

## Introduction

In early 2020 a national lockdown order was issued in the United Kingdom (UK) to reduce the spread of COVID-19, leading to concerns about how individuals would cope with the stressors of social isolation and other associated COVID-19 traumas (Holmes et al., 2020). Within the first few months of lockdown, most individuals experienced worsening mental health symptoms (Saunders et al., 2021). The changes in symptoms over time were unevenly patterned amongst different groups (Saunders et al., 2021). This raised questions as to why some groups have had worse psychological experiences than others (Jia et al., 2020).

An important psychological factor affecting the impact of stressful life events such as COVID-19 on individuals' mental health is how individuals cope with stress. Coping is broadly defined as the cognitive and behavioural efforts that individuals employ to manage stress (Lazarus & Folkman, 1991). Numerous coping styles have been identified, including self-distraction, active coping, denial, substance use, use of emotional support, use of informational support, and behavioural changes.. There is much debate as to whether certain strategies are more beneficial than others. Strategies that involve addressing and resolving stressors can be more effective than others at buffering the effects of stress and supporting mental health (Taylor & Stanton, 2007). Avoidant strategies may be helpful in reducing short term stress, but are generally considered harmful in the long term as no direct actions are taken to reduce the stressor leading to prolonged exposures to high levels of stress (Rippeto & Rogers, 1987). Individuals' stress responses may have long-term health consequences (Penley et al., 2002), and it is possible that coping with a COVID-19 related trauma in a maladaptive way could be associated with later mental health problems.

Understanding the associations of coping strategies used during COVID-19 pandemic with psychological distress is important as it could help identify social and personal resources required by individuals to mitigate psychological stress as COVID-19 continues, and in future pandemics. Therefore, the current study sought to investigate how different coping strategies were associated with the growth trajectories of anxiety and depressive symptoms in a sample of 26,505 participants tracked across 21 weeks of the pandemic in the UK. We controlled for a range of known sociodemographic, psychosocial, and COVID-19 specific trauma variables that have been previously identified as predictors of coping style. Specifically, we explored whether particular coping strategies were associated with (i) better mental health, including anxiety and depressive symptoms, when lockdown was introduced, and (ii) faster recovery from symptoms of anxiety and depressive symptoms as the pandemic continued.

## Methods

### Participants

Data were drawn from the COVID-19 Social Study; a large panel study of the weekly psychological and social experiences of over 70,000 adults (aged 18+) in the UK during the COVID-19 pandemic (details described

elsewhere (Fancourt et al., 2020). We focused on participants (N=61,586) recruited between 21<sup>th</sup> March and 14<sup>th</sup> August 2020 and restricted to those responding to the coping module in week 8 (N=29,882). 11.3% of participants withheld data on demographics and were therefore excluded, leaving an analytical sample of 26,505.

## Measures

### *Mental health*

We focused on depressive and anxiety symptoms as our measures of mental health, which were measured using the Patient Health Questionnaire (PHQ-9) (Kroenke & Spitzer, 2002) and Generalised Anxiety Disorder assessment (GAD-7) respectively. Detailed information is included in the online Supplement.

### *Coping strategy*

Coping was measured using the 28-item brief-COPE questionnaire; a short version of a well-established multidimensional measure of coping strategies (Carver et al., 1989). In line with previous research, we used a 4 factor model for our analyses: problem-focused coping (active coping, planning), emotion-focused coping (positive reframing, acceptance, humour, religion), avoidant coping (behavioural disengagement, denial, substance use), and socially-supportive coping (emotional support, instrumental support, and venting) (Nahlen Bose et al., 2015) (see online Supplement).

### *Socioeconomic and psychosocial covariates*

We identified potential confounders using directed acyclic graphs (VanderWeele et al., 2008), including a number of sociodemographic and psychosocial variables as time-invariant covariates (see online Supplement).

## Analysis

We examined mental health trajectories by coping strategy while adjusting for a number of known coping and mental health predictors. Data were analysed using growth curve modelling (see online Supplement for detail). To account for the non-random nature of the sample (N=26,505), data were weighted to the proportions of age group, gender, ethnicity, educational level, and country of living on the basis of Office for National Statistics (ONS) (Office for National Statistics, 2020).

To explore potential gender differences in our results, we repeated the analysis stratifying by gender, with male participants providing a total of 188,366 observations (N=13,385) and women participants providing 192,172 observations (N=13,120). Main analyses were carried out using Stata v15 (Statacorp, 2017).

## Results

Online supplementary Table S1 presents the demographic characteristics of the participants. Participants were most likely to use more socially-supportive coping styles, and less likely to adopt avoidant coping styles (Supplementary Table S2).

### *Coping and mental health*

Participants with greater use of problem-focused and avoidant coping had higher depressive symptoms at baseline (problem-focused  $0.59 \pm 0.16$ ,  $p < 0.001$ ; avoidant  $3.99 \pm 0.10$ ,  $p < 0.001$ ) and anxiety symptoms at baseline (problem-focused  $1.08 \pm 0.13$ ,  $p < 0.001$ ; avoidant  $3.30 \pm 0.11$ ,  $p < 0.001$ ) (Figures 1-2; for full results see Table S3). Depressive symptoms and anxiety both decreased over time, but there was no evidence that the growth rate depended on coping strategy either for depressive symptoms (problem-focused  $0.01 \pm 0.01$ ,  $p = 0.183$ ; avoidant  $-0.01 \pm 0.01$ ,  $p = 0.318$ ) or anxiety (problem-focused  $-0.01 \pm 0.01$ ,  $p = 0.241$ ; avoidant  $-0.01 \pm 0.01$ ,  $p = 0.041$ ).

Participants with greater use of socially-supportive coping also had more depressive symptoms at baseline ( $1.13 \pm 0.11$ ,  $p < 0.001$ ) and more symptoms of anxiety ( $1.09 \pm 0.09$ ,  $p < 0.001$ ). However, their symptoms decreased at a faster rate over the following weeks both for depressive symptoms ( $-0.04 \pm 0.01$ ,  $p < 0.001$ ) and anxiety ( $-0.05 \pm 0.01$ ,  $p < 0.001$ ).

Finally, participants with greater use emotion-focused coping had lower initial depressive symptoms ( $-0.61 \pm 0.10$ ,  $p < 0.001$ ) and anxiety ( $-0.61 \pm 0.09$ ,  $p < 0.001$ ), but there was no difference in the rate of change over the following weeks for depressive symptoms ( $0.00 \pm 0.01$ ,  $p = 0.318$ ) or symptoms of anxiety ( $0.01 \pm 0.01$ ,  $p = 0.111$ ).

### *Sensitivity analyses*

When stratified by gender, depression and anxiety trajectories were the same for men (Supplementary figures S1-S2). However, women's symptoms decreased at a faster rate over the follow-up period both for those individuals using higher levels of avoidant coping styles (depression:  $-0.03 \pm 0.01$ ,  $p = 0.004$ , anxiety:  $-0.03 \pm 0.01$ ,  $p < 0.001$ ) or supportive coping styles (depression:  $0.00 \pm 0.01$ ,  $p < 0.001$ , anxiety:  $-0.04 \pm 0.01$ ,  $p < 0.001$ ) (Supplementary Figures S3-S4 and Table S4).

## Discussion

This is the first study to examine how coping strategies were related to the growth trajectories of depressive symptoms and anxiety during the COVID-19 pandemic. Participants with greater use of problem-focused, avoidant, and socially-supportive coping had higher mental health symptoms at the start of lockdown in the

UK, while those with less use of emotion-focused coping had higher initial symptoms. Generally, mental distress decreased over 21 weeks as lockdown continued and was gradually eased. There was little evidence that problem-focused, avoidant or emotion-focused coping strategies were associated with the rate of change in depressive symptoms and anxiety, except in women, where avoidant coping was associated with a slightly faster rate of improvement over time. However, greater use of socially-supportive coping strategies was associated with a faster rate of improvements in depressive symptoms and anxiety over time, with these results present in both genders but particularly marked amongst women.

Problem-focused coping (e.g. actively seeking solutions to problems) and emotion-focused coping (e.g. acceptance and positive reframing) were associated with higher levels of depressive symptoms and anxiety at the start of lockdown. This is consistent with some previous findings on emotion-focused coping, but at odds with others that suggest that taking responsive approaches to stressors (i.e. problem-focused) can be beneficial in reducing psychological distress (Lazarus & Folkman, 1991; Penley et al., 2002; Suls & Fletcher, 1985). It is possible that individuals who were finding the start of the pandemic psychologically more difficult were already having to work harder to employ such coping styles to help them manage their responses at the start of lockdown. Alternatively, it is possible that problem-focused coping styles were less effective because opportunities to alter or remove the source of stress were not available in the face of an uncontrollable virus (Steptoe & Poole, 2016). Emotion-focused coping is aimed at managing the emotions associated with the stressors, rather than changing the stressors themselves, so an emphasis on addressing emotions and challenges of the pandemic may have highlighted the stressful nature of the situation (Baker & Berenbaum, 2007).

Greater use of avoidant coping was associated with higher levels of initial depressive symptoms and anxiety. This relationship is likely to be bidirectional as individuals with higher psychological distress typically choose less effective coping mechanisms (Holahan et al., 2005). Previous evidence indicates that avoidant coping is an effective strategy for denying the reality of the stressor (Skinner et al., 2003). However, over time this coping strategy has been associated with decreased psychological health in general population (Blalock & Joiner, 2000), older adults (Powers et al., 2002), college students (Penland et al., 2000), and clinical patients (Holahan et al., 1997). The combined results here did not find any meaningful difference in trajectories of mental health experiences over time, although people employing avoidant coping strategies had poorer experiences consistently across the follow-up. There was some evidence that avoidant coping was associated with relieving mental health symptoms in women. It is of note that the gender gap in symptoms of anxiety and depression was greater at the start of lockdown, suggesting women may have experienced higher levels of stressors earlier in the pandemic (e.g. balancing childcare and work) while potentially also being more reactive to those stressors (Fancourt et al., 2020). Consequently, avoidant coping may have helped to reduce the negative appraisal of these stressors, thereby supporting faster mental health recovery in women. However, while avoidant coping may be beneficial in providing short-term relief (i.e.

through distraction), long term effects may leave individuals feeling hopeless or self-blaming due to the lack of action taken to reduce the stressors (Leventhal, 1970). It is possible this study did not cover a long enough timespan to detect the long-term mental ill health effects from avoidant coping (Holahan et al., 2005).

Finally, greater use of socially-supportive coping was related to higher levels of depressive symptoms and anxiety, but people who scored higher on socially-supportive coping experienced a more rapid rate of decrease over time. Socially-supportive coping is known to be associated with good mental health maintenance (Ozbay et al., 2007). Social support has multiple dimensions including friendship network size, emotional support, and instrumental support (practical help such as money) and has been shown to help build resilience to stress (Ozbay et al., 2007). People who were more distressed initially might work harder to use socially-supportive coping strategies which, over time helped them to recover from their distress. This is supported by a general population study in China finding that people who adopted socially-supportive coping styles reported less psychological distress later on (Yu et al., 2020). Furthermore, this is consistent with data from an online peer-mentoring platform making use of social support strategies implemented after universities closed in Iran, which found similar patterns of improvements in anxiety levels of medical students over time (Kazerooni et al., 2020). Wider evidence from outside the pandemic has further indicated the benefits of social support in reducing psychological distress (Charles J. Holahan et al., 1995). High levels of social support have also been shown to buffer against the full impact of mental illness (for example, in veterans with post-traumatic stress disorder), and increase mental ill health recovery rates (Ozbay et al., 2007; Travis et al., 2004). The finding that this result was present in both genders but stronger in women is not surprising given research suggesting that women's social networks have been more disrupted during COVID-19. Therefore, lower levels of socially-supportive coping in women may have a more detrimental effect on mental health than in men.

Our analyses showed associations between coping strategies and mental health in the early weeks of lockdown and stay at home instructions. Overall, mental health symptoms improved over time, which may suggest an adaptation process similar to that experienced during other types of isolation and incarceration (Porter & DeMarco, 2019). While most coping strategies were not associated with the rate of decrease, this paper demonstrates that socially-supportive coping was associated with a greater rate of improvement in depressive symptoms and anxiety indicative of a protective effect against psychological distress, which has implications for supporting people during pandemics. Previous work during the COVID-19 pandemic found a number of predictors of avoidant coping, with higher levels being observed in people with lower socioeconomic position, mental health conditions, higher rates of loneliness, and those experiencing COVID-19 related adverse events relating to finances and basic needs (Fluharty & Fancourt, 2020). These groups have also been identified as having poorer mental health experiences during this period. Therefore, they provide a target group in need of social support, which is particularly crucial during a period of time in which social and physical distancing is constantly stressed adding to the feeling of isolation (Saltzman et al.,

2020). This suggests the importance of researching socially-supportive interventions such as connecting individuals to others digitally or through the use of community programmes (e.g. Mutual Aid and social prescribing schemes) to reach those experiencing poor mental health to try and reduce the risk of widening social inequalities in mental health as this pandemic continues (Moore & March, 2020).

### *Strengths and limitations*

This study has a number of strengths including its large sample size, its longitudinal tracking of participants' mental health across 21 weeks, and its rich inclusion of measures on psychological and social experiences during COVID-19. We measure coping, depression, and anxiety using validated measures. However, there are several limitations. First, the study did not use a random sample, but it does have good stratification across all major socio-demographic groups and analyses were weighted on the basis of population estimates of core demographics. Whilst the recruitment strategy purposively sampled from groups such as individuals from a low-income background, individuals with no or few educational qualifications, and individuals who were unemployed, it is possible that the full range of psychological experiences was not adequately captured. Second, there was a slightly greater risk of dropout amongst individuals experiencing poor mental health and it is possible that the sampling was selective towards individuals more likely to engage with positive or emotion-focused coping strategies (who were therefore happy to take part in a study on their emotions). However, our analysis made use of all available data from participants and predicted the trajectories for all individuals, even if they subsequently dropped out of the study. Additionally, we had a good spread across possible responses for each measure included in the coping questionnaire and the sample remained heterogeneous even with attrition. Third, coping was only measured at one timepoint and therefore we were not able to examine changes in coping strategy across time. Nevertheless, use of coping styles has been shown to be largely determined by trait factors such as personality and socio-demographic characteristics, with only expect minor variations to use of strategy depending on specific events during the pandemic (Fluharty & Fancourt, 2020). Fourth, coping styles are not mutually exclusive, and individuals may use a combination of coping to deal with stressors as well as change the use of coping according to specific stresses and situations. We modelled coping styles simultaneously so they adjusted for one another, but future research could explore whether particular patterns of coping styles (such as high socially-supportive coping alongside low avoidant coping) are most beneficial.

## Conclusions

Our results have implications for understanding coping behaviours during the pandemic more generally. Notably, problem-, avoidant- and emotion-focused coping strategies were not associated with faster improvements in mental health. Suggesting the adoption of one of these coping styles in itself is not necessarily a driver of improvements in mental health; rather that the specific attributes of the behaviours expressed as part of this coping style are important in themselves (Bu et al., 2020). Future studies are encouraged to examine individual propensities towards certain coping styles in combination with specific

behaviours that have been shown to be either beneficial or detrimental to mental health. This should help elucidate whether specific beneficial activities have equal benefits if undertaken as part of avoidant-focused coping strategies or either problem- or emotion-focused strategies, and therefore what the interplay is between individual coping styles and specific behaviours in affecting mental health.

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