated positive, small to medium correlations with the more adaptive coping styles such as active coping, planning, positive reframing, acceptance, religion, emotional and instrumental support (but not humour). Higher levels of post-traumatic growth correlated with higher scores in the ‘adaptive’ coping styles. The highest correlation was between instrumental and emotional support (r=.659).

Table 7

Descriptive and inferential statistics of coping styles (BriefCOPE) for males and females by age group

	Emerging adults (18-24 years) M (SD)		**Young adults (25-44 years) M (SD)**		**Middle-aged adults (45-64 years) M (SD)**		**Older adults (65-84 years) M (SD)**		**Two-way ANOVA**		
	Males (n=18)	**Females (n=51)**	**Males (n=102)**	**Females (n=185)**	**Males (n=81)**	**Females (n=195)**	**Males (n=15)**	**Females (n=35)**	**Gender (F(df), *p*, ηp²)**	**Age group (F(df), *p*, ηp²)**	**Age group x Gender (F(df), *p*, ηp²)**
Active coping	3.67 (1.33)	4.00 (0.82)	3.74 (1.62)	4.16 (1.64)	3.68 (1.84)	4.25 (1.89)	4.27 (1.71)	3.86 (1.52)	*F*(1,674)=2.11, *p*=.15, ηp²<.01	*F*(3,674)=0.06, *p*=.98, ηp²<.01	*F*(3,674)=0.97, *p*=.41, ηp²<.01
Planning	4.56 (1.65)	4.22 (1.64)	3.70 (1.66)	4.04 (1.63)	3.59 (1.84)	4.23 (1.83)	3.67 (1.68)	3.46 (1.54)	*F*(1,674) = 0.42, *p* =.52, ηp²<.01	*F*(3,674)=2.20, *p*=.09, ηp²=.01	*F*(3,674)=1.53, *p*=.21 , ηp²<.01
Positive reframing	4.22 (1.93)	4.27 (1.73)	3.53 (1.51)	4.23 (1.63)	3.30 (1.44)	4.18 (1.78)	3.67 (1.50)	4.09 (1.63)	***F*(1,674)=10.27, *p*=.001, ηp²=.02**	*F*(3,674)=2.42, *p*=.07, ηp²=.01	*F*(3,674)=0.49, *p*=.69 , ηp²<.01
Acceptance	4.72 (1.81)	4.61 (1.76)	5.06 (2.13)	5.20 (1.83)	4.75 (2.03)	5.77 (1.75)	4.80 (2.21)	5.37 (2.07)	***F*(1,674)=8.59, *p*=.003, ηp²=.01**	*F*(3,674)=0.26, *p*=.85, ηp²<.01	*F*(3,674)=2.24, *p*=.08, ηp²=.01
Humour	4.33 (2.03)	5.49 (1.65)	4.03 (1.83)	3.63 (1.69)	3.62 (1.74)	3.38 (1.47)	3.13 (1.60)	3.14 (1.72)	*F*(1,674)=0.91, *p*=.34, ηp²=.01	***F*(3,674)=5.32, *p*=.001, ηp²=.02**	*F*(3,674)=0.27, *p*=.85, ηp²<.01
Religion	2.17 (0.51)	4.24 (1.89)	2.45 (1.13)	2.83 (1.46)	2.43 (1.04)	2.83 (1.51)	2.67 (1.29)	3.11 (1.78)	***F*(1,674)=12.05, *p*<.001, ηp²=.02**	*F*(3,674)=0.43, *p*=.73, ηp²<.01	*F*(3,674)=0.74, *p*=.53, ηp²<.01
Emotional support	3.56 (1.65)	3.16 (1.77)	3.19 (1.30)	4.02 (1.60)	2.79 (1.19)	3.59 (1.49)	3.20 (1.52)	3.86 (1.75)	***F*(1,674)=25.02, *p*<.001, ηp²=.04**	***F*(3,674)=6.52, *p*<.001, ηp²=.03**	*F*(3,674)=0.21, *p*=.89, ηp²<.01
Instrumental support	3.89 (1.57)	4.67 (1.83)	2.87 (1.11)	3.61 (1.46)	2.60 (1.01)	3.16 (1.36)	2.53 (0.99)	2.80 (1.02)	***F*(1,674)=8.52, *p*=.004, ηp²=.01**	***F*(3,674)=12.11, *p*<.001, ηp²=.05**	*F*(3,674)=0.82, *p*=.49, ηp²<.01
Self-distraction	4.72 (1.90)	4.10 (1.87)	3.73 (1.55)	4.16 (1.58)	3.05 (1.19)	3.99 (1.62)	3.47 (1.41)	3.57 (1.67)	***F*(1,674)=8.04, *p*=.005, ηp²=.01**	***F*(3,674)=13.46, *p*<.001, ηp²=.06**	*F*(3,674)=1.52, *p*=.21, ηp²<.01
Denial	2.17 (0.51)	5.25 (1.83)	2.49 (1.16)	2.44 (0.99)	2.36 (0.88)	2.43 (0.89)	3.20 (1.37)	2.14 (0.43)	*F*(1,674)=3.37, *p*=.07, ηp²<.01	*F*(3,674)=1.49, *p*=.22, ηp²<.01	***F*(3,674)=4.61, *p*=.003, ηp²=.02**
Venting	3.33 (1.33)	2.41 (0.96)	3.09 (1.33)	3.34 (1.49)	2.60 (1.08)	3.13 (1.22)	2.87 (0.99)	2.83 (0.92)	*F*(1,674)=3.66, *p*=.06, ηp²<.01	***F*(3,674)=5.47, *p*=.001, ηp²=.02**	*F*(3,674)=0.77, *p*=.51, ηp²<.01
Substance use	2.72 (1.60)	3.73 (1.54)	3.02 (1.59)	2.76 (1.45)	2.69 (1.39)	2.69 (1.36)	2.67 (1.18)	2.17 (0.51)	*F*(1,674)=2.89, *p*=.09, ηp²<.01	*F*(3,674)=2.15, *p*=.09, ηp²<.01	*F*(3,674)=0.61, *p*=.61, ηp²<.01
Disengagement	3.00 (1.41)	2.41 (1.15)	2.74 (1.48)	2.67 (1.12)	2.33 (0.88)	2.46 (0.96)	2.47 (1.06)	2.17 (0.45)	*F*(1,674)=0.14, *p*=.71, ηp²<.01	***F*(3,674)=6.31, *p*<.001, ηp²=.03**	*F*(3,674)=0.55, *p*=.65, ηp²<.01
Self-blame	3.78 (1.90)	3.04 (1.61)	2.72 (1.22)	3.07 (1.40)	2.57 (1.35)	2.87 (1.37)	2.53 (0.64)	2.37 (0.65)	*F*(1,674)=0.65, *p*=.42, ηp²<.01	***F*(3,674)=10.07, *p*<.001, ηp²=.04**	*F*(3,674)=0.60, *p*=.62, ηp²<.01

Social Support, social networks, and social activity

Our main research question was to examine the relationship between social support, social networks, social activity, and mental health outcomes during the COVID-19 pandemic in New Zealand. Two-way ANOVA tests were conducted to examine the effect of gender and age group on social support, social networks, and social activity scores (see Table 8). There was no significant interaction between gender and age group for any of the scales. However, there were main effects of age group and gender for all social support scales (social support, social network, and social activity scales). Overall, women had statistically significantly greater social support, larger social networks and engaged in more social activity than men, although the effect sizes were small.

Bonferroni post hoc tests revealed the 'older' adult's group were significantly more socially active than all younger age groups. In addition, 'young' adults had significantly larger social networks and more perceived social support than 'middle-aged' adults. However, the effect sizes for these differences were small.

In addition, statistically significant, positive correlations were found between social network and perceived social support ($p=.577$), social network and social activity ($p=.465$) and perceived social support and social activity ($p=.346$). All correlations were significant at the 0.01 level (2-tailed).

Table 8

Descriptive and inferential statistics of social support, social network and social activity scales for males and females by age group

	Emerging adults (18-24 years) M (SD)		**Young adults (25-44 years) M (SD)**		**Middle-aged adults (45-64 years) M (SD)**		**Older adults (65-84 years) M (SD)**		**Two-way ANOVA**		
	Males (n=18)	**Females (n=51)**	**Males (n=102)**	**Females (n=185)**	**Males (n=82)**	**Females (n=196)**	**Males (n=15)**	**Females (n=35)**	**Gender (F(df), *p*, ηp²)**	**Age group (F(df), *p*, ηp²)**	**Age group x Gender (F(df), *p*, ηp²)**
Social support	63.50 (11.83)	67.53 (10.34)	64.84 (14.34)	68.54 (12.67)	61.66 (16.21)	64.60 (15.67)	64.53 (19.22)	69.23 (12.60)	***F*(1,676) = 5.70, *p*=.02, ηp²<.01**	***F*(3,676) = 2.78, *p*=.04, ηp²=.01**	*F*(3,676) = 0.065, *p*=.98, ηp²<.01
Social network	34.89 (8.67)	35.43 (9.17)	34.17 (8.13)	36.65 (8.77)	29.68 (9.23)	35.39 (8.86)	29.07 (13.82)	36.00 (6.99)	***F*(1,676) = 15.49, *p*<.001, ηp²=.02**	***F*(3,676) = 5.03, *p*=.002, ηp²=.02**	*F*(3,676) = 2.42, *p*=.07, ηp²=.01
Social activity	16.22 (9.07)	17.45 (6.23)	14.71 (8.75)	17.22[a] (7.41)	14.09 (7.86)	18.36 (8.24)	17.00 (7.09)	23.06 (8.84)	***F*(1,672) = 15.42, *p*<.001, ηp²=.02**	***F*(3,672) = 3.26, *p*=.02, ηp²=.01**	*F*(3,672) = 1.22, *p*=.30, ηp²<.01

Note. [a] n= 181

Changes in social support, social network, and social activity since the COVID-19 pandemic

Participants were also asked if they had experienced changes in their perceived social support, social network, and levels of social activity since the beginning of the COVID-19 pandemic. Overall, 33% of participants were less socially active, 24% experienced a smaller social network and 15% experienced less social support since the pandemic began. In contrast, 14% of participants experienced an increase in social activity, 18% reported an increase in social networks and social support since the COVID-19 pandemic began. The remaining participants reported no change in these variables.

Social support changes

For both female and male in the 'young', 'middle-aged' and 'older' age groups, the majority (66.7% to 75.5%) experienced 'no change' in their perceived social support since the COVID-19 pandemic. However, 55.6% (males) and 52% (females) in the 'emerging' adults (18 to 24 years old) experienced a change since the COVID-19 pandemic. Within this youngest age group of 18 to 24 year olds, 27.8% (males) and 22% (females) experiencing less social support, conversely, 27.8% (males) and 30% (females) experienced more social support since the COVID-19 pandemic (see Table 9).

Social network changes

A similar trend was found for social network changes since the pandemic with 33.3% of 'emerging' males and 35.3% of 'emerging' females experiencing a reduction in the size of their social networks. In contrast, for participants in all other groups the proportions who experienced a reduction in social network ranged from 13.7% ('young' males) to 26.7% ('older' males) (see Table 9).

Social activity changes

The ‘emerging’ group again experienced some of the largest losses in social activity since the COVID-19 pandemic, with 38.9% of males and 31.4% of females less socially active. However, ‘young’ and ‘middle-aged’ females also experienced similar reductions in their social activity at 35.7% and 42.6% respectively since the COVID-19 pandemic (see Table 9).

Table 9

Changes in social support, social network, and social activity (since the COVID-19 pandemic) for males and females by age group

	Emerging adults (18-24 years)		Young adults (25-44 years)		Middle-aged adults (45-64 years)		Older adults (65-84 years)	
	Males n (%)	**Females n (%)**	**Males n (%)**	**Females n (%)**	**Males n (%)**	**Females n (%)**	**Males n (%)**	**Females n (%)**
Social support								
Less support	5 (27.8)	11 (22.0)	7 (6.9)	23 (12.4)	9 (11.0)	33 (16.8)	3 (20.0)	4 (11.4)
No change	8 (44.4)	24 (48.0)	77 (75.5)	125 (67.6)	62 (75.6)	137 (69.9)	10 (66.7)	25 (71.4)
More support	5 (27.8)	15 (30.0)	18 (17.6)	37 (20.0)	11 (13.4)	26 (13.3)	2 (13.3)	6 (17.1)
Social network								
Smaller network	6 (33.3)	18 (35.3)	14 (13.7)	40 (21.6)	20 (24.4)	52 (26.4)	4 (26.7)	6 (17.1)
No change	10 (55.6)	22 (43.1)	72 (70.6)	99 (53.5)	52 (63.4)	112 (56.9)	9 (60.0)	24 (68.6)
Larger network	2 (11.1)	11 (21.6)	16 (15.7)	46 (24.9)	10 (12.2)	33 (16.8)	2 (13.3)	5 (14.3)
Social activity								
Less socially active	7 (38.9)	16 (31.4)	21 (20.6)	66 (35.7)	19 (23.2)	84 (42.6)	2 (13.3)	8 (22.9)
No change	7 (38.9)	22 (43.1)	66 (64.7)	97 (52.4)	53 (64.6)	91 (46.2)	10 (66.7)	23 (65.7)
More socially active	4 (22.2)	13 (25.5)	15 (14.7)	22 (11.9)	10 (12.2)	22 (11.2)	3 (20.0)	4 (11.4)

Relationship between social support, social network, social activity, and mental health outcomes

Pearson correlations were conducted to measure the strength of relationships between the social support variables (social support, social network, and social activity) and mental health variables (depression, anxiety, stress, PTSD, and post-traumatic growth) by gender and age group (see Table 10). Overall, lower scores in social support, social network size and social activity was associated with higher levels of distress and lower scores in post-traumatic growth, with group sizes ranged from 15 to 195 participants.

Social support scale

Lower social support was associated with higher levels of distress, with all groups showing negative, and mainly small to moderate strength relationships. Depression (of all the mental health variables) correlated the highest with the social support scale, for all age and gender groups (except 'older' females), with 'older' adult males showing the highest correlation ('large' strength). 'Young' adult females showed the highest correlation between anxiety, stress, PTSD, and social support. 'Older' males showed the highest correlation between post-traumatic growth and social support (positive, medium relationship).

Social network scale

Lower social network scores were also associated with higher levels of distress with all groups showing negative, mainly small to moderate strength relationships. 'Older' males showed the highest correlation between depression and social network size. 'Older' females showed the highest correlation between both PTSD ('large' strength) and anxiety when correlated with the social network scale, with both 'younger' and 'older' females showing the highest correlation between stress and social network size. Finally, 'older' males showed the

highest correlation (positive, small relationship) between post-traumatic growth and social network size.

Social activity scale

Finally, lower social activity scores were associated with higher levels of distress with all groups showing negative, and mainly small to moderate strength relationships. 'Older' males showed the highest correlation between social activity and the mental health variables of depression ('moderate' strength), PTSD ('moderate' strength) and stress. However, 'emerging' males showed the highest correlation between social activity and anxiety ('moderate' strength). 'Young' adult males showed the highest correlation (positive, moderate relationship) between social activity and post-traumatic growth. A full set of correlations between the social support scales and mental outcome scales, by gender and age group separately, can be found in the appendix (Table A.7).

Table 10

Pearson correlations between social support and mental health variables by age group and gender

	Emerging adults (18-24 years)		**Young adults (25-44 years)**		**Middle-aged adults (45-64 years)**		**Older adults (65-84 years)**	
	Males	**Females**	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
Social support scale	**(n=18)**	**(n=51)**	**(n=102)**	**(n=185)**	**(n=82)**	**(n=195)**	**(n=15)**	**(n=35)**
Depression	-.369	-.297*	-.366**	-.504**	-.433**	-.405**	-.619*	-.156
Anxiety	-.132	-.138	-.246*	-.389**	-.228*	-.245**	-.078	.213
Stress	-.232	-.212	-.337**	-.396**	-.195	-.300**	-.215	-.345*
PTSD	-.124	-.245	-.241*	-.402**	-.310**	-.381**[a]	-.357	-.179
Post traumatic growth	.239	-.077	.208*	.080	.134[b]	.104	.345	.004
Social network scale	**(n=18)**	**(n=51)**	**(n=102)**	**(n=185)**	**(n=82)**	**(n=196)**	**(n=15)**	**(n=35)**
Depression	-.210	-.328*	-.277**	-.414**	-.285**	-.338**	-.494	-.427*
Anxiety	-.360	-.146	-.183	-.297**	-.226*	-.262**	-.236	-.426*
Stress	-.140	-.207	-.303**	-.325**	-.162	-.243**	-.048	-.325
PTSD	.011	-.257	-.186	-.289**	-.275*	-.285**[c]	-.265	-.549**
Post traumatic growth	.114	-.087	.048	.084	.073[b]	.093	.248	-.030
Social activity scale	**(n=18)**	**(n=51)**	**(n=102)**	**(n=181)**	**(n=82)**	**(n=195)**	**(n=15)**	**(n=35)**
Depression	-.157	-.302*	-.186	-.298**	-.336**	-.221**	-.617*	-.443**
Anxiety	-.501*	-.136	-.028	-.171*	-.165	-.158*	-.409	-.243
Stress	-.177	-.239	-.224*	-.239**	-.169	-.159*	-.333	-.263
PTSD	-.155	-.096	.025	-.240**	-.272*	-.175*[a]	-.515*	-.489**
Post traumatic growth	-.200	-.092	.364**	.157*	.136[b]	.159*	-.016	.261

Note. [a]=196, [b]=81, [c]=197. **. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Association between changes in social support, social network and social activity since the COVID-19 pandemic and mental health outcomes

Several one-way ANOVA tests were run to compare the mean mental health variable scores (depression, anxiety, stress, and post-traumatic growth) of the groups who experienced a reduction, no change or an increase in social support, social network size or social activity since the COVID-19 pandemic the (see Table 11 and Figures 3 to 7).

There was a significant main effect of change in social support, social network, and social activity on all mental health outcome variables. Bonferroni post hoc analysis indicated that the mean depression, anxiety, stress, and PTSD scores were statistically significantly higher for those who experienced less social support, a reduction in social network size or less social activity since the COVID-19 pandemic, compared with those who experienced no change. In addition, mean scores in these same mental health variables were higher (across nearly all social support variables) for those who experienced an increase in support, network size or social activity, compared to those who experienced no change (although not all differences were statistically significant).

In contrast, the mean post-traumatic growth scores were statistically significantly higher for those who experienced an increase in social support, network size or social activity compared to those who experienced no change in these variables. The largest effect sizes (>.11) were found for a change in social support for the depression, anxiety, stress, and PTSD scales.

Figure 3

Mean depression scores of participants who experienced less, no change or more social support, network, and activity since the COVID-19 pandemic

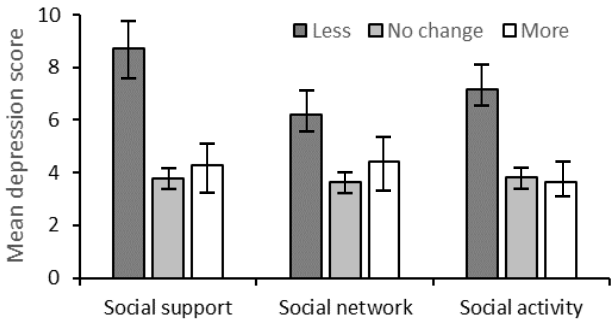


Figure 4

Mean anxiety scores of participants who experienced less, no change or more social support, network, and activity since the COVID-19 pandemic

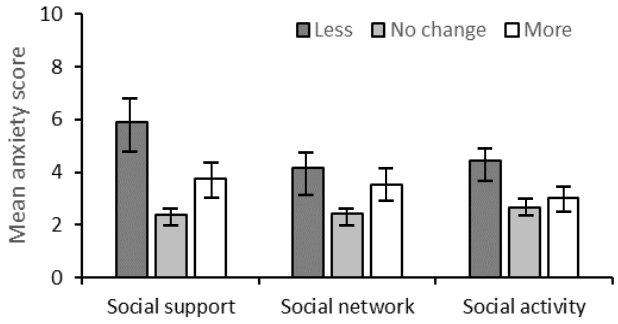


Figure 5

Mean stress scores of participants who experienced less, no change or more social support, network, and activity since the COVID-19 pandemic

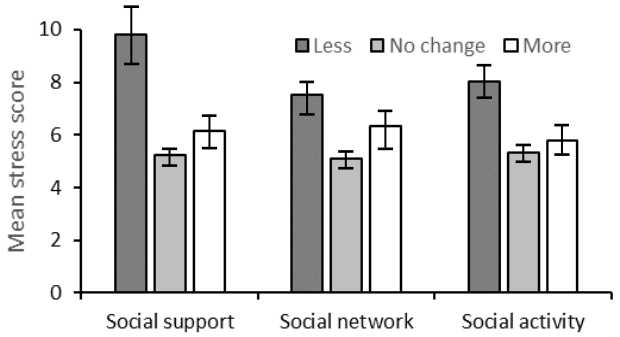


Figure 6

Mean PTSD scores of participants who experienced less, no change or more social support, network, and activity since the COVID-19 pandemic

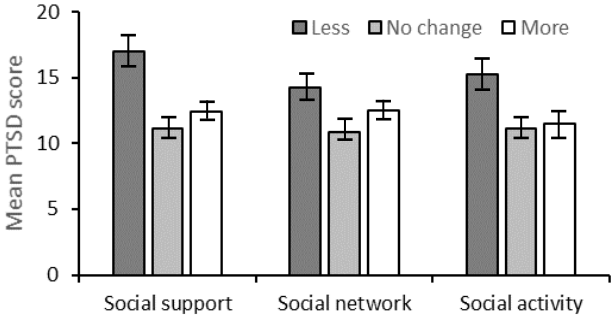


Figure 7

Mean post-traumatic growth scores of participants who experienced less, no change or more social support, network, and activity since the COVID-19 pandemic.

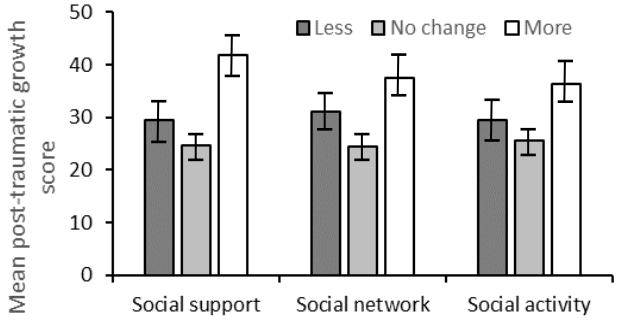


Table 11

One-way ANOVA between changes in social support, network and activity since the COVID-19 pandemic and mental health outcomes

	Social support change Less (n= 100) No change (n=473) More (n=122)	**Social network change** Less (n=165) No change (n=405) More (n=127)	**Social activity change** Less (n=228) No change (n=375) More (n=94)
Depression	$F(2, 692) = 51.02$, $p = <.001$, $\eta p^2 = .128$	$F(2, 694) = 34.92$, $p = <.001$, $\eta p^2 = .091$	$F(2, 694) = 21.76$, $p = <.001$, $\eta p^2 = .059$
Anxiety	$F(2, 692) = 46.75$, $p = <.001$, $\eta p^2 = .119$	$F(2, 694) = 14.82$, $p = <.001$, $\eta p^2 = .041$	$F(2, 694) = 18.20$, $p = <.001$, $\eta p^2 = .050$
Stress	$F(2, 692) = 49.63$, $p = <.001$, $\eta p^2 = .125$	$F(2, 694) = 23.57$, $p = <.001$, $\eta p^2 = .064$	$F(2, 694) = 22.20$, $p = <.001$, $\eta p^2 = .060$
PTSD	$F(2, 693) = 53.09$, $p = <.001$, $\eta p^2 = .133$[a]	$F(2, 695) = 34.98$, $p = <.001$, $\eta p^2 = .091$[b]	$F(2, 695) = 26.82$, $p = <.001$, $\eta p^2 = .072$[c]
PTGI	$F(2, 691) = 30.35$, $p = <.001$, $\eta p^2 = .081$[d]	$F(2, 693) = 11.49$, $p = <.001$, $\eta p^2 = .032$[e]	$F(2, 693) = 15.75$, $p = <.001$, $\eta p^2 = .043$[f]

Note. [a]n= 101 ('less' group), [b]n= 166 ('less' group), [c]n= 229 ('less' group), [d]n= 472 ('no change' group), [e]n= 126 ('more' group), [f]n= 227 ('less' group).

Participants who experienced less support, network, and social activity

We carried out additional exploratory analyses of the mental health outcomes for the groups reporting a decrease in social support, networks, or activity since the COVID-19 pandemic. We conducted a series of one-way ANOVA tests (see Table 12), to compare the effect of a decrease in the three social support variables on mental health outcomes, looking at gender and age group separately to see who was most affected (sample sizes were too small to conduct two-way ANOVA tests).

There was a significant effect of gender on scores for PTSD for those who experienced a decrease in social activity since the COVID-19 pandemic, with females experiencing significantly higher mean PTSD scores than males. In addition, there was a significant effect of age group on scores for depression (for those who experienced less social

activity), anxiety (for those who experienced less support, smaller networks, and less social activity), stress (for those who experienced smaller networks and less social activity) and finally PTSD (for those who experienced less support, smaller networks, and less social activity).

Bonferroni post hoc tests for age group indicated that for those participants who experienced a decrease in social support, the 'emerging' adults mean scores were significantly higher than the 'middle-aged' adults (for anxiety and PTSD) and the 'older' adults (PTSD only). For those who experienced a decrease in social network, the 'emerging' adults mean scores were significantly higher than the 'middle-aged' adults (for anxiety, stress, and PTSD) and finally, 'older' adults (PTSD only). Finally, for those who had experienced a decrease in social activity, the 'emerging' adults mean scores were significantly higher than the 'younger' adults (for depression, anxiety, and PTSD), 'middle-aged' adults (for depression, anxiety, stress, and PTSD) and 'older' adults (anxiety, stress, and PTSD) (all p's $<.05$).

Table 12

One-way ANOVA between changes in social support, network and activity since the COVID-19 pandemic and mental health outcomes

	Males M (SD)	**Females M (SD)**	**Emerging adults (18-24 years) M (SD)**	**Young adults (25-44 years) M (SD)**	**Middle-aged adults (45-64 years) M (SD)**	**Older adults (65-84 years) M (SD)**	**One-way ANOVA Gender (F(df), p, ηp2)**	**One-way ANOVA Age group (F(df), p, ηp2)**
Less social support	**(n=24)**	**(n=70)**	**(n=16)**	**(n=33)**	**(n=44)**	**(n=7)**	df(1,92)	df(3,96)
Depression	9.21 (5.62)	8.53 (6.02)	11.19 (5.15)	8.79 (6.41)	8.23 (5.61)	5.57 (3.51)	F=0.24, p=0.63, ηp^2=.003	F=1.81, p=.15, ηp^2=.05
Anxiety	6.17 (4.53)	6.06 (5.03)	8.50 (5.57)	6.45 (4.98)	4.70 (4.26)	4.71 (3.73)	F=0.009, p=0.93, ηp^2<.001	**F=2.89, p=.04, ηp^2=.08**
Stress	9.50 (5.23)	10.07 (5.27)	12.00 (5.38)	10.52 (5.30)	8.73 (4.76)	8.00 (4.58)	F=0.21, p=0.65, ηp^2=.002	F=2.21, p=.09, ηp^2=.06
PTSD	15.79 (5.76)	17.51 (6.09)[a]	20.63 (5.23)	17.39 (6.15)	16.02 (5.73)[b]	13.43 (4.96)	F(1,93)=1.46, p=0.23, ηp^2=.02	**F(1,97)=3.50, p=0.02, ηp^2=.10**
Post-traumatic growth	25.96 (19.83)	32.11 (20.79)	36.69 (21.74)	27.48 (21.91)	28.34 (18.07)	30.86 (26.09)	F=0.60, p=0.21, ηp^2=.02	F=0.81,p=0.49, ηp^2=.03
Smaller social network	**(n=44)**	**(n=115)**	**(n=26)**	**(n=57)**	**(n=72)**	**(n=10)**	df(1,157)	df(3,161)
Depression	6.93 (5.75)	7.30 (5.94)	9.19 (6.25)	7.74 (6.20)	6.25 (5.40)	5.10 (3.41)	F=0.13, p=0.72, ηp^2=.001	F=2.31, p=0.08, ηp^2=.04
Anxiety	4.11 (3.90)	4.68 (4.65)	6.65 (5.21)	5.00 (4.61)	3.31 (3.70)	3.50 (3.37)	F=0.51,p=0.48, ηp^2=.003	**F=4.50, p=0.005, ηp^2=.08**
Stress	7.09 (4.81)	8.51 (5.55)	10.38 (5.88)	9.14 (5.30)	6.65 (4.76)	5.80 (4.71)	F=2.24, p=0.14, ηp^2=.01	**F=5.07, p=0.002, ηp^2=.09**
PTSD	13.84 (6.47)	15.80 (6.66)[c]	19.12 (5.83)	16.39 (6.82)	13.53 (6.01)[d]	10.80 (4.69)	F(1,158)=2.81, p=0.10, ηp^2=.02	**F(3,162)=7.56, p<.001, ηp^2=.12**
Post-traumatic growth	26.14 (21.20)	31.08 (23.08)	35.92 (22.96)	28.65 (24.51)	26.93 (19.39)	34.80 (26.52)	F=1.53, p=0.22, ηp^2=.01	F=1.26, p=0.29, ηp^2=.02
Less social activity	**(n=49)**	**(n=173)**	**(n=25)**	**(n=88)**	**(n=105)**	**(n=10)**	df(1,220)	df(3,224)
Depression	5.86 (5.62)	6.26 (5.64)	9.64 (6.43)	6.16 (5.87)	5.57 (5.01)	4.60 (3.57)	F=0.20, p=0.66, ηp^2=.001	**F=4.04, p=.008, ηp^2=.05**
Anxiety	4.14 (4.15)	4.23 (4.43)	7.56 (5.40)	4.47 (4.63)	3.23 (3.46)	3.00 (3.09)	F=0.02, p=0.91, ηp^2<.001	**F=7.70, p<.001, ηp^2=.09**
Stress	6.65 (5.29)	7.73 (5.04)	10.76 (5.83)	8.07 (5.21)	6.50 (4.42)	5.10 (3.98)	F=1.70, p=0.19, ηp^2=.008	**F=6.36, p<.001, ηp^2=.08**
PTSD	13.41 (6.97)	14.31 (6.44)[e]	20.32 (5.85)	14.72 (7.17)	12.65 (5.30)[f]	10.70 (3.43)	F(1,221)=0.72, p=0.40, ηp^2=.003	**F(3,225)=12.01,p<.001, ηp^2=.14**
Post-traumatic growth	25.33 (20.36)[g]	32.99 (22.83)	39.20 (23.19)	27.63 (21.62)	32.15 (22.53)[h]	31.00 (19.48)	**F(1,219)=4.43, p=0.04, ηp^2=.02**	**F(3,223)=1.92, p=0.13, ηp^2=.03**

Note. [a]n = 71, [b]n=45, [c]n=116, [d]n=73, [e]n=174, [f]n=106, [g]n=48, [h]n=104

Multiple regression analysis of the mental health outcomes

The aim of this set of analyses was to determine which variables significantly predicted the mental health outcome variables (depression, anxiety, stress, PTSD, and post-traumatic growth). The predictor variables were selected based on our research questions, analysis to date, and past published literature. Various models were run until we determined the best fit model for our data. Hierarchical regression was used to explore the predictive influence of different variables on mental health outcomes. Predictors were added in four separate blocks.

The first block contained known predictors of mental health outcomes (based on past research), gender and previous mental health diagnosis. The second block included age group (the 18 to 24 age group was the comparison group). The third block included social support, network, and activity scales, as well as reduced social support, network, and activity since the COVID-19 pandemic. The fourth and final block included the six coping styles that in past research had been related to poorer mental health outcomes and had shown moderate positive correlations with the mental health outcomes in correlation analysis (for variables of depression, stress, anxiety, and PTSD symptoms). The fourth block for the post-traumatic growth regression, included the eight more adaptive coping styles based on the positive correlations from our analysis and past research.

Depression

Multiple regression analysis was used to test which variables significantly predicted participants' ratings of depression symptoms (see Table 13). The regression equation was significant for all four models. Model one accounted for 11% of the variance in depression scores (R^2 =.11, F(2, 671) = 41.70, p < .001), model two accounted for 12% (R^2 =.12, F(5,668) = 18.41, p < .001), model three accounted for 33% (R^2 =.33, F(11,662) = 29.23, p < .001) and model four accounted for 55% of the variance in depression scores (R^2 =.55, F(17,656) = 46.61, p < .001). For model four, a previous mental health diagnosis, lower scores on the perceived social support and social activity scales, a reduction in social network size since the COVID-19 pandemic and higher scores in the coping styles of disengagement and self-blame were significant predictors of depression in this model.

Anxiety

The multiple regression for anxiety is shown in Table 14. The regression equation was significant for all four models. Model one accounted for 18% of the variance in anxiety scores (R^2 =.18, F(2, 671) = 73.52, $p < .001$), model two accounted for 21% (R^2 =.21, F(5,668) = 34.64, $p < .001$), model three accounted for 30% (R^2 =.30, F(11,662) = 26.25, $p < .001$) and model four accounted for 48% of the variance in anxiety scores (R^2 =.48, F(17,656) = 35.22, $p < .001$). For model four, a previous mental health diagnosis, a reduction in perceived social support since the COVID-19 pandemic and higher scores for the coping styles of self-distraction, denial, venting, disengagement, and self-blame were significant predictors of anxiety in this model.

Stress

Table 15 displays the multiple regression analysis for stress. The regression equation was significant for all four models. Model one accounted for 13% of the variance in stress scores (R^2 =.13, F(2, 671) = 51.66, $p < .001$), model two accounted for 17% (R^2 =.21, F(5,668) = 27.18, $p < .001$), model three accounted for 30% (R^2 =.30, F(11,662) = 26.17, $p < .001$) and model four accounted for 52% of the variance in stress scores (R^2 =.52, F(17,656) = 41.97, $p < .001$). For model four, female gender, the 25 to 44 year age group, a previous mental health diagnosis, lower scores on the social activity scale, a reduction in perceived social support since the COVID-19 pandemic along with higher scores for the coping styles of self-distraction, denial, venting, disengagement, and self-blame were significant predictors of stress in this model.

Table 13

Multiple regression analysis of predictors of depression (p<.001 for all models)

	Unstandardized Coefficients	95.0% CI		Std. Error	Standardized Coefficients	Sig.
	B	LL	UL	*SE B*	*β*	*p*
Model 1 (Constant)	3.86	3.25	4.48	0.31		<.001
Female	-0.35	-1.09	0.38	0.37	-.04	.344
Mental health diagnosis	3.62	2.84	4.40	0.40	.34	**<.001**
Model 2 (Constant)	2.78	1.44	4.13	0.68		<.001
Female	-0.33	-1.07	0.40	0.37	-.03	.373
Mental health diagnosis	3.44	2.65	4.22	0.40	.32	**<.001**
18 to 24 years	2.23	0.58	3.88	0.84	.14	**.008**
25 to 44 years	1.25	-0.10	2.60	0.69	.13	.070
45 to 64 years	0.89	-0.46	2.25	0.69	.09	.194
Model 3 (Constant)	9.16	7.19	11.12	1.00		<.001
Female	0.10	-0.57	0.78	0.34	.01	.768
Mental health diagnosis	2.53	1.83	3.24	0.36	.23	**<.001**
18 to 24 years	1.80	0.33	3.27	0.75	.11	**.016**
25 to 44 years	1.20	-0.02	2.41	0.62	.12	.053
45 to 64 years	0.26	-0.95	1.47	0.61	.03	.671
Social support scale (MPSS)	-0.08	-0.10	-0.05	0.01	-.23	**<.001**
Social network scale (Lubben)	-0.04	-0.08	0.01	0.02	-.07	.120
Social activity scale (SAL)	-0.04	-0.08	0.00	0.02	-.07	.068
Less social support	1.80	0.75	2.85	0.53	.13	**<.001**
Less social network	1.58	0.76	2.41	0.42	.14	**<.001**
Less social activity	0.62	-0.09	1.34	0.37	.06	.089
Model 4 (Constant)	1.39	-0.53	3.31	0.98		.155
Female	-0.15	-0.71	0.42	0.29	-.01	.614
Mental health diagnosis	1.12	0.50	1.73	0.31	.10	**<.001**
18 to 24 years	0.02	-1.23	1.26	0.64	.00	.981
25 to 44 years	0.24	-0.77	1.25	0.52	.03	.639
45 to 64 years	0.11	-0.89	1.10	0.51	.01	.833
Social support scale (MPSS)	-0.04	-0.06	-0.02	0.01	-.13	**<.001**
Social network scale (Lubben)	-0.03	-0.07	0.01	0.02	-.06	.097
Social activity scale (SAL)	-0.04	-0.07	0.00	0.02	-.07	**.034**
Less social support	0.25	-0.64	1.13	0.45	.02	.586
Less social network	1.20	0.51	1.88	0.35	.11	**<.001**
Less social activity	0.02	-0.58	0.61	0.31	.00	.959
Coping - self-distraction	0.17	-0.01	0.35	0.09	.06	.069
Coping - denial	0.13	-0.16	0.41	0.15	.03	.391
Coping - venting	0.11	-0.13	0.35	0.12	.03	.376
Coping - substance use	-0.08	-0.28	0.12	0.10	-.02	.431
Coping - disengagement	1.15	0.86	1.45	0.15	.28	**<.001**
Coping - self-blame	0.99	0.74	1.23	0.12	.29	**<.001**

Note. R^2 = .11 for model 1; ΔR^2 = .01 for model 2, ΔR^2 = .21 for Model 3, ΔR^2 = .22 for Model 4.

Table 14

Multiple regression analysis of predictors of anxiety (p<.001 for all models)

	Unstandardized Coefficients	95.0% CI		Std. Error	Standardized Coefficients	Sig.
	B	LL	LL	*SE B*	*β*	*p*
Model 1 (Constant)	2.21	1.76	2.66	0.23		<.001
Female	0.01	-0.53	0.55	0.27	.00	.965
Mental health diagnosis	3.49	2.92	4.06	0.29	.42	**<.001**
Model 2 (Constant)	1.84	0.86	2.81	0.50		<.001
Female	0.06	-0.48	0.59	0.27	.01	.839
Mental health diagnosis	3.29	2.72	3.86	0.29	.40	**<.001**
18 to 24 years	1.68	0.48	2.88	0.61	.14	**.006**
25 to 44 years	0.71	-0.27	1.69	0.50	.10	.156
45 to 64 years	-0.17	-1.15	0.81	0.50	-.02	.727
Model 3 (Constant)	3.80	2.27	5.32	0.78		<.001
Female	0.13	-0.39	0.66	0.27	.02	.619
Mental health diagnosis	2.82	2.27	3.37	0.28	.34	**<.001**
18 to 24 years	1.53	0.38	2.67	0.58	.13	**.009**
25 to 44 years	0.81	-0.13	1.76	0.48	.11	.091
45 to 64 years	-0.36	-1.29	0.58	0.48	-.05	.454
Social support scale (MPSS)	-0.02	-0.04	0.00	0.01	-.09	**.029**
Social network scale (Lubben)	-0.03	-0.06	0.01	0.02	-.07	.136
Social activity scale (SAL)	0.00	-0.03	0.03	0.02	.00	.996
Less social support	2.07	1.26	2.88	0.41	.20	**<.001**
Less social network	0.30	-0.34	0.94	0.33	.04	.359
Less social activity	0.51	-0.04	1.07	0.28	.07	.070
Model 4 (Constant)	-1.92	-3.50	-0.35	0.80		.017
Female	-0.06	-0.53	0.40	0.24	-.01	.793
Mental health diagnosis	1.93	1.43	2.43	0.26	.23	**<.001**
18 to 24 years	0.46	-0.56	1.48	0.52	.04	.377
25 to 44 years	0.23	-0.60	1.06	0.42	.03	.587
45 to 64 years	-0.40	-1.21	0.42	0.42	-.05	.342
Social support scale (MPSS)	0.00	-0.02	0.02	0.01	.00	.989
Social network scale (Lubben)	-0.02	-0.05	0.01	0.02	-.06	.110
Social activity scale (SAL)	0.00	-0.03	0.03	0.02	-.01	.887
Less social support	0.91	0.18	1.63	0.37	.09	**.014**
Less social network	0.10	-0.47	0.66	0.29	.01	.735
Less social activity	0.02	-0.47	0.51	0.25	.00	.948
Coping - self-distraction	0.15	0.00	0.30	0.08	.07	**.046**
Coping - denial	0.44	0.20	0.67	0.12	.12	**<.001**
Coping - venting	0.30	0.10	0.50	0.10	.11	**.003**
Coping - substance use	-0.08	-0.25	0.08	0.08	-.03	.332
Coping - disengagement	0.53	0.28	0.77	0.12	.17	**<.001**
Coping - self-blame	0.55	0.35	0.75	0.10	.22	**<.001**

Note. R^2 = .18 for model 1; ΔR^2 = .03 for model 2, ΔR^2 = .10 for Model 3, ΔR^2 = .17 for Model 4.

Table 15

Multiple regression analysis of predictors of stress, (p<.001 for all models)

	Unstandardized Coefficients	95.0% CI		Std. Error	Standardized Coefficients	Sig.
	B	Lower CI	Upper CI	*SE B*	*β*	*p*
Model 1 (Constant)	4.75	4.17	5.32	0.29		<.001
Female	0.50	-0.18	1.19	0.35	.05	.148
Mental health diagnosis	3.61	2.89	4.34	0.37	.36	**<.001**
Model 2 (Constant)	3.19	1.96	4.42	0.63		<.001
Female	0.59	-0.08	1.27	0.34	.06	.082
Mental health diagnosis	3.35	2.63	4.07	0.37	.33	**<.001**
18 to 24 years	2.83	1.31	4.34	0.77	.19	**<.001**
25 to 44 years	2.22	0.98	3.46	0.63	.25	**<.001**
45 to 64 years	0.86	-0.38	2.09	0.63	.09	.174
Model 3 (Constant)	6.58	4.70	8.46	0.96		<.001
Female	0.79	0.14	1.44	0.33	.08	**.017**
Mental health diagnosis	2.69	2.01	3.37	0.35	.26	**<.001**
18 to 24 years	2.43	1.02	3.84	0.72	.16	**<.001**
25 to 44 years	2.18	1.02	3.35	0.59	.24	**<.001**
45 to 64 years	0.44	-0.71	1.60	0.59	.05	.452
Social support scale (MPSS)	-0.04	-0.07	-0.02	0.01	-.14	**<.001**
Social network scale (Lubben)	-0.01	-0.06	0.03	0.02	-.03	.531
Social activity scale (SAL)	-0.03	-0.07	0.01	0.02	-.06	.133
Less social support	2.53	1.53	3.54	0.51	.20	**<.001**
Less social network	0.85	0.06	1.65	0.40	.08	**.035**
Less social activity	0.50	-0.19	1.18	0.35	.05	.157
Model 4 (Constant)	-1.32	-3.18	0.53	0.95		.162
Female	0.56	0.01	1.11	0.28	.06	**.045**
Mental health diagnosis	1.34	0.75	1.94	0.30	.13	**<.001**
18 to 24 years	0.89	-0.32	2.09	0.62	.06	.150
25 to 44 years	1.27	0.29	2.25	0.50	.14	**.011**
45 to 64 years	0.32	-0.65	1.28	0.49	.04	.519
Social support scale (MPSS)	-0.01	-0.03	0.01	0.01	-.04	.302
Social network scale (Lubben)	-0.01	-0.05	0.02	0.02	-.03	.445
Social activity scale (SAL)	-0.04	-0.07	0.00	0.02	-.07	**.031**
Less social support	0.97	0.11	1.82	0.44	.07	**.028**
Less social network	0.55	-0.11	1.22	0.34	.05	.103
Less social activity	-0.20	-0.78	0.38	0.30	-.02	.508
Coping - self-distraction	0.28	0.10	0.45	0.09	.10	**.002**
Coping - denial	0.39	0.11	0.67	0.14	.08	**.006**
Coping - venting	0.38	0.15	0.62	0.12	.11	**.001**
Coping - substance use	0.07	-0.12	0.27	0.10	.02	.470
Coping - disengagement	0.80	0.51	1.08	0.15	.21	**<.001**
Coping - self-blame	0.69	0.46	0.93	0.12	.22	**<.001**

Note. R^2 = .13 for model 1, ΔR^2 = .04 for model 2, ΔR^2 = .13 for Model 3, ΔR^2 = .22 for Model 4.

PTSD

The multiple regression for PTSD is shown in Table 16. The regression equation was significant for all four models. Model one accounted for 20% of the variance in PTSD scores (R^2 =.20, F(2, 672) = 84.67, $p < .001$), model two accounted for 24% (R^2 =.24, F(5,669) = 42.19, $p < .001$), model three accounted for 38% (R^2 =.38, F(11,663) = 36.75, $p < .001$) and model four accounted for 56% of the variance in PTSD scores (R^2 =.56, F(17,657) = 48.72, $p < .001$). For model four, female gender, a previous mental health diagnosis, the 25 to 44 year age group, lower scores on the social support scale, a reduction in social network size since the COVID-19 pandemic, along with higher scores for the coping styles of self-distraction, denial, disengagement, and self-blame were significant predictors of PTSD symptoms in this model.

Post-traumatic growth

Multiple regression analysis was used to test which variables significantly predicted participants' ratings of post-traumatic growth (see Table 17). A significant regression equation was found for all four models. Model one accounted for 3% of the variance in post-traumatic growth scores (R^2 =.03, F(2, 670) = 10.42, $p < .001$), model two accounted for 4% (R^2 =.04, F(5,667) = 5.03, $p < .001$), model three accounted for 8% (R^2 =.08, F(11,661) = 5.20, $p < .001$) and model four accounted for 41% of the variance in post-traumatic growth scores (R^2 =.41, F(19,653) = 24.04, $p < .001$). For model four, higher scores on the social activity scale, higher scores for the coping styles of active coping, positive reframing, religion, emotional support, and lower scores for the coping styles of acceptance and humour, were significant predictors of post-traumatic growth in this model.

Table 16

Multiple regression analysis of predictors of PTSD, (p<.001 for all models)

	Unstandardized Coefficients	95.0% Confidence Interval for *B*		Std. Error	Standardized Coefficients	Sig.
	B	Lower CI	Upper CI	*SE B*	*β*	*p*
Model 1 (Constant)	10.11	9.42	10.81	0.35		<.001
Female	0.84	0.01	1.66	0.42	.07	**.047**
Mental health diagnosis	5.58	4.71	6.46	0.45	.44	**<.001**
Model 2 (Constant)	8.48	7.00	9.96	0.76		<.001
Female	0.93	0.12	1.74	0.41	.08	**.025**
Mental health diagnosis	5.19	4.32	6.06	0.44	.40	**<.001**
18 to 24 years	3.94	2.11	5.77	0.93	.21	**<.001**
25 to 44 years	2.32	0.83	3.81	0.76	.20	**.002**
45 to 64 years	0.74	-0.75	2.24	0.76	.07	.329
Model 3 (Constant)	12.57	10.33	14.82	1.14		<.001
Female	1.06	0.29	1.83	0.39	.09	**.007**
Mental health diagnosis	4.39	3.58	5.20	0.41	.34	**<.001**
18 to 24 years	3.49	1.81	5.17	0.86	.19	**<.001**
25 to 44 years	2.41	1.02	3.80	0.71	.21	**<.001**
45 to 64 years	0.27	-1.11	1.65	0.70	.02	.702
Social support scale (MPSS)	-0.06	-0.09	-0.03	0.02	-.16	**<.001**
Social network scale (Lubben)	-0.02	-0.07	0.03	0.03	-.03	.545
Social activity scale (SAL)	-0.01	-0.05	0.04	0.03	-.01	.821
Less social support	2.64	1.45	3.83	0.61	.16	**<.001**
Less social network	1.85	0.90	2.79	0.48	.14	**<.001**
Less social activity	0.65	-0.17	1.47	0.42	.05	.121
Model 4 (Constant)	4.15	1.91	6.40	1.14		<.001
Female	0.67	0.00	1.33	0.34	.06	**.049**
Mental health diagnosis	2.86	2.14	3.58	0.37	.22	**<.001**
18 to 24 years	1.41	-0.05	2.88	0.75	.08	.059
25 to 44 years	1.41	0.23	2.60	0.60	.12	**.020**
45 to 64 years	0.11	-1.06	1.28	0.60	.01	.851
Social support scale (MPSS)	-0.03	-0.05	0.00	0.01	-.07	**.030**
Social network scale (Lubben)	-0.02	-0.06	0.03	0.02	-.03	.479
Social activity scale (SAL)	-0.01	-0.05	0.03	0.02	-.01	.682
Less social support	0.82	-0.21	1.86	0.53	.05	.120
Less social network	1.48	0.68	2.29	0.41	.11	**<.001**
Less social activity	-0.10	-0.81	0.60	0.36	-.01	.776
Coping - self-distraction	0.45	0.24	0.66	0.11	.13	**<.001**
Coping - denial	0.35	0.01	0.68	0.17	.06	**.045**
Coping - venting	0.16	-0.13	0.44	0.14	.04	.272
Coping - substance use	-0.14	-0.38	0.09	0.12	-.04	.228
Coping - disengagement	0.85	0.50	1.20	0.18	.18	**<.001**
Coping - self-blame	1.09	0.80	1.38	0.15	.27	**<.001**

Note. R^2 = .20 for model 1, ΔR^2 = .04 for model 2, ΔR^2 = .14 for Model 3, ΔR^2 = .18 for Model 4.

Table 17

Multiple regression analysis of predictors of post-traumatic growth, (p<.001 for all models).

	Unstandardized Coefficients	95.0% Confidence Interval for *B*		Std. Error	Standardized Coefficients	Sig.
	B	Lower CI	Upper CI	*SE B*	*β*	*p*
Model 1 (Constant)	22.69	19.61	25.78	1.57		<.001
Female	7.31	3.65	10.98	1.87	.15	**<.001**
Mental health diagnosis	3.64	-0.25	7.53	1.98	.07	.067
Model 2 (Constant)	25.89	19.16	32.61	3.42		<.001
Female	7.26	3.59	10.93	1.87	.15	**<.001**
Mental health diagnosis	3.21	-0.73	7.15	2.01	.06	.110
18 to 24 years	1.24	-7.04	9.51	4.21	.02	.769
25 to 44 years	-3.43	-10.19	3.32	3.44	-.08	.319
45 to 64 years	-4.27	-11.03	2.50	3.45	-.09	.216
Model 3 (Constant)	8.01	-2.98	19.00	5.60		.153
Female	4.67	0.88	8.46	1.93	.10	**.016**
Mental health diagnosis	3.87	-0.09	7.83	2.02	.08	.055
18 to 24 years	2.79	-5.44	11.02	4.19	.04	.505
25 to 44 years	-1.23	-8.03	5.56	3.46	-.03	.722
45 to 64 years	-2.18	-8.92	4.57	3.44	-.05	.527
Social support scale (MPSS)	0.18	0.04	0.33	0.07	.12	**.013**
Social network scale (Lubben)	-0.13	-0.37	0.12	0.13	-.05	.304
Social activity scale (SAL)	0.49	0.25	0.73	0.12	.18	**<.001**
Less social support	2.44	-3.40	8.28	2.97	.04	.412
Less social network	-0.50	-5.13	4.13	2.36	-.01	.832
Less social activity	3.93	-0.10	7.96	2.05	.08	.056
Model 4 (Constant)	-11.65	-21.42	-1.88	4.98		.020
Female	-0.18	-3.35	2.99	1.61	.00	.911
Mental health diagnosis	0.62	-2.65	3.89	1.67	.01	.711
18 to 24 years	0.34	-6.51	7.18	3.49	.00	.923
25 to 44 years	-1.65	-7.22	3.93	2.84	-.04	.562
45 to 64 years	-0.81	-6.31	4.68	2.80	-.02	.771
Social support scale (MPSS)	0.11	-0.02	0.23	0.06	.07	.086
Social network scale (Lubben)	-0.20	-0.40	0.00	0.10	-.08	.050
Social activity scale (SAL)	0.30	0.11	0.50	0.10	.11	**.002**
Less social support	-0.67	-5.42	4.09	2.42	-.01	.783
Less social network	-2.09	-5.82	1.66	1.90	-.04	.274
Less social activity	-0.65	-3.93	2.62	1.67	-.01	.697
Coping – active coping	3.36	2.25	4.46	0.56	.26	**<.001**
Coping – planning	-0.04	-1.19	1.11	0.59	.00	.947
Coping – positive reframing	4.04	2.95	5.12	0.55	.30	**<.001**
Coping – acceptance	-1.17	-2.00	-0.35	0.42	-.10	**.005**
Coping – humour	-0.89	-1.74	-0.04	0.43	-.07	**.040**
Coping – religion	2.10	1.09	3.10	0.51	.13	**<.001**
Coping – emotional support	1.94	0.73	3.16	0.62	.14	**.002**
Coping – instrumental support	1.21	-0.21	2.64	0.73	.08	.095

Note. R^2 = .03 for model 1, ΔR^2 = .01 for model 2, ΔR^2 = .04 for Model 3, ΔR^2 = .33 for Model 4.

Discussion

Unprecedented measures, such as lockdowns and social distancing, were first implemented in early 2020, by the New Zealand government, during the COVID-19 pandemic. This research investigated the relationships between different coping styles, social support, social networks, and social activity and the mental health of New Zealanders during July and August 2020. At this point, New Zealand had successfully eliminated COVID-19 from the community (with the only cases being reported in quarantine facilities from arrivals to the country).

Our research investigated a combination of predictor variables to determine which accounted for overall wellbeing and distress (depression, anxiety, stress, PTSD, and post-traumatic growth). We hypothesised that higher levels of perceived social support, more extensive social networks, and higher social activity would be associated with lower levels of distress. In addition, we hypothesised that those who experienced a reduction in these three variables since the COVID-19 pandemic would have poorer mental health outcomes. We predicted that high perceived social support would have a stronger association with well-being than large social networks or high social activity. Furthermore, adaptive coping styles would be associated with higher levels of post-traumatic growth, and dysfunctional coping styles would be associated with higher levels of distress. Finally, we hypothesised that females (compared to males) and younger age groups (compared to older age groups) would have higher levels of distress.

Overall predictors of mental health and wellbeing

This research investigated the participants' overall predictors of depression, anxiety, stress, PTSD, and post-traumatic growth. The models were significant for every variable and explained between 41% and 56% of the variance. The combined dysfunctional coping styles accounted for the largest variance in depression, anxiety, stress, and PTSD. In contrast, adaptive coping styles accounted for the most variance in post-traumatic growth scores.

Table 18 summarises the regression analysis and shows that a previous mental health diagnosis and coping styles of behavioural disengagement and self-blame were consistently among the top five highest predictor variables for depression, anxiety, stress, and PTSD. Higher perceived social support was associated with lower levels of depression and PTSD, and social activity was associated with lower depression and stress scores. Higher distress was associated with a reduction in perceived social support (for anxiety and stress) and a reduction in social networks (for depression and PTSD). The female gender and the 25 to 44 age group were significantly predictive of stress and PTSD. Despite the 18 to 24 age group experiencing significantly higher distress levels than all other older age groups in earlier ANOVA results, it was not a significant predictor of distress in our regression analysis. Social activity and adaptive coping styles (active coping, positive reframing, religion, emotional support) were significant predictors of post-traumatic growth.

Our regression analysis also showed that despite social support, social networks, and social activity accounting for a significant proportion of the variance in wellbeing, the addition of coping styles explained significantly more of the variance (in all mental health outcomes) above and beyond all other variables including, age group, gender, and previous mental health diagnoses (see Table 18).

Table 18

Overall predictors of mental health outcomes from multiple regression analysis

Predictor variables	Depression	Anxiety	Stress	PTSD	Post-traumatic growth
Female gender			✓ 10	✓ 8	
Mental health diagnosis	✓ 5	✓ 1	✓ 4	✓ 2	
18 to 24 years					
25 to 44 years			✓ 3	✓ 5	
45 to 64 years					
Social support scale (MPSS)	✓ 3			✓ 7	
Social network scale (Lubben)					
Social activity scale (SAL)	✓ 6		✓ 9		✓ 5
Less social support since the pandemic		✓ 6	✓ 8		
Smaller social networks since the pandemic	✓ 4			✓ 6	
Less social activity since the pandemic					
Coping - self-distraction		✓ 7	✓ 6	✓ 4	-
Coping - denial		✓ 4	✓ 7	✓ 9	-
Coping - venting		✓ 5	✓ 5		-
Coping - substance use					-
Coping – behavioural disengagement	✓ 1	✓ 3	✓ 2	✓ 3	-
Coping - self-blame	✓ 2	✓ 2	✓ 1	✓ 1	-
Coping – active coping	-	-	-	-	✓ 2
Coping – planning	-	-	-	-	
Coping – positive reframing	-	-	-	-	✓ 1
Coping – acceptance	-	-	-	-	✓ 6
Coping – humour	-	-	-	-	✓ 7
Coping – religion	-	-	-	-	✓ 4
Coping – emotional support	-	-	-	-	✓ 3
Coping – instrumental support	-	-	-	-	

Note. A tick indicates a significant predictor. Predictors are numbered in order of variance explained (i.e., '1' is the largest variance). A dash indicates variables not included in multiple regression analysis for that mental health outcome.

Coping styles and mental health

As predicted, the more dysfunctional coping styles of self-blame, disengagement, venting, denial, and self-distraction (except substance use) were associated with higher levels of distress. In our regression models, self-blame and behavioural disengagement were in the top three highest predictors of distress across depression, anxiety, stress, and PTSD. In line with our other hypotheses, higher scores in more adaptive coping styles such as active coping, positive reframing, religion, and emotional support (but not planning, and instrumental support) significantly predicted post-traumatic growth in our models. In addition, lower scores in acceptance and humour also significantly predicted post-traumatic growth.

Our results were similar to Stoop-Maigret (2020), who also conducted research during the COVID-19 pandemic in New Zealand. Her results found coping styles of self-blame, disengagement, self-distraction, venting, and planning predicted higher perceived stress, and emotional support and acceptance predicted lower perceived stress. Gurvich et al. (2020) reported similar findings with the coping styles of 'positive reframing, acceptance and humour' being associated with better mental outcomes and 'self-blame, venting, behavioural disengagement, and self-distraction being associated with higher distress rates.

Dawson et al. (2020) found that 'avoidant' coping styles were associated with depression and anxiety. They also found that psychological flexibility was an independent predictor of well-being. It could be described as a 'high-order' response strategy that may contribute to the coping styles used when faced with stressors such as during the COVID-19 pandemic. Few studies have investigated coping styles and their relationship to post-traumatic growth during the COVID-19 pandemic.

Social support variables and mental health

Social support explained less of the variance than coping styles for all the regression analyses. The regression analyses revealed lower perceived social support significantly predicted depression and PTSD, not anxiety or stress. Lower social activity significantly predicted depression and stress (but not anxiety and PTSD). More extensive social networks were not protective against any of the distress variables. Social activity significantly predicted post-traumatic growth.

The results from the regression on changes in social support, social networks, and social activity since the pandemic found that decreased social support significantly predicted anxiety and stress (but not depression and PTSD). In contrast, a reduction in social networks significantly predicted depression and PTSD (but not anxiety or stress). Finally, a reduction in social activity was not a significant predictor of any mental health variables in our model.

Our results were similar to other international studies conducted during the COVID-19 pandemic in 2020, where social support was associated with lower levels of anxiety (Skalski et al., 2021, Ozmete et al., 2020, Bauer, 2020), PTSD (Skalski et al., 2021) and depression (Grey eta l., 2020; Bauer, 2020).

Gender differences in mental health

The female gender was a significant predictor of stress and PTSD only, not depression and anxiety in our regression model. Our results contrast with Gurvich et al. (2021), who found that females experienced higher depression, anxiety, and distress levels during the pandemic than males. Further international research from Giannakas et al. (2020), Wang et al. (2020), Mazza et al. (2020), and Xiong et al. (2020) all found that being female (compared to male) was associated with overall poorer mental health during the COVID-19 pandemic.

Gender differences in coping styles

Whilst gender was not a significant predictor in the regression analysis for anxiety and depression, the ANOVA analysis indicated that females scored significantly higher than males in the coping styles that accounted for variance in post-traumatic growth, such as positive reframing, religion, and emotional support. These adaptive coping styles can also associate with higher well-being (Carver, 1997). The mean score on the self-distraction coping scale (significant predictor for anxiety, stress, and PTSD in our model) was significantly higher for men than women. An explanation for the lack of significant gender differences in depression and anxiety could be that adaptive coping styles were protective of developing higher depression and anxiety scores in females (compared to males). In addition, other variables could be contributing to these gender results that were not measured in our regression models.

Our results are consistent with those (Matud, 2004) who found females traditionally score higher than males for 'emotional' coping styles (positive reframing, acceptance, religion) and social support (instrumental and emotional support). However, our findings do not support those (Matud, 2004) who found males traditionally score higher in action-oriented styles such as planning. In general, literature on coping has not examined differences between genders to a large extent. There is little consistency in measures used or agreement on what constitutes a 'coping style' (Eisenbarth, 2019).

Gender differences in social support, networks, and activity

Our ANOVA results showed that women had statistically significantly greater perceived social support, more extensive social networks and engaged in more social activity than men, although the effect sizes were small. Our research was consistent with Coventry et al. (2004), whose research with Australian participants found marginally higher social support for females compared to males. However, research surrounding gender differences in social support variables is inconsistent, with some studies showing no differences and others

consistent with our research that women receive greater support than men ((Barbee, 1993; Coventry et al., 2004).

In addition, males' and females' social networks often look different, with female networks often based on cooperation and are more intimate, conversely, males' networks are often built around sports or work activities and competition and less on emotional connection and trust. The perceived social support within social networks is usually lower for males than females (Barbee, 1993).

Age group differences in mental health

Despite the 'emerging' age group (18 to 24 years) scoring significantly higher mean scores across all measures of distress in the ANOVA analysis, it was not a significant predictor in the multiple regression analysis. Our results could be explained by the fact that the 18 to 24-year-old group scored significantly higher results (than other age groups) in several dysfunctional coping styles (in the ANOVA analysis), which predicted a large amount of the variance in distress scores in our regression models. In addition, for those who experienced a loss in perceived social support since the pandemic, the 18 to 24-year-old group had significantly higher anxiety and PTSD scores than the 'middle-aged' and 'older' age groups. Similar trends were found for ANOVA analysis of social networks and social activity.

Our results supported the "paradox of ageing" theory (Mroczek & Kolar, 1998), with 'older' adults reporting lower distress levels overall than younger age groups. Despite older people being at greater risk of getting seriously ill from COVID-19, this did not increase distress in these participants. Our findings were also similar to Li et al. (2021) and Birditt et al. (2021), who both found that despite the oldest age group having the highest risk of a poor outcome from COVID-19, they had higher well-being scores than younger age groups. The

social impact of COVID-19 public health measures (lockdowns, social distancing) and lack of adaptive coping strategies may have taken a higher toll on the younger population's wellbeing than on older groups.

Findings from Wang (2020) and Mazza (2020) were similar to our research and found that being female and young were predictors of poorer mental health during the COVID-19 pandemic. Salman et al. (2020) also found significantly higher anxiety and depression amongst young female students during the COVID-19 pandemic.

Being aged 25 to 44-years and female was associated with more stress and PTSD in our regression models. Prickett et al. (2020) found that New Zealand mothers with young children experienced decreased parenting satisfaction. Family demands increased for around 50% of parents (doubled for mothers compared to fathers) during the early stages of the COVID-19 pandemic. Work/family conflict was also associated with lower well-being and increased partner conflict (especially for mothers). Additional variables such as family and work pressure (which was not measured in our regression model) could explain some of the variance contributing to stress and PTSD in this group.

Age group differences in coping styles

Our ANOVA analysis showed the 'emerging' (18 to 24-year-olds) group scored significantly higher results in the dysfunctional coping styles of 'self-distraction', 'self-blame' (compared to all other age groups), 'venting' and 'disengagement' (compared to the 'middle aged' and 'older' age groups). The 18 to 24 years old (females only) group also had significantly higher scores on the denial coping scale than all other groups. These coping styles also predicted a large amount of the variance in distress scores in our regression models. Previous research also showed that denial and self-blame were significant predictors of stress in young female college/university students (Eisenbarth, 2019).

Being aged 18 to 24 was also associated with significantly higher scores than all other age groups for ‘instrumental support’, ‘self-distraction’, and ‘self-blame’ coping style. In addition, coping styles of ‘humour’, ‘venting’, and ‘disengagement’ were significantly higher for 18 to 24-year-olds than for the ‘middle-aged’ and ‘older’ age groups. The 18 to 24 years group’s mean ‘emotional support’ coping style scores were significantly higher than the ‘young’ and ‘middle-aged’ groups. Furthermore, being aged 25 to 44-years old was associated with significantly higher scores in coping styles of emotional support, disengagement (more than the ‘middle-aged’ group) and ‘instrumental support’ (more than the ‘middle-aged’ and ‘older’ age groups).

Overall, the 18 to 24-year-olds had significantly higher scores on numerous coping subscales than the older groups, particularly in dysfunctional coping styles. This could be because this group was experiencing higher distress levels during the COVID-19 pandemic and needed to engage in coping strategies to deal with stressors. Alternatively, dysfunctional coping styles could have contributed to higher distress levels than in older groups. Furthermore, they may have looked to their social networks for advice and support more than older groups (instrumental and emotional support coping strategies).

Our findings were consistent with Eisenbarth (2019), who also found that the coping styles of ‘self-blame’, venting’, ‘disengagement’, and ‘self-distraction’ were associated with poorer mental health outcomes in Australia. In addition, Munsell et al. (2020) found that college (university) students (mean age of 26 years) utilised ‘maladaptive’ coping styles identified by the Brief COPE scale significantly more than the general population during the COIVD-19 pandemic in the United States of America. Salman et al. (2020) found that young Pakistani students scored the highest in ‘religion’ and’ acceptance’ coping styles.

Age group differences in social support, networks, and activity

Despite 18 to 24-year-olds displaying the highest association between a loss of social support since the pandemic and higher levels of anxiety and PTSD (in our ANOVA analysis), this age group was not a significant predictor of distress in our regression model. As discussed earlier, there were differences in this age group's coping styles, which may have masked the effect of younger age accounting for more considerable variance in distress.

Our ANOVA analysis found that 'young' adults (25 to 44 years old) had more extensive social networks and perceived social support than 'middle-aged' (45 to 64 years) adults. However, there were no significant differences in social support variables between other age groups. The socioemotional selectivity theory predicts that as we age, our social networks diminish in size and become more selective, focusing on the quality of relationships rather than quantity (Carstensen, 1995; English et al., 2014). However, our research found no significant differences in the size of social networks between 18 to 24-year-olds and any of the older age groups.

ANOVA analyses also found that 'young' females had the highest association between low perceived social support and higher anxiety, stress, and PTSD levels. In addition, around 50% of 'emerging' adults' (male and female) experienced a change in their perceived social support since the COVID-19 pandemic (the largest proportion compared to all other age groups). When we looked across all groups who experienced a reduction in perceived social support since the pandemic, those aged between 18 to 24 years old had significantly higher anxiety and PTSD scores than the 'middle-aged' and 'older' age groups. Similar trends were found for social networks and social activity.

Past research has found that younger people are more socially active than older generations (Cornwell et al., 2008). However, we found older participants were significantly

more active than all younger age groups. We also found that a larger percentage of participants in the 18 to 24-year-old group had experienced a reduction in their social support, social networks and activity compared to older adults. Therefore, the public health measures to reduce social interaction during the pandemic may have had a larger impact on younger New Zealander's social activity, contributing to their poorer wellbeing and overall distress.

Future research and recommendations

This research was conducted over one time period, early in the COVID-19 pandemic in New Zealand. With the pandemic still ongoing in 2022, longitudinal studies are essential to gauge how New Zealanders are coping now, considering COVID-19 measures such as isolation, schooling disruption, social distancing, masking, and vaccine mandates being utilised. In particular, further research on the mental health impact of these public health measures on adolescents and young adults is imperative.

Further research could include additional variables such as how psychological flexibility, personality, and past trauma interacts with coping styles and social support. In addition, more research would be beneficial on how social support is utilised amongst different ethnicities in New Zealand to cope with the pandemic. Finally, it is vital to ensure New Zealanders learn adaptive coping styles as this is likely to improve overall wellbeing, especially for younger New Zealanders. The latter appear to be most at risk from the stressors and public health measures implemented in New Zealand during the COVID-19 pandemic.

Limitations

This survey was conducted when COVID-19 was not circulating in the community and may not be indicative of the well-being of New Zealanders in 2022, now over two years into the pandemic. Comparative studies often used different measurement tools for well-

being, social support, and coping, therefore, a direct contrast with other studies is difficult. In addition, cultural and ethnic factors were not considered in these results. The survey's online aspect and self-recruitment nature may have limited the pool of participants.

Limitations also included fewer participants in the ‘emerging’ and ‘older’ adult groups compared to other age groups. In addition, around 50% of participants were from one region in New Zealand (Waikato) rather than an even spread throughout the country. Our sample was approximately 2/3 female, so there was no even distribution of males and females. A further limitation was that we asked participants to report their age group rather than actual age, this limited our analysis around age as a variable. Finally, this research did not include other factors contributing to mental health, such as personality factors and past trauma.

Conclusion

This research highlighted the disproportional effect the COVID-19 pandemic was having on younger adults’ mental health and wellbeing in New Zealand during July and August 2020. Perceived social support (compared with social networks and social activity) was a buffer to poor mental health outcomes for our participants. However, dysfunctional coping styles significantly explained additional variance (in all mental health outcomes) above and beyond other variables, including age group, gender, and previous mental health diagnoses. Social activity and adaptive coping styles to deal with pandemic stressors were related to post-traumatic growth. Overall, this research highlights the need for strong social support and education on adaptive coping styles to reduce distress, particularly for the younger adult population of New Zealand.

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Appendix

Appendix A

Table A.1

Living situation of participants

Variables		n (%)
Thinking of your money situation right now, would you say:		
	I cannot make ends meet	51 (7.3%)
	I have just enough to get along	226 (32.4%)
	I am comfortable	400 (57.3%)
	Decline to answer	11 (1.6%)
	Don't know	8 (1.1%)
	Missing	2 (.3%)
	Total	698 (100%)
What is your relationship status?		
	currently married & living together, or living with someone in marital-like relationship	471 (67.5%)
	Total	698 (100%)
How many children do you have?		
	0	217 (31.1%)
	1	82 (11.7%)
	2	207 (29.7%)
	3	119 (17.0%)
	4	45 (6.4%)
	5	10 (1.4%)
	6 or more	10 (1.4%)
	Missing	8 (1.1%)
	Total	698 (100%)
How many of your children live with you?		
	0	347 (49.7%)
	1	117 (16.8%)
	2	133 (19.1%)
	3	60 (8.6%)
	4	14 (2.0%)
	5	1 (.1%)
	6 or more	1 (.1%)
	Missing	25 (3.6%)
	Total	698 (100%)
Who do you live with?		
	Alone	71 (10.2%)
	Living with family	295 (42.3%)
	Living with partner	261 (37.4%)
	Living with others	63 (9.0%)
	Missing	8 (1.1%)
	Total	698 (100%)
How much personal space do you feel you have in your home?		
	totally inadequate personal space	42 (6.0%)
	somewhat inadequate personal space	105 (15.0%)
	somewhat adequate personal space	181 (25.9%)
	adequate personal space	79 (11.3%)
	completely adequate personal space	288 (41.3%)
	Missing	3 (.4%)
	Total	698 (100.0%)
Are you currently a pet owner?		
	Yes	460 (65.9%)
	No	236 (33.8%)
	Missing	2 (.3%)
	Total	698 (100%)
Would you say your pets are?		
	Extremely important	244 (53%)
	Very important	109 (23.7%)
	Fairly important	79 (17.2%)
	Not too important	23 (5%)
	Not at all important	5 (1.1%)

Total	460 (100%)

Table A.2

Health diagnosis and mental health support practises of participants

Variables	n (%)
Do you have any diagnosed mental health conditions (e.g., depression, bipolar etc)?	
Yes	179 (25.6%)
No	517 (74.1%)
Missing	2 (.3%)
Total	698 (100%)
Do you have any other diagnosed medical or health conditions?	
Yes	232 (33.2%)
No	460 (65.9%)
Missing	6 (.9%)
Total	698 (100%)
In the past week have you done any of the following to support your mental health? (Please select all that apply):	
Taken medication (e.g., anti-depressants)	116 (16.6%)
Spoken with a psychiatrist, psychologist, or other mental health professional	43 (6.2%)
Spoken with a GP or other healthcare professional about your mental health	43 (6.2%)
Spoken to somebody on a support line via the phone.	19 (2.7%)
Accessed an online mental health programme (e.g., CBT)	5 (.7%)
Spoken with others on an online mental health forum	11 (1.6%)
Used other mental health resources (e.g., self-help books, videos, or apps)	54 (7.7%)
Spent time on self-care specifically to help your mental health (e.g., mindfulness, meditation or planning for hobbies or relaxation).	206 (29.5%)
Spent time on physical exercise specifically to help your mental health.	228 (32.7%)
Spent time playing with or petting a pet specifically to help your mental health.	164 (23.5%)
Spoken about your mental health to a friend or family member.	166 (23.8%)
None of the above.	311 (44.6%)

Table A.3

COVID-19 personal experiences, opinions of the government response and future transmission

Variables	n (%)
Thinking about your social circle, friends, and whānau. How close has COVID-19 come to you? Please select all that apply.	
I don't know anyone with COVID-19, cold or flu symptoms	348 (49.8%)
I know people with cold and flu symptoms	262 (37.5%)
I know at least one suspected case of COVID-19	33 (4.7%)
I know at least one person who was/is a confirmed case of COVID-19	98 (14%)
There is a confirmed case of COVID-19 in my household	2 (0.3%)
Don't know/Don't want to say	7 (1%)
Have you had COVID-19?	
Yes, diagnosed and recovered	2 (0.3%)
Yes, diagnosed and still ill	1 (0.1%)
Not formally diagnosed but suspected	14 (2%)
Not that I know of / No	682 (97.6%)
Are you confident that COVID-19 can be contained, and widespread community transmission prevented?	
Not confident at all	43 (6.2%)
Slightly unconfident	106 (15.2%)
Neutral	73 (10.4%)
Slightly confident	264 (37.8%)
Very confident	213 (30.5%)
I support the government's response to the COVID-19 pandemic.	
Strongly agree	408 (58.4%)
Somewhat agree	197 (28.2%)
Neither agree nor disagree	20 (2.9%)
Somewhat disagree	42 (6%)
Strongly disagree	32 (4.6%)

Table A.4.

Impact of the COVID-19 pandemic on employment

Variables	n (%)
How has your work been impacted by the COVID-19 pandemic? Please select all that apply.	
I have lost my job	49 (7%)
My working hours have been reduced	92 (13.2%)
I cannot work due to COVID-19 restrictions	11 (1.6%)
I am now working from home	58 (8.3%)
My pay has been reduced	56 (8%)
My working hours have increased	53 (7.6%)
My pay has increased	17 (2.4%)
I have a new job	15 (2.1%)
I have been promoted	5 (0.7%)
I was/am considered an 'essential worker' during Alert Level 4	161 (23%)
I was not working before the COVID-19 pandemic	70 (10%)
My work has not been impacted	187(26.8%)
I am a student	81 (11.6%)
Other	164 (23.5%)

Table A.5

Additional life stressors experienced during the COVID-19 pandemic

Variables	n (%)
Have you experienced any of the following during the COVID-19 pandemic? Please select all that apply.	
Evicted / lost accommodation	7 (1%)
Unable to access sufficient food	32 (4.6%)
Unable to access required medication	22 (3.1%)
Somebody close to you is in hospital (from COVID-19 or another cause)	38 (5.4%)
Somebody close to you has died (due to COVID-19 or another cause)	59 (8.4%)
You have personally suffered a major injury/illness	22 (3.1%)
Increased interpersonal conflict in your home	89 (12.7%)
You have felt unsafe in your home	17 (2.4%)
None of the above	479 (68.5%)
Other	67 (9.6%)

Table A.6

Correlations between coping styles and mental health outcomes

	Depression (n=694)	Anxiety (n=694)	Stress (n=694)	PTSD (n=695)	Growth (n=693)	Active Coping (n=695)	Planning (n=695)	Positive Reframing (n=695)	Acceptance (n=695)	Humour (n=695)	Religion (n=695)	Emotional Support (n=695)	Instrumental Support (n=695)	Self-Distraction (n=695)	Denial (n=695)	Venting (n=695)	Substance Use (n=695)	Disengagement (n=695)	Self-Blame (n=695)
Active Coping	.077*	.189**	.199**	.199**	.488**														
Planning	.218**	.279**	.323**	.320**	.374**	.632**	1												
Positive Reframing	.032	.146**	.148**	.168**	.520**	.546**	.527**	1											
Acceptance	.033	.039	.083*	.091*	.186**	.376**	.435**	.425**	1										
Humour	.089*	.140**	.155**	.143**	.031	.071	.173**	.223**	.239**	1									
Religion	.030	.104**	.064	.145**	.303**	.220**	.227**	.300**	.136**	.076*	1								
Emotional Support	.109**	.217**	.222**	.206**	.419**	.425**	.421**	.401**	.251**	.119**	.216**	1							
Instrumental Support	.153**	.224**	.248**	.277**	.395**	.477**	.506**	.395**	.247**	.087*	.252**	.659**	1						
Self-Distraction	.331**	.368**	.409**	.429**	.284**	.437**	.444**	.346**	.267**	.240**	.164**	.414**	.407**	1					
Denial	.307**	.338**	.337**	.293**	.161**	.148**	.201**	.146**	-.016	.056	.100**	.069	.114**	.168**	1				
Venting	.413**	.447**	.489**	.462**	.242**	.343**	.494**	.313**	.202**	.266**	.205**	.413**	.432**	.469**	.302**	1			
Substance Use	.281**	.240**	.301**	.255**	.042	.052	.152**	.064	.011	.132**	0.041	.106**	.095*	.188**	.215**	.280**	1		
Disengagement	.616**	.525**	.577**	.550**	.039	.067	.245**	.069	-.005	.158**	0.061	.117**	.164**	.342**	.406**	.477**	.369**	1	
Self-Blame	.619**	.539**	.588**	.618**	.110**	.200**	.379**	.144**	.037	.121**	.138**	.236**	.312**	.407**	.295**	.488**	.382**	.600**	1

Note. **. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Table A.7

Pearson correlations between social support, social network and social activity scales and mental health variables by age group and gender.

	Males	Females	Emerging adults (18-24 years)	Young adults (25-44 years)	Middle-aged adults (45-64 years)	Older adults (65-84 years)
Social support scale	(n=217)	(n=466)	(n=73)	(n=291)	(n=281)	(n=51)
Depression	-.371**	-.402**	-.281*	-.446**	-.396**	-.397**
Anxiety	-.175**	-.258**	-.098	-.326**	-.216**	-.173
Stress	-.234**	-.297**	-.170	-.347**	-.256**	-.307*
PTSD	-.228**	-.324**b	-.170	-.317**	-.334**e	-.251
Post traumatic growth	.184**a	.080	.029	.160**	.127*f	.149
Social network scale	(n=217)	(n=467)	(n=73)	(n=291)	(n=282)	(n=51)
Depression	-.227**	-.363**	-.254*	-.360**	-.290**	-.494**
Anxiety	-.142*	-.256**	-.162	-.247**	-.191**	-.352*
Stress	-.146*	-.259**	-.158	-.287**	-.172**	-.242
PTSD	-.123	-.274**c	-.183	-.229**	-.226**g	-.376**
Post traumatic growth	.071a	.061	-.037	.106	.119*h	.145
Social activity scale	(n=217)	(n=462)	(n=73)	(n=287)	(n=281)	(n=51)
Depression	-.231**	-.277**	-.220	-.237**	-.228**	-.522**
Anxiety	-.120	-.180**	-.236*	-.102	-.113	-.325*
Stress	-.189**	-.234**	-.191	-.205**	-.125*	-.354*
PTSD	-.092	-.228**d	-.107	-.111	-.162**e	-.490**
Post traumatic growth	.225**a	.143**	-.096	.255**	.177**f	.205

Note. a=216, b=467, c=468, d=463, e=282, f=280, g=283, h=281. ** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed)

Appendix B

Survey

The effect of social relationships and support in response to the COVID-19 pandemic in New Zealand.

So that we can better understand how New Zealanders are coping with the challenges of the COVID-19 pandemic, we invite you to participate in this University of Waikato study. We are interested in finding out how New Zealanders social relationships and supports have been impacted by the COVID-19 pandemic. In addition, we also want to understand how people are feeling and coping with the restrictions that have been adopted to try to limit the consequences of the virus.

Your participation in the study is entirely voluntary and anonymous—we won't ask your name, and you can stop any time or skip any questions you prefer not to answer. At the end, if you wish, you can follow a link to provide your e-mail to get a summary of the results of the study and/or enter a draw to win a $50 supermarket voucher; if you do, your e-mail address cannot be linked with your answers to these questions. Please only participate in this survey if you are at least 18 years old. We expect the survey will take about 15-20 minutes.

There will be some questions about yourself and your experiences recently with the COVID-19 pandemic. We will also ask about your social relationships and networks and some questions about how you've been feeling and coping during the COVID-19 pandemic.

The findings of this survey will be reported in a Master's Thesis at the University of Waikato, School of Psychology, and may also be presented at professional conferences and published in the scientific literature. All data will be reported as group patterns, so that no person will be identifiable in any reports. The data will be retained for at least five years following completion of the study. If you have any questions about the survey, please feel free to contact me (Andrea Perry) at ap173@students.waikato.ac.nz. This research is supervised by Professor Nicola Starkey (nstarkey@waikato.ac.nz). The University of Waikato Human Research Ethics Committee has approved this research project. Any questions about the ethical conduct of this research may be sent to the Secretary of the Committee, email humanethics@waikato.ac.nz. Thank you for considering completing this survey.

I agree to participate in this research and understand that I may withdraw from this study by not finishing or submitting the survey. If I have any concerns about the ethical conduct of this study, I may contact the secretary of the University of Waikato Human Research Ethics Committee via humanethics@waikato.ac.nz or by mail at Human Research Ethics Committee, The University of Waikato, Private Bag 3105, Gate 1, Knighton Road, Hamilton, New Zealand.

- Yes
- No

How old are you?

- Select age from drop down menu (if under 18 years old the survey will end).

Do you live in New Zealand?

- Yes
- No (if 'no' then the survey will end).

Study specific questions on COVID-19 pandemic

What is the current 'COVID-19 Alert Level' where you live?

- Alert level 4
- Alert level 3
- Alert level 2
- Alert level 1
- No Alert level

Thinking about your social circle, friends, and whānau. How close has COVID-19 come to you? Please select all that apply.

- I don't know anyone with COVID-19, cold or flu symptoms
- I know people with cold and flu symptoms
- I know at least one suspected case of COVID-19
- I know at least one person who had/has a confirmed case of COVID-19
- There is a confirmed case of COVID-19 in my household
- Don't know/Don't want to say

Have you had COVID-19?

- Yes, diagnosed and recovered
- Yes, diagnosed and still ill
- Not formally diagnosed but suspected
- Not that I know of / No

Are you confident that COVID-19 can be contained, and widespread community transmission prevented?

- Not confident at all
- Slightly unconfident
- Neutral
- Slightly confident
- Very confident

I support the government's response to the COVID-19 pandemic.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

How has your work been impacted by the COVID-19 pandemic? Please select all that apply.

- I have lost my job
- My working hours have been reduced
- I cannot work due to COVID-19 restrictions
- I am now working from home
- My pay has been reduced
- My working hours have increased
- My pay has increased
- I have a new job
- I have been promoted
- I was/am considered an 'essential worker' during Alert Level 4 – Lockdown
- I was not working before the COVID-19 pandemic
- My work has not been impacted

- I am a student
- Other (please specify)

Have you experienced any of the following during the COVID-19 pandemic? Please select all that apply.

- Evicted / lost accommodation
- Unable to access sufficient food
- Unable to access required medication
- Somebody close to you is ill in hospital (due to COVID-19 or another illness)
- Somebody close to you has died (due to COVID-19 or another cause)
- You have personally suffered a major injury/illness
- Increased interpersonal conflict in your home
- You have felt unsafe in your home – if someone selects this option a pop-up will include the following text of how to access help. *If you feel unsafe right now, please call the police by dialling 111. If you feel you need to talk to someone about feeling unsafe, and it is not an emergency, please call the It's Not OK family violence information line on 0800 456 450. You can also call the 2SHINE national help line on 0508 744 633.*
- None of the above
- Other (please specify)

LUBBEN SOCIAL NETWORK SCALE – REVISED (LSNS-R)

FAMILY/WHĀNAU: Considering the people to whom you are related by birth, marriage, and adoption (including those who you live with).

Q 1. How many relatives do you see or hear from at least once a month?

- none (0)
- one (1)
- two (2)
- three to four (3)
- five to eight (4)
- nine or more (5)

Q 2. How often do you see or hear from the relative with whom you have the most contact?

- less than monthly (0)
- monthly (1)
- few times a month (2)
- weekly (3)
- few times a week (4)
- daily (5)

Q 3. How many relatives do you feel at ease with that you can talk about private matters?

- none (0)
- one (1)
- two (2)
- three to four (3)
- five to eight (4)
- nine or more (5)

Q 4. How many relatives do you feel close to such that you could call on them for help?

- none (0)

- one (1)
- two (2)
- three to four (3)
- five to eight (4)
- nine or more (5)

Q 5. When one of your relatives has an important decision to make, how often do they talk to you about it?

- never (0)
- seldom (1)
- sometimes (2)
- often (3)
- very often (4)
- always (5)

Q 6. How often is one of your relatives available for you to talk to when you have an important decision to make?

- never (0)
- seldom (1)
- sometimes (2)
- often (3)
- very often (4)
- always (5)

FRIENDSHIPS: Considering all of your friends including those who live in your neighborhood…

Q 7. How many of your friends do you see or hear from at least once a month?

- none (0)
- one (1)
- two (2)
- three to four (3)
- five to eight (4)
- nine or more (5)

Q 8. How often do you see or hear from the friend with whom you have the most contact?

- never (0)
- seldom (1)
- sometimes (2)
- often (3)
- very often (4)
- always (5)

Q 9. How many friends do you feel at ease with that you can talk about private matters?

- none (0)
- one (1)
- two (2)
- three to four (3)
- five to eight (4)
- nine or more (5)

Q 10. How many friends do you feel close to such that you could call on them for help?

- none (0)
- one (1)
- two (2)
- three to four (3)
- five to eight (4)
- nine or more (5)

Q 11. When one of your friends has an important decision to make, how often do they talk to you about it?

- never (0)
- seldom (1)
- sometimes (2)
- often (3)
- very often (4)
- always (5)

Q 12. How often is one of your friends available for you to talk to when you have an important decision to make?

- never (0)
- seldom (1)
- sometimes (2)
- often (3)
- very often (4)
- always (5)

Study specific question **-** In general, has your social network (i.e., people you see or talk to on a regular basis including family, friends, workmates, neighbours, etc.) changed since the COVID-19 pandemic began?

Please think about the past 7 days. Compared to before the COVID-19 pandemic, I now see or talk to those in my social network:

- Significantly less
- Slightly less
- The same amount
- Slightly more
- Significantly more

Multidimensional Scale of Perceived Social Support (MPSS)

We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

- "1" if you Very Strongly Disagree
- "2" if you Strongly Disagree
- "3" if you Mildly Disagree
- "4" if you are Neutral
- "5" if you Mildly Agree
- "6" if you Strongly Agree
- "7" if you Very Strongly Agree

1. There is a special person who is around when I am in need.

2. There is a special person with whom I can share my joys and sorrows.

3. My family really tries to help me.

4. I get the emotional help and support I need from my family.

5. I have a special person who is a real source of comfort to me.

6. My friends really try to help me.

7. I can count on my friends when things go wrong.

8. I can talk about my problems with my family.

9. I have friends with whom I can share my joys and sorrows.

10. There is a special person in my life who cares about my feelings.

11. My family is willing to help me make decisions.

12. I can talk about my problems with my friends.

Study specific question **-** In general, has the social support available to you from a partner, family and/or friends changed since the COVID-19 pandemic began (if applicable)?

Please think about the past 7 days. Compared to before the COVID-19 pandemic,

- I have significantly less social support
- I have slightly less social support
- My social supports have stayed the same
- I have slightly more social support
- I have significantly more social support

SOCIAL ACTIVITY LOG (SAL)

THINK OF THE PAST WEEK. In the past 7 days, circle a number for how many times you:

Number of Times (select one): 0 1 2 3 4 5 6 or more

1. Went shopping with friends or family you do not live with.
2. Had friends or family come to visit.
3. Talked on the telephone or video called friends or family you do not live with.
4. Went to a movie, concert, theatre, or other cultural or entertainment musical event.
5. Went to watch a sports game.
6. Participated in sports with other people you do not live with.
7. Got emails, social media messages, letters, cards, or notes from people you know, but do not live with.
8. Went to museums, art exhibits, or similar activities.
9. Had coffee, tea, or other drinks with friends or family you do not live with.
10. Sent emails, social media messages, letters, cards, or notes to people you know but do not live with.
11. Played cards or games with people you do not live with.
12. Went to other social events (parties, meals, or other happenings) where you talked with people you do not live with.

13. Did other social activities with people you do not live with. (Select "0" if you did NO OTHER social activities other than the ones already listed

Study specific question – Now think about how socially active you were before the COVID-19 pandemic***.*** Please think about the past 7 days, compared to before the COVID-19 pandemic:

- I now do significantly more social activities.
- I now do slightly more social activities.
- I do the same number of social activities.
- I now do slightly fewer social activities than usual.
- I now do significantly fewer social activities than usual.

Brief COPE

The following questions ask how you have sought to cope with the COVID-19 pandemic. Read the statements and indicate how much you have been using each coping style.

- I haven't been doing this at all
- I've been doing this a little bit
- I've been doing a medium amount
- I've been doing this a lot

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 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 feeling escape.

10. I've been getting help and advice from other people.

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 criticizing 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 been 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 about what to do.
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.

Depression, Anxiety and Stress Scales (DASS 21)

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the **past week**. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 - Did not apply to me at all
1 - Applied to me to some degree, or some of the time
2 - Applied to me to a considerable degree, or a good part of time
3 - Applied to me very much, or most of the time

1. I found it hard to wind down
2. I was aware of dryness of my mouth
3. I couldn't seem to experience any positive feeling at all
4. I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)
5. I found it difficult to work up the initiative to do things
6. I tended to over-react to situations
7. I experienced trembling (eg, in the hands)
8. I felt that I was using a lot of nervous energy
9. I was worried about situations in which I might panic and make a fool of myself
10. I felt that I had nothing to look forward to
11. I found myself getting agitated
12. I found it difficult to relax
13. I felt down-hearted and blue
14. I was intolerant of anything that kept me from getting on with what I was doing
15. I felt I was close to panic
16. I was unable to become enthusiastic about anything
17. I felt I wasn't worth much as a person
18. I felt that I was rather touchy
19. I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)
20. I felt scared without any good reason
21. I felt that life was meaningless

The Abbreviated PCL-C - The Post-Traumatic Checklist – 6-item Civilian Version

These questions are about problems and complaints that people sometimes have in response to stressful life experiences. Please indicate how much you have been bothered by each problem in the **past month**. For these questions, the response options are:

- Not at all (1)
- A little bit (2)
- Moderately (3)
- Quite A Bit (4)
- Extremely (5)

1. Repeated, disturbing memories, thoughts, or images of a stressful experience from the past?
2. Feeling very upset when something reminded you of a stressful experience from the past?
3. Avoided activities or situations because they reminded you of a stressful experience from the past?
4. Feeling distant or cut off from other people?
5. Feeling irritable or having angry outbursts?
6. Difficulty concentrating?

Post Traumatic Growth Inventory (PTGI)

Indicate for each of the statements below the degree to which this change occurred in your life as a result of the COVID-19 pandemic, using the following scale.

- 0 = I did not experience this change as a result of my crisis.
- 1 = I experienced this change to a very small degree as a result of my crisis.
- 2 = I experienced this change to a small degree as a result of my crisis.
- 3 = I experienced this change to a moderate degree as a result of my crisis.
- 4 = I experienced this change to a great degree as a result of my crisis.
- 5 = I experienced this change to a very great degree as a result of my crisis.

1. I changed my priorities about what is important in life. (V)

2. I have a greater appreciation for the value of my own life. (V)

3. I developed new interests. (II)

4. I have a greater feeling of self-reliance. (Ill)

5. I have a better understanding of spiritual matters. (IV)

6. I more clearly see that I can count on people in times of trouble. (I)

7. I established a new path for my life. (II)

8. I have a greater sense of closeness with others. (I)

9. I am more willing to express my emotions. (I)

10. I know better that I can handle difficulties. (III)

11. I am able to do better things with my life. (II)

12. I am better able to accept the way things work out. (Ill)

13. I can better appreciate each day. (V)

14. New opportunities are available which wouldn't have been otherwise. (II)

15. I have more compassion for others. (I)

16. I put more effort into my relationships. (I)

17. I am more likely to try to change things which need changing. (II)

18. I have a stronger religious faith. (N)

19. I discovered that I'm stronger than I thought I was. (III)

20. I learned a great deal about how wonderful people are. (I)

21. I better accept needing others. (I)

Demographics

Which of the following best describes your relationship status?

- currently married & living together, or living with someone in marital-like relationship
- never married & never lived with someone in a marital-like relationship
- separated
- divorced or formerly lived with someone in a marital-like relationship
- widowed

How do you identify your gender?

- Male
- Female
- Gender diverse
- Prefer not to say

How do you describe your ethnicity? (please tick all that apply)

- New Zealand European
- Māori
- Samoan
- Cook Islands Māori
- Tongan
- Niuean
- Chinese
- Indian
- Other (Please state: eg, Dutch, Japanese, Tokelauan).

Which region do you live?

- Northland – Auckland – Waikato – Bay of Plenty – Gisborne – Hawkes Bay – Taranaki – Manawatu/Wanganui – Wellington – Tasman – Nelson – Marlborough – West Coast – Canterbury – Otago – Southland

Who do you live with?

- Alone
- Living with family
- Living with partner
- Living with others

How much personal space do you feel you have in your home?

- totally inadequate personal space

- somewhat inadequate personal space
- adequate personal space
- somewhat adequate personal space
- completely adequate personal space

How many children do you have?

0 1 2 3 4 5 6 7 or more

How many of your children live with you?

- 0 1 2 3 4 5 6 7 or more

Are you currently a pet owner?

- Yes
- No

Would you say your pets are?

- extremely important to you
- very important to you
- fairly important to you
- not too important to you
- not at all important to you

Thinking of your money situation right now, would you say:

- I cannot make ends meet
- I have just enough to get along
- I am comfortable
- Decline to answer
- Don't know

Do you have any diagnosed mental health conditions (e.g., depression, bipolar etc)?

- Yes
- No

If yes, please specify _____

Do you have any other diagnosed medical or health conditions?

- Yes
- No

If yes, please specify _____

In the past week have you done any of the following to support your mental health? (Please select all that apply):

- Taken medication (e.g., anti-depressants)
- Spoken with a psychiatrist, psychologist, or other mental health professional
- Spoken with a GP or other healthcare professional about your mental health
- Spoken to somebody on a support line via the phone.
- Accessed an online mental health programme (e.g., CBT)
- Spoken with others on an online mental health forum
- Used other mental health resources (e.g., self-help books, videos or apps)
- Spent time on self-care specifically to help your mental health (e.g., mindfulness, meditation or planning for hobbies or relaxation).
- Spent time on physical exercise specifically to help your mental health.
- Spent time playing with or petting a pet specifically to help your mental health.

- Spoken about your mental health to a friend or family member.
- None of the above.

Thank you for completing this survey. If you're having a hard time coping, please remember there are lots of people out there who can help. In New Zealand, you can call or text 1737 any time, or call Lifeline at 0800 543 354. Some good information about taking care of your mental health during the COVID-19 situation is available at: https://www.mentalhealth.org.nz/get-help/COVID-19/

If you would like to be sent a summary of the results of this study, please follow this link:[link to e-mail list]. Your contact details cannot be linked with your answers to these questions.

If you would like to enter the draw to win a $50 supermarket voucher, please follow this link:[link to competition entries]. Your contact details cannot be linked with your answers to these questions.

Appendix C

Dissemination flyer

VOLUNTEERS WANTED

Can you help us? We are interested in exploring how New Zealanders are coping during the COVID-19 pandemic.

You are invited to participate in a 15-20 minute survey to explore New Zealanders experiences during the COVID-19 pandemic.

We are also interested in how our social world and relationships have changed considering the physical and social restrictions in place.

To take this anonymous survey, use this QR code

or copy this link to your browser

https://waikato.qualtrics.com/jfe/form/SV_3DEhAxwrusRmt9z

For more information contact:

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School of Psychology

The University of Waikato

THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

This survey has received approval (HREC(Health)2020#43) from the University of Waikato Human Research Ethics Committee (humanethics@waikato.ac.nz).