Adolescent future thinking, its

relationship to wellbeing, and the Covid-19 pandemic

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May 2022

*Submitted in partial fulfilment of the requirements for the degree of Doctor in Clinical Psychology (DClinPsy), Royal Holloway, University of London*

**Acknowledgments**

Thank you so much to the students who came to the research session and agreed to take part. You’ve made the whole project possible, and I am very grateful for the time and effort you put into it. Thank you to the teachers that helped set everything up and agreed that it was a meaningful project and a good use of the student’s time. The project wouldn’t have been possible without you! Thank you for your interest in mental health.

A massive thank you to my supervisor Professor Andy MacLeod. Thank for your clear and calm approach and being so helpful when I was unsure about things. Thanks also to the kind and approachable course staff at Royal Holloway and to my inspiring and supportive cohort.

Thank you to my husband Rich for letting me use your Microsoft word for the last three years (or more…!). Thank you for piloting the study, for all your genuine interest and thanks for always being there to make me laugh and plan fun things with me for these past 3 years. An extra important thanks for providing top quality coffee!

Thank you to my parents who inspired and encouraged me to work towards a career in clinical psychology from when I was a teenager and supported me. Thanks for all the proof reading, brunches, and phone calls. Special thanks to my cousin Eleni for all the walks at Kenwood house and fun nights to keep me going, to my brother Costa for the best cups of tea, and the rest of my lovely family for being so supportive. Finally, thank you to all my amazing friends who are all so inspiring. Thank you for planning fun things with me and making me laugh. Thanks for wanting to hear all about the thesis and checking in on me!

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**Adolescent Future Thinking, its**

**relationship to wellbeing, and the Covid-19 pandemic**

# **Lay summary**

## **Systematic Review**

***Introduction:*** The aim of the systematic review was to explore the impact of the Covid-19 pandemic on adolescents and emerging adults. Research consistently shows that the mental health of this age group is worsening compared with previous generations. This is often attributed to the many fast-paced changes in society including the pressures that come alongside social media. Neuroscientific evidence also shows that the brain is still developing until age 25, meaning that being an adolescent or emerging adult is a vulnerable age and it is also often when mental health difficulties tend to emerge. Other systematic reviews on the pandemic have established that adolescents and emerging adults have been amongst the most affected in terms of their mental health. These reviews compare the mental health of youth to adults and other groups during the pandemic, however the most helpful way to determine the *impact* of the pandemic on a particular group involves having the same group’s mental health measured pre and post the start of the pandemic. This is referred to as longitudinal research. The current review is therefore focused on longitudinal research only.

***Methods:*** Two academic databases were searched with search terms relevant to adolescents and emerging adults, mental health, and the pandemic. Initially the search brought up 2,063 results, with 11 meeting the final criteria. Studies tended to measure mental health symptoms and difficulties such as depression, anxiety, psychological wellbeing, stress, psychotic-like experiences, and loneliness.

***Findings:*** The studies meeting the criteria represented many different countries globally, including European countries, the UK, the USA, and Australia. The most common ages represented were around the mid-teens, although the ages ranged from 13-22. Most studies measured post pandemic mental health in the initial stages of the pandemic during lockdown in May-June 2020. Pre-pandemic measures were most routinely taken in 2018/2019. Overall, most studies found that there was a significant increase in mental health problems during the pandemic, compared with before. This was true for depression, anxiety, stress, emotion dysregulation, anger, and loneliness. There was also a significant decrease in psychological wellbeing. Some studies also controlled for ‘age effects’, to account for the fact that there is a probability that people will develop mental health problems over time anyway, especially within this age range where mental health difficulties are likely to occur. These studies most often found that mental health was still found to have reliably decreased during the pandemic after controlling for this. The most significant mental health problem to have increased was depression. Further, nine studies reported on gender differences, with females having worsened mental health outcomes compared to males in eight studies

***Discussion:*** Mental health problems worsened, as did loneliness, from pre-to post-pandemic. It could be that there was an interaction between loneliness and worsened mental health symptoms, as well as other factors such as increased unhelpful use of social media, decreased meaningful activities and physical activity. This review has some limitations as it involves studies mostly undertaken during the early phases of the pandemic. It seems that mental health could have worsened further into the pandemic due to long lasting on and off again restrictions, uncertainties, and struggles to go back to a ‘normal’ life. It would be helpful to find out more about the longer-term impacts through more research. This research could be longitudinal but also include time points further into the pandemic and it would also be helpful to explore this question qualitatively using interviews.

***Conclusion****:* This research shows that mental health worsened in adolescents and emerging adults during the pandemic. This has important implications for public funding and policy for adolescent and young adult mental health.

## 

## **The study**

***Introduction:*** For teenagers, an important part of psychological wellbeing, identity development and a successful transition into being an adult is a concept referred to as future orientation. Future orientation describes how someone sees the future, what they think is likely to happen to them, and what they can achieve. This is related to so many other factors including what someone chooses to do, whether they engage in risky behaviours, planning and sense of self. It is well established that future orientation is important for a teenager’s mental health, but less is known about a part of this concept called future thinking. Future thinking may refer either to the number of future thoughts someone has (these can be either positive or negative) or refer to the types of thoughts they have about the future (i.e., themes). In this study, we therefore explored the relationships with future thinking, depression, anxiety, and psychological wellbeing. Further, one factor known to impact on future orientation is stress, and because of the Covid-19 pandemic, we were interested in whether teenagers’ future thoughts would be related to the pandemic or not, and whether this impacted on their mental health.

***Methods:*** In a school setting, 16–18-year-olds were asked to complete a task designed to elicit their future thinking in terms of things that they were looking forward to and things that they were not looking forward to (these were positive and negative conditions of the task, respectively), as well as asking them to do this for different time periods (the next week, the next year, and the next 5-10 years). Following this they rated whether each response was ‘Covid-related’ or not. They then completed established questionnaires that measure symptoms of depression, anxiety, psychological wellbeing (flourishing) and positive/negative emotions. The researchers then counted their responses and coded them into themes.

***Results:***

* Higher psychological wellbeing (flourishing) was correlated with having more positive future thoughts, but no other relationships were found with the positive and negative conditions overall.
* Anxiety was correlated with more positive Covid-related future thoughts, but again no other overall relationships were found.
* When separating out the different time periods for future thinking, more relationships were found, indicating that the nearer future might be more important for teenagers. For example, higher flourishing was associated with positive future thoughts in the next week and higher depression was associated with more negative future thoughts in the next week. Covid-related negative future thoughts in the next week were also associated with higher negative emotions and anxiety.
* Flourishing was also associated with more positive thoughts in the distant future therefore again indicating that flourishing has a stronger relationship with future thinking.
* Coding of future thoughts into themes showed that Achievement and Intrapersonal thoughts seemed most important to the adolescents as they came up most frequently and had the greatest relationship to emotions/anxiety.
* An additional and somewhat unexpected finding was that the overall mental health of the teenagers was poorer than what would usually be expected.

***Discussion and conclusions:*** This study provides evidence that future thinking is important for the overall mental health of adolescents, especially thoughts related to the nearer future. This is probably at least partly because the brain is still developing. This connects with other research that shows that teenagers see the distant future as further away than adults and are generally more present focused. It seems that flourishing has the strongest association overall to positive future thinking in adolescents. The study also provided some evidence that Covid-related future thoughts *in the near future* are related to high anxiety and negative emotions. This shows one way that the pandemic has affected thinking and wellbeing. The poor mental health of the teenagers overall could be attributed to the timing of the study which was well into the Covid-19 pandemic after multiple lockdowns and restrictions. These findings have important implications for psychological therapies and interventions, showing what areas could be targeted and how therapies can be adapted for teenagers. It was concluded that further research is needed to further explore these relationships.

## **Integration, impact, and dissemination**

***Integration*:** The research topic overall combines a focus on young people, an already vulnerable population, and the Covid-19 pandemic. The systematic review has brought to light important longitudinal changes and has shown that mental health has worsened. The study has linked this to other research on future thinking and psychological wellbeing.

***Impact*:** The findings have the potential to impact at multiple levels, this includes but is not limited to:

* Young people themselves and their families, for example the systematic review findings serve to normalise any worsened mental health following the start of the pandemic which, in itself, can often be a therapeutic technique to reduce feelings of blame or stigma.
* Clinicians and mental health professionals, for example to highlight the importance of considering the impact of the pandemic in their therapeutic work with young people, as well as considering the importance on wellbeing and identity development of thoughts/themes related to the near future.
* Systems working with young people such as schools, workplaces, and universities, for example to invest into their mental health by funding group-level interventions, support groups, and mental health education.
* Public policy and funds for mental health provisions such as for Child and Adolescent Mental Health Services (CAMHS) and specialist services for emerging adults.
* Focusing on adolescent and emerging adult’s mental health in the event of future pandemics/disasters.

***Dissemination:*** A presentation of the findings and clinical implications of the research has been given to trainee and qualified Clinical Psychologists in a university setting and to NHS CAMHS clinicians. A summary will also be sent to the students who took part and to their teachers, as well as adolescent and emerging adult charities and relevant media outlets. Academic journals and conferences that are relevant to the research will be approached for publication.

**How has the Covid-19 pandemic affected the mental health of adolescents and emerging adults (aged 13-25)?**

# **Systematic Review**

## **Abstract**

The unprecedented Covid-19 pandemic has affected lives globally, and cross-sectional research has concluded that adolescents and emerging adults have been the amongst the most adversely affected in terms of their mental health. This is an already vulnerable population for emergent mental health difficulties. The aim of this review was to ascertain the impactof the pandemic on this population’s mental health (ages 13-25) using solely longitudinal research. Most of the pandemic research has involved retrospective reports on mental health or utilised cross-sectional designs which come alongside more problematic methodological limitations when assessing impact. Searches on databases PsychINFO and WebofScience were conducted using search terms related to adolescents and emerging adults, the pandemic and mental health. The search yielded 2,063 results. Of these 11 studies met criteria for the current review. Key constructs measured included depression (n=8), anxiety (n=4), psychological wellbeing (n=5), psychotic-like experiences (n=1), personality difficulties/factors (n=2), stress (n=2), loneliness (n=2) emotional dysregulation (n=1), anger (n=1) and internalising symptoms (n=1). Studies represented many different countries globally and sample sizes tended to be relatively small, with mid-teens being the most common age range. Most of the follow up measures were taken in the early stages of the first lockdown in May/June 2020. Studies were assessed for risk of bias, four studies were low risk, three were moderate risk and four were high risk of bias. Most studies (n=9) showed a significant increase in mental health difficulties and/or a decrease in wellbeing from pre- to post-pandemic with only a few exceptions (e.g., psychotic-like experiences, countries with no remote learning/less restrictions). Depression showed the greatest increase. Nine studies reported on gender differences, with females having worsened mental health outcomes compared to males in eight studies. These findings have important implications for public funding in mental health provisions for adolescents and emerging adults. Further research is needed to ascertain the longer-term impacts of the pandemic.

## **Introduction**

On 11th March 2020, the World Health Organisation (WHO) declared Covid-19 a global pandemic (World Health Organisation, 2020). Since then, there have been multiple lockdowns/home quarantine orders, social distancing regulations and other restrictions to help prevent the spread of the virus. These however also resulted in significantly increased social isolation. Children and adolescents were taken out of schools for the first time, which not only resulted in their education being disrupted, but altered their daily routines, interrupted contact with peers/teachers and reduced physical activity and recreation. As a consequence of the restrictions, people struggled to access physical and mental health care, support from social networks, community groups, learning, employment, and recreational activities. Overall, this seems to have created a sense of global collective trauma (Duane et al., 2020;Silver, 2020). Resulting anxiety has been multifaceted; anxiety may relate to the virus itself (e.g., contracting or passing on the virus, concerns about vulnerable loved ones), social isolation and socioeconomic factors (Aknin et al., 2022).

Whilst measures that were put in place were necessary to prevent and slow down an escalating health emergency, prolonged and repeated home confinement may have had unintended consequences on the populations’ immediate and longer-term mental health (Kaufman et al., 2020;Wang, et al., 2020). Quarantine due to Covid-19 has been shown to have negative effects on mental health such as increasing feelings of confusion, anger, and post-traumatic distress (Brooks et al., 2020), with duration of quarantine, fear of infection, boredom, frustration, lack of information, financial difficulties and stigma increasing the risk of negative psychological outcomes (Hossain, et al., 2020). A recent meta-analysis indicated that symptoms of anxiety, depression, stress, and sleep difficulties are common responses to the pandemic (Rajkumar, 2020). Matched group studies have shown a three-fold increase in depression symptoms during the pandemic (Ettman et al., 2020; Ebrahimi et al., 2021), a four-fold increase in psychological distress (McGinty et al., 2020) and significantly higher levels of anxiety (Fujiwara et al., 2020). Longitudinal data in adult samples also shows that mental distress has significantly increased (Pierce et al., 2020a). The Opinions and Life Survey also suggests that depression was still higher than expected in early 2021 (21% scoring above clinical cut offs for depression rather than the usual expected pre-pandemic 10%) (ONS, 2021). Further, previous research on other health emergencies and disasters has shown a detrimental effect on mental health (Furr et al., 2010; Sprang and Silman, 2013; Tang et al., 2014; Tang et al., 2017). This indicates the need for attention and resources for mental health difficulties and for provision of services.

**The Covid-19 pandemic and young people**

Young people may have been amongst the least affected by the pandemic in terms of their physical health, but they may have been amongst the most affected in terms of their mental health and quality of life (Jia et al., 2020, Alonzi et al., 2020,Evans et al., 2021; O’Connor et al., 2020; Smith et al., 2020). The pandemic has forced adolescents and emerging adults to be away from their peers at a critical time in their cognitive, emotional, and physical development, social changes, and other transitions. Adolescence is a time where identity formation is key (Erikson, 1969) meaning formative years have been disrupted. The World Health Organisation describes adolescence as critical, with a rate of growth and change that is second only to infancy (Villaruel and Lerner, 1994). These changes are driven by biological processes (Kipke, 1999) and mean that adolescents are especially vulnerable to any risks to wellbeing (Kleinert, 2007). Emerging adults (18-25 years) are also at a distinct period of development, with continued identity development, and role exploration, coming alongside its own vulnerabilities (Arnett, 2000).

Adolescents would have experienced social isolation at a time when social connection is imperative (Blakemore and Mills, 2014), when conflict with their parents or caregivers is elevated (Branje, 2018), and at a time where they are vulnerable to emerging mental health difficulties, creating a long-term vulnerability to mental health problems (Paus et al., 2008). Further, previous research on other disasters has found that young people respond differently to adults, with more severe psychological difficulties and longer-term difficulties such as generalisations of developed fears (Evans and Oehler-Stinnett, 2006;Norris et al., 2002a; Norris, et al., 2002b).

Neuropsychological research has shown that the brain does not stop maturing and developing until age 25 (Sylvester, 2007) and therefore adolescence can be seen to last until early adulthood. During this time the brain is undergoing numerous changes that help multitasking, problem solving, and the ability to process complex information (Dahl, 2003). The prefrontal cortex specifically is known to be one of the final parts of the brain to mature and continues to develop until emerging adults are 25 years old (Casey et al., 2008). The prefrontal cortex is involved in abstract thought, cognitive analysis, and the moderation of socially appropriate behaviour in social situations and in making complex judgments in difficult situations (Arain et al., 2013). In this context, young people may be more vulnerable to the negative consequences of lockdowns and social distancing because they have not yet developed their ‘mature’ coping skills as coping is a developmentally acquired skill (Fields and Prinz, 1997). A recent meta-analysis of global prevalence of depression and anxiety symptoms in children and adolescents found that 1 in 4 youth globally are experiencing clinically significant depression symptoms and 1 in 5 are experiencing clinically significant anxiety symptoms. This is around double that of pre-pandemic estimates. They also found that depression and anxiety symptoms were higher further into the pandemic and that depression symptoms were more common in older children and in girls (Racine et al., 2021).

Much of the current research in relation to adolescents and emerging adults has been cross-sectional research across different groups of young people which has helped to understand moderating and protective factors. A systematic review focused on these types of studies, found that already vulnerable groups such as LGBTQI+, females, ethnic minorities and those with pre-existing health or mental health conditions have been found to fare worse during the pandemic in terms of their mental health (Samji et al., 2021). Neurodiverse groups also have been shown to display worsened mental health (Nonweiler et al., 2021). Other moderating factors have been shown to be increased screen time and higher levels of sedentary activity, both being associated with worsened mental health outcomes (see systematic reviews: Chawla et al 2021; Samji et al., 2021).

**The unique pressures for current youth**

Even prior to the onset of the Covid-19 pandemic emerging, research over the last couple of decades shows that young people’s mental health is worsening. A recent longitudinal UK study found that mental health difficulties have worsened in recent years. They found that levels of depression have increased from 9% for young people born in the early 1990’s to almost 15% for those born at the turn of the millennium and rates of self-harm had risen from 12% to 14%. This study also found that body image of younger people was worse, as was sleep (Patalay and Gage, 2019). Other research has consistently found that young people’s mental health is worsening in the UK (Fink et al., 2009,Collinshaw et al., 2010), as well as in other countries (Twenge et al., 2010; Hagquist, 2010).

An international systematic review repeated this finding, concluding that internalising symptoms seem to be increasing when comparing mental health in this century to the previous century (Bor et al., 2014). Changes in society contributing towards these difficulties have been the vast increase in exposure to screens and technology, internet use and social media. This has meant young people are less active and may feel more isolated and may struggle with pressures related to social media (Carli et al., 2014). There have also been heightened academic pressures than previous generations experienced (West and Sweeting, 2003). This highlights how young people’s mental health is increasingly pertinent, with the pandemic being yet another added stressor.

Mental health is a critical component of overall wellbeing and is entangled with physical health (World Health Organisation, 1948; Patel et al., 2018). Clinical mental health problems affect our ability to have well-rounded lives, to work, to achieve meaningful life goals, and are connected to high rates of mortality (e.g., Chida and Steptoe, 2008;Howel, et al., 2007;Keyes and Simoes, 2012), reflecting a huge amount of suffering. Social and psychological interventions are therefore paramount in tackling the decline in mental health and understanding the impact of the pandemic is a key factor in assisting with this.

**The present review**

The present review focuses on adolescents and emerging adults’ mental health (13-25). This is related to the neuropsychological definition that cognitive development continues until 25, and that this is an important life stage related to many transitions and pressures. Adolescence and emerging adulthood are therefore critical periods of development, which can be related to and influence the likelihood, severity, and course of mental health problems (Kessler et al., 2007; Kessler et al., 2012). There are considerable methodological difficulties when ascertaining the impact of the pandemic on mental health (Robinson et al., 2022). Much of the current research is cross-sectional, in that it compares groups in the present and is able to elucidate who fares worse (e**.**g., see systematic reviews Samji et al., 2021; Chawla et al., 2021), or is based on retrospective reports on mental health (e**.**g., seesystematic reviews; Samji et al., 2021; Chawla et al., 2021;Ceilo et al., 2021). Retrospective reports are prone to substantial bias and are therefore considerably unreliable (Ban-Zeev et al., 2009). Other research has compared different samples pre-and post-pandemic (McGinty et al., 2020;Daly et al., 2021;and reported in systematic reviews such as Samji et al., 2021; Chawla et al., 2021; Ceilo et al., 2021). This again comes with methodological constraints such as the difference between the samples, how they have been selected and recruited, and demographic differences between them (Pierce et al., 2020b;Robinson et al., 2022).

A sounder way of measuring the impact of the pandemic is by using longitudinal studies which can illustrate how mental health has shifted over time in the same samples pre-and post-pandemic. These can more accurately ascertain the time course of mental health alongside the pandemic (Robinson et al., 2022). Although these studies still come alongside methodological constraints (such as other factors affecting mental health alongside/instead of the pandemic), they provide a stronger way of elucidating the impact of the pandemic. Most systematic reviews on mental health and young people during the pandemic do not solely focus on longitudinal studies, and mostly include non-longitudinal cross-sectional research and retrospective reports, and therefore their pandemic inferences are weaker (e**.**g., Cielo et al., 2021; Jones et al., 2021; O’Reilly et al., 2020; Chawla et al., 2021; Samji et al., 2021; Loades et al., 2021; Panda et al., 2021; Mao et al., 2021; Nearchou et al., 2020; Panchal et al., 2021; Rajmil et al., 2021; Singh et al., 2020; Marques de Miranda et al., 2020). The age group here is also more unique as most reported reviews focus either on under 18’s or young adults only. Further, there are far fewer studies providing longitudinal data in general, mostly due to the lack of available baseline data. A recent systematic review on a similar age range, including all types of studies and pre-pandemic research, concluded that there is a need for longitudinal pandemic research (O’Reilly et al., 2021). Therefore, to the author’s knowledge there is no other systematic review for this age range focused solely on longitudinal research.

In this review, it is acknowledged that mental health is a complex and multifaceted concept and mental health will be defined as encompassing mental distress and psychological wellbeing. This review will also encompass broader concepts such as loneliness, anger and emotion dysregulation that relate to mental health but are not psychological disorders. Psychological difficulties will include, but are not limited to, depression, anxiety disorders and psychosis. Psychological wellbeing may be defined as positive affect or concepts that measure flourishing or related ideas. The present review will also focus on youth reported symptoms only for a more accurate picture for this age cohort. Further, because the pandemic is likely to have affected different groups in specific ways such as neurodiversity (Breaux et al., 2021), LGBTQI+ (Krueger et al., 2021) and those with pre-existing mental health and physical health difficulties (Samji et al., 2021;), this review will focus on the general population of adolescents and emerging adults only rather than specific subgroups. Although this research is incredibly important, it is perhaps best seen as a different piece of work, each with its own important conclusions. This review therefore specifically focuses on the general population of adolescents and emerging adults globally.

## **Methods**

**Search strategy**

This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (Moher et al., 2009). The study focused on peer-reviewed, published, quantitative original longitudinal research that measured mental health pre and post the start of the Covid-19 pandemic, for 13–25-year-olds. Studies were included from March 2020, when the World Health Organisation (WHO) declared Covid-19 a global pandemic. Table 1 below shows the inclusion and exclusion criteria. The protocol was also registered on PROSPERO: <https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022295681>

**Table 1: Inclusion and Exclusion criteria**

|  |  |
| --- | --- |
| **Inclusion criteria** | **Exclusion criteria** |
| Studies published from March 2020  ***Types of studies***  Quantitative studies  Studies that directly relate to the Covid-19 pandemic since it began e.g., lockdowns, school shutdowns  Longitudinal studies including a pre-pandemic measure and at least one post-pandemic measure  Studies that measure mental health e.g., depression, insomnia, anxiety, trauma/ptsd, as a main focus of their study  Studies from any country and available in English  Studies with ‘mediating’ ‘moderating’ or ‘protective’ factors around mental health only where the study is longitudinal  ***Types of participants***  Studies including age range of 13-25  Data are self-report from the participants only  ***Types of constructs***  mental health, psychological wellbeing, loneliness | ***Types of studies***  Qualitative and mixed methods  No pre-pandemic measure  Indirect reports from third party  Studies on groups with pre-existing diagnosed difficulties such as physical health difficulties, mental health difficulties Studies on suicidality/self-harm only  Studies on mental health treatments  ***Types of participants***  Studies with where some of the sample lie outside the 13-25 age range.  Selected specific samples of groups of young people e.g., colleges students only  Studies where the main focus is not mental health |
|  |  |

**Search Guidelines**

The primary search engines that were used to identify articles were APA PsychInfo and Webofscience. The studies chosen for the review were based on the inclusion criteria above. Searches were conducted in September 2021 and were extracted from the respective databases onto the software/website Rayan. Rayan was used to when reviewing abstracts. Table 2 below shows the exact search terms used.

**Table 2: Search terms**

|  |
| --- |
| -13-25-year-olds  - Adolescen\* OR “school age” OR “young people” OR teen\* OR “gen z” OR millennial\*  -The Covid-19 pandemic  -Covid\* OR coronavirus OR pandemic OR “global pandemic” OR lockdown\*  -Mental health  -“Mental health” OR “psychological distress” OR wellbeing OR “psychological wellbeing” OR “mental disorder” OR “mental distress” OR anxiety\* OR depression OR “low mood” OR stress OR depressi\* OR “psychiatric disorder” |

**Screening guidelines**

PRISMA (Moher et al., 2009) methods were used to guide the process of the systematic review. After the initial searches, data were stored on Rayan software and duplicates were removed. All the remaining abstracts were reviewed. A selection of the original search (10%) was re-checked by another reviewer who was a Clinical Psychologist in training (190 abstracts in total). Any disagreements were discussed, and final decisions were re-evaluated by both reviewers. Only 4 disagreements were found indicating a high agreement. Full text articles of eligible abstracts were retrieved and assessed on whether they answered the research question and fulfilled the inclusion criteria. A selection of these (10%) were also re-checked by another reviewer. There were no disagreements from these. The citations of the final included papers were also searched to see if any were missed from the formal search. Two more studies were found from searching citations. These studies citations were also searched but no further studies were found. Figure 1 shows the PRISMA flow diagram.

**Figure 1: PRISMA flow diagram adapted from Moher et al., (2009)**

**Identification of studies via databases and registers**

Records removed *before screening*:

Duplicate records removed (n = 181)

Records marked as ineligible by automation tools (n = 181)

Records removed for other reasons (n = 0)

Records identified from database search: 2083

Databases (n = 2)

**Identification**

Records screened

(n = 1901)

Records excluded\*\* Did not match criteria

(n = 1835)

Reports sought for retrieval of full text:

(n = 66)

Reports not retrieved

(n =0)

**Screening**

Reports excluded (n=51):

Reason 1: sample younger than age remit either at baseline or follow up (n = 29)

Reason 2: no pre-pandemic measure or uses a different sample as a comparison group (n =14)

Reason 3: main focus was not mental health (n=9)

Reason 4: Design of study did not meet criteria: 2

Reason 5: sample university students only (n=1)

Reason 6: used parent reports (n=1)

Reason 7: duplicate found (n=1)

Reports assessed for eligibility

(n = 66)

Studies included in review

(n = 9)

Reports found in citations of included texts that were included (n=2)

Reports of included studies

(n =11)

**Included**

**Data extraction process**

Data from the studies that met criteria required for the critical appraisal of the studies were extracted from the final articles by one researcher using a pre-designed data extraction form and then entered into a summary table for comparison. The key areas included: sample, recruitment rate/attrition, country, primary measures, length of follow up pre-to post-pandemic, analysis methods and summary of results.

**Quality assessment of studies**

A similar systematic review including only longitudinal studies in relation to mental health and the Covid-19 pandemic (for all ages) created their own methods to review quality and risk of bias. This was specifically for the unique longitudinal studies examining the impact of the pandemic, which need to use samples recruited from previous mental health studies (Robinson et al., 2022). Robinson et al., (2022) “reviewed widely used methodological quality scales and risk of bias measures (e.g., Newcastle Ottawa Scale) to develop a list of bias indicators relevant to the included studies…Indicators were rated...; (i) whether the study reported representative sampling (yes = lower in risk of bias), (ii) whether the study underwent peer review (yes = lower in risk of bias), (iii) relatively low level of attrition (25%) to minimize bias on study results (yes = lower in risk of bias), (iv) whether the study had a relatively large (N ≥ 1000) sample size (yes = lower in risk of bias), (v) whether the pre-pandemic measure of mental health was collected within the last 12 months of the post-pandemic outbreak measure (yes = lower in risk of bias), (vi), whether survey delivery mode (e.g. online) was consistent across pre and post outbreak waves of data collection (yes = lower in risk of bias), (vii) whether conflicts of interest were reported (no conflicts = lower in risk of bias “ extracted from Robinson et al., (2022) pp 568.

## **Results**

Eleven longitudinal studies were included in the review (see Table 3). All studies measured pre and post pandemic mental health of adolescents and emerging adults and used data from previously registered longitudinal studies. Most of the studies measured their post-pandemic follow up in the early stages of the pandemic in 2020 when most countries had their first lockdown. Time 1 (pre-pandemic) ranged from 2015-2019, with 2018/2019 being the most common. Time 2 (post-pandemic) ranged from March 2020-November 2020 with May 2020 being the most common follow up date.

Key constructs measured included depression (n=8), anxiety (n=4), psychological wellbeing and positive affect (n=5) psychotic-like experiences (n=1), personality factors (including extroversion and neuroticism) n=2), stress (n=2), loneliness (n=2), emotional dysregulation (n=1), anger (n=1) and internalising symptoms (in reference to anxiety and depression n=1). Sample sizes varied from 136-7639, with sample sizes under 1000 being the most common. The samples were representative of many different countries including Sweden, Iceland, Germany, China, Ukraine, USA, Canada, UK, Switzerland, and Australia. The mean ages of the sample ranged from 13-22, with mid-teens being the most common age reported in the studies overall. Between 48.8% and 70.8% of each sample were female. Table 3 shows a summary of the key findings for the included studies.

**Table 3:** A summary of the results for the final included longitudinal studies evaluating mental health pre and post the start of the Covid-19 pandemic

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Authors** | **Sample** | **Recruitment rate from original sample** | **Country** | **Primary measures** | **Length of follow up and dates pre-post pandemic start** | **Analysis methods** | **Summary of results** |
| ***Upton et al., (2021***) | 443 participants  Mean age (at post-pandemic follow up) 22.0 years, SD 0.7  Recruited from a previous longitudinal study (APSALS) which were originally recruited from secondary schools | 813 participants invited,  443 took part  (54% response rate) | Australia | ***Depression:*** PHQ-9  ***Generalised Anxiety:*** GAD-7 | ***Time 1:*** August 2018–December 2019)  ***Time 2:***  18 May and 25 June 2020 | Analysis of change and logistic regression  Mixed effects logistic regression  Considered age by time interaction effect | Significant increase in depression pre (M = 6.0, s.d. = 5.9) to during the pandemic (M = 7.2, s.d. = 6.2)  after adjusting for covariates (coef 1.29; 95% CI 0.72–1.86).  The likelihood of meeting the depression cut-off was significantly higher during the pandemic (2.56; 95% CI 1.54–4.28)  Significant increase in anxiety pre (M = 5.0, s.d. = 5.2) to during the pandemic (M = 5.7, s.d. = 5.7), after adjusting for covariates (coef 0.78; 95% CI 0.26–1.31).  The likelihood of meeting the anxiety cut-off was not significantly higher during the pandemic (1.25; 95% CI 0.78–2.01).  Effect sizes not reported |
| ***Essau and de la Torre-Luque,***  ***(2021)*** | 904 participants  Mean age at Time 1 was 17.18 years and at time 2 was 19.17 years  Recruited from previous study Millennium Cohort Study (MCS) ‘sweep 7’ | 10,533 participants from original study – 904 completed Covid questionnaire    (8.6% response rate) | United Kingdom | ***Mental health difficulties:*** Strengths and Difficulties Questionnaire SDQ  ***Self-report questions***  ***Impact of Covid-19:***  K6 Kessler Distress Scale, Warwick Edinburg Mental Wellbeing Scale,  WEMWBS, PHQ-2 and GAD-2 | ***Time 1:*** (MCS sweep 7) January 2018 – March 2019  ***Time 2:*** COVID-19 Survey in May 2020. | Latent class analysis was used to identify adolescent psycho-  pathological profiles at time 1  Linear regression (K6 and WEMWBS scores) and generalised linear regression (PHQ-2 and GAD-2 scores, under gamma distribution) were used. | ***Outcomes during Covid-19 pandemic***  Regression models with the covariates explained a significant proportion of outcome variance (R 2 adj = 0.50, for mental distress; R 2 adj = 0.46, for mental wellbeing; R 2 adj = 0.35, for anxious symptoms; R 2 adj = 0.42, for depressive symptoms) indicating medium effect sizes.  ***Psychopathological profiles***  Participants were split into groups depending on scores on mental health questionnaires. Those in the high-symptom and emotion-dysregulation classes were mostly female and had a higher probability of experiencing stress, conflict and loneliness when compared with the other classes. |
| ***De France et al., (2022)*** | 136 participants  Mean age at  Wave 1 was 13.9 years SD 0.82 and at the final wave  16.21 years SD 0.97  Participants recruited from community,  who had taken part in a 2-year  longitudinal study | 184 took part in wave 1,  136 took part in wave 5.  (74% response rate) | Ontario, Canada | ***Anxiety:*** Multi-  dimensional Anxiety Scale for Children MASC  ***Depression:*** The Children’s Depression Inventory CDI  ***Emotion Dysregulation***:  The Difficulties in Emotion Regulation Scale DERS and its short form DERS-COVID  ***Questions on the impact of the pandemic*** | ***Time 1:*** 2 years before pandemic start  ***Time 2, 3 and 4***: 6 months apart  ***Time 5:*** 6 months after time 4 and during the pandemic | Linear latent growth models were used for the outcome variables  Models controlled for age and number of days since pandemic start  For other questions, t tests, Chi Square tests and correlations were used | The linear model  fit reasonably well, having a root mean square error of approximation (RMSEA) 90% confidence intervals (Cis) that reached  the lowest boundary and SRMRs below .06.  Anxiety and depression scores were significantly higher than previous trajectories would have predicted, meaning that the change could more confidently be attributed to Covid-19 than getting older  Latent growth models run separately for males and females. At Time 5, anxiety explained the following amount of variance; R 2 = .52 for males and R 2 = .68 for females (large effect sizes)  At Time 5, depression explained the following amount of variance, R 2 = .52 for males and R 2 = .80 for females (large effect sizes)  At Time 5, emotion dysregulation explained the following amount of variance, R 2 = .59 for males and R 2 = .32 for females (large effect sizes)  Adolescents who experienced lower levels of depression and emotion dysregulation symptoms at Time 1, reported the highest level of symptom increase during the pandemic in comparison to their expected scores |
| ***Romm et al., (2021)*** | 208 participants  *Mean age*(at time 2) 15.09 years SD 0.50 | 299 participated in the original study, 208 completed data for Wave 3  (69% response rate) | Mid Atlantic southeast region ofUSA | ***Depression:*** Child Depression Inventory CDI-2  ***Positive and Negative Affect:*** PANAS short form  ***Life satisfaction:*** Student’s Life Satisfaction Scale  ***Friendship and Isolation:*** Subscales from the Perth A loneliness scale  ***Reappraisal and Suppression of Negative Affect:*** Emotion Regulation Questionnaire ERQ  ***Savouring and Dampening of Positive Affect***: Positive Affect and Responses Survey PAARS  ***Eudaimonic and Hedonic Wellbeing*** motives for Activities Scale HEMA | ***Time 1***: Wave 1 and 2 were around 6 months apart  (exact dates not provided)  ***Time 2:*** Wave 3  March 26th 2019 – August 23rd 2020  (those who completed after March 2020 considered during pandemic)  Pre: n = 123  During n = 85 | Latent change score LCS models used to examine outcomes from wave 2-3  Standard model fit criteria were used, including chi-square tests, comparative fit index (CFI), Tucker–Lewis Index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). | LCS models provided a good fit to the data, (v2 / df = 1.86, RMSEA =.07, CFI =.99, TLI =.95, SRMR=.06).  Modifications showed that the LCS needed to be freed for depression, negative affect, positive affect, friendship, and isolation (Mis >10; D CFI <.01). This suggested that adolescents who completed Wave 3 during COVID-19 reported greater increases in depression, negative affect, and isolation and greater decreases in positive affect and friendship from Wave 2 to Wave 3 compared to adolescents who completed Wave 3 before COVID-19  Eudaimonic and hedonic motives were protective factors.  Effect sizes not reported |
| ***Aleksandrov and Okhrimenko***  ***(2020)*** | 152 participants  Mean age not given but sample described as between 15-17  Sample taken from adolescents who underwent “routine examination” in schools before the pandemic start | 152 potentially retained throughout study (unclear)  (Potential 100% response rate) | Ukraine | ***Neuroticism:***  Standardised  questionnaire for detecting neuroticism  ***Personality Factors:***  Multifactor Questionnaire  16-PF-form C | ***Time 1:*** November 2019  ***Time 2:*** May 2020 | Indicators subsections of questionnaires are gathered and compared  Correlational analyses also used /Spearman’s rank | All subsection indicators were pre pandemic within the ‘norm’ ranges. During pandemic all means increased, but neurasthenia and psychasthenia reached the level of clinical significance. Depression also reached ‘critical’ levels. E.g., Means compared pre and most, depression pre: 1.11, post: 3.92, neurasthenia pre: 3.53, post: 6.47, psychasthenia pre: 5.41, post 8.78, hypochondria pre: 0.85, post 3.86.  The risk of increased depression relates to emotional instability (r s= -0.164, р ≤ 0.05) and anxiety (rs = -0.213, р ≤ 0.01).  Small effect size |
| ***Sun et al., (2021)*** | 938 participants  Mean age was 17.65 years, age ranged from 14-25 | 2265 took part at time 1, 938 participated in second wave.  (41% response rate) | China | ***Psychotic like experiences***:  CAPE-P15  ***Childhood trauma:*** The CTQ  ***Resilience:***  Connor-Davidson Resilience Scale CD-RISK-10  ***Psychological Status during public health emergencies***:  PQPHE | ***Time 1:*** October 2019 – November 2019  ***Time 2:*** April 2020 – May 2020 | Paired t-tests  Participants divided into groups and then data analysed using ANOVA, Chi Square and Kruskal-Wallace H  Investigated predictors of changes using regression | PLE’s before the pandemic were significantly higher than during the pandemic (1.28 ± 0.01 vs. 1.11 ± 0.01 *t*= 16.180, *df* = 937, p< .001). This remained significantly higher even after excluding those with a relative with Covid-19 or living in Hubei (1.28 ± 0.01 vs. 1.11 ± 0.01, *t* = 16.384, *df* = 909, p < .001)  Cohen’s d (effect size) not given  All Covid-19 related psychological symptoms (including depression1.68 ± 0.14; neurasthenia 1.68 ± 0.16; fear 1.46 ± 0.12; anxiety and obsession-compulsion 1.17 ± 0.17; and hypochondriasis 0.65 ± 0.17; were most serious in the persistent group (group with highest PLE’s)  Non-PLE’s group had the best mental health during the pandemic |
| ***Alt at al.,***  ***(2021)*** | 843 participants  Mean age at Time 1 was 16.11 years SD 0.78  Age range 14 – 17  Fairpam was original study collecting data on child development | 9640 contacted from original study, 3182 participated, 843 were in middle adolescence and their data were used.  No data is provided for original number of middle adolescents who were invited so actual response rate unknown  From original data 33% response rate | Germany | ***Depression:***  German Trait Depression Scales STDS  ***Extraversion***:  Big Five Inventory short version  ***Loneliness***:  UCLA Loneliness Scale | ***Time 1: Mid*** October 2018 – mid August 2019  ***Time 2:*** Mid May 2020 – mid July 2020 | Latent change score model | The means of the latent change variables indicated an intraindividual rise of negative mood (M = .27, p < .001; 95% CI = 0.21, 0.32) and an increase of  anhedonia (M = .53, p < .001; 95% CI = 0.47, 0.59)  The mean of the change of loneliness indicated a rise of loneliness (M = .18, p < .001; 95% CI = 0.08, 0.28).  Higher extraversion  at T1 predicted a greater increase in negative  mood (b =.14, p =.003, r  = .19, 95% CI = 0.11,  0.29), more anhedonia (b= .15 p = .002, r = .20, 95% CI = 0.11, 0.32), and a higher increase of loneliness (b = .15, p< .001, r = .20, 95% CI = 0.13, 0.29).  Effect size not reported |
| ***Thorisdottir et al., (2021)*** | 7639 participants reported in final sample  Mean age is not provided, age ranges provided in two cohorts 13-15 and 16-18.  Data from Icelandic school surveys | ***13–15-year-olds:*** 11774 -7639  ***16–18-year-olds***: 9836 – 7639  Authors report that response rates of eligible participants  ranged from 63–86% | Iceland | ***Depression:***  Symptom checklist 90  SCL-90  ***Psychological Wellbeing:***  Short  Warwick Edinburgh  Mental Wellbeing Scale | ***Times for two age groups***  ***Time 1:***  ***13–15-year-olds*** Feb 2016 (n=11  774),  Feb 2018 (n=11  411)  ***Time 2:***  Sept 14–Nov 20, 2020  (n=9836),  ***Time 1:*** ***16–18-year-olds*** Oct, 2016 (n=9630),  Oct, 2018 (n=9411)  ***Time 2:***  Oct 6–Nov 20, 2020  (n=7639). | Linear mixed effects models were generated for  continuous variables    Logistic mixed effects models generated for binary outcomes | Significantly higher depressive symptoms were reported by participants in 2020 than in 2016 and  2018 for all age groups (p<0·0001, Cohen’s d ranging from  0·15 to 0·41 representing a small effect size). There was an increase of ·2% between 2016 and 2018 and of 9·5% between 2018 and 2020 (β 0·57, 95% CI 0·53–0·60)  Adjusting for gender and household  status, depressive symptoms among 13–18-year-olds  significantly increased over time, an increase of 3·2% between 2016 and 2018 and of 9·5% between 2018 and 2020  (β 0·57, 95% CI 0·53–0·60).  Psychological wellbeing significantly worsened over time (β–0·46, 95% CI –0·49 to –0·42), with an average decrease of 1·6% between 2016 and 2018  compared with  5·4% between 2018 and 2020 (Cohen’s d between -.20 - -.35 representing a small effect size) |
| ***Chen et al., (2021)*** | 1900 participants  Mean age at baseline 13.6 years SD 0.4.  Data used from longitudinal Study of Resilience and Stress STARS | 2283 in original sample, 1900 in final sample  (Response rate 83%) | Sweden | ***Stress***  ***Psychosomatic symptoms***  ***Happiness*** (the Oxford Happiness Questionnaire) | ***Time 1:*** September 2015 – June 2019  ***Time 2:*** (this was further divided into two groups Covid-19 exposed and non-Covid-19 exposed) Non Covid exposed: September 2017 – January 2020  Covid exposed: February – November 2020 | Paired Student’s t-test to compare baseline to follow up.  General linear models for repeated measures were used to examine group differences | Levels of perceived stress (p< .001), psychosomatic symptoms significantly increased (p=.007), and happiness (p< .001) and sleep (p< .001)) significantly decreased at the two-year follow up compared to baseline. T values not reported  Effect size not reported  When analysing group differences, there were *no* significant differences between the control and Covid-19 exposed groups, apart from psychosomatic symptoms (p values for each variable no longer significant). This suggests the changes over time can be attributed to age rather than Covid-19 related. |
| ***Shanahan et al., (2022)*** | 769 participants  All participants were 20 years old at baseline and 22 years at follow up  Data was used from original longitudinal study ‘Zurich Project’ | 1159 eligible from previous study, 769 in final sample  (66% response rate) | Zurick, Switzerland | ***Stress*** The perceived stress scale  ***Internalising symptoms*** Social Behaviour Questionnaire  ***Anger*** PROMIS Emotional Distress Anger Short Form | ***Time 1***: 2 years prior to follow up  ***Time 2:*** week commencing 11th April 2020, 4 weeks into Swiss lockdown | Paired t-test to compare baseline to follow up  Regression | Stress levels and anger were higher during the pandemic when comparing means (p<.001). Internalising symptoms decreased (p<.001).  Effect size not reported  Pre-pandemic distress (β = 0.34, p < 0.001) and hopelessness during the pandemic (β = 0.14, p < 0.001) were the most strongly associated with pandemic stress, anger, and internalising symptoms |
| ***Magson et al., (2021)*** | 248 participants  During follow up, mean age was 14.4 years SD .05  Recruited from original study Risks to Adolescent Wellbeing Project | 467 invited and 248 participated  53% response rate | New South Wales, Australia | ***Generalised anxiety*** The Generalised anxiety subscale  ***Depression symptoms***  The Short Mood and Feelings Questionnaire – Child Version  ***Life Satisfaction*** The Student’s Life Satisfaction Scale  ***Covid-19 related distress*** | ***Time 1:*** throughout 2019  ***Time 2:*** May 5th-May 14th 2020, two months into lockdown | Paired t-test to compare baseline to follow up  Statistical modelling – MEMCORE macro | Significant increase in depression (t(1, 247) = 6.26, p < 0.001, d = 0.15), and anxiety, (t(1, 244) = 5.26, p < 0.001, d = 0.40), and a significant decrease in life satisfaction, (t(1, 244) = −5.26, p < 0.001, d = 0.61) from pre-to post-pandemic  Covid-19 related distress significantly moderated greater increases in anxiety and depression  Effect size not reported |

**Risk of bias**

Studies were assessed for risk of bias using the adapted tool made for Covid-19 longitudinal studies by Robinson et al., (2022) illustrated in Table 4 below. Only two of the studies had low attrition, and only three had a high sample size. Seven reported a representative sample. All studies were peer reviewed and most of them (n=7) had pre-pandemic data collected within 12 months of the follow up. Four studies were low risk of bias, three were moderate risk of bias and four were high risk of bias. Some of the details were difficult to ascertain from the reported studies such as the consistency of the delivery mode of the surveys and whether the sample was representative so if this was not clear it was marked as ‘no’. The Robinson et al (2022) tool did not come with instructions for overall ratings and so as a general guide two or fewer scores of ‘no’ was judged to be low risk of bias, three scores of ‘no’ was moderate risk, four or more scores of ‘no’ was high risk of bias.

**Table 4.** Studies assessed for risk of bias using Robinson et al., (2022) framework for quality assessment

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **First Author (Year)** | **Representative sampling** | **Peer review** | **Low Attrition** | **Large Sample size** | **Pre-pandemic measure collected within 12 months of the post-pandemic measure** | **Consistency of Survey delivery mode** | **Conflicts of interests reported** | **Risk of bias/global rating** |
| Upton et al., (2021) | YES | YES | NO | NO | YES | YES | YES | LOW RISK OF BIAS |
| Essau and de la Torre-Luque, (2021) | YES | YES | NO | NO | NO | YES | YES | MODERATE RISK OF BIAS |
| De France et al., (2022) | NO | YES | NO | NO | YES | NO | NO | HIGH RISK OF BIAS |
| Romm et al., (2021) | YES | YES | NO | NO | YES | YES | NO | MODERATE RISK OF BIAS |
| Aleksandrov and Okhrimenko (2020) | NO | YES | YES | NO | YES | NO | NO | HIGH RISK OF BIAS |
| Sun et al., (2021) | NO | YES | NO | YES | YES | YES | YES | LOW RISK OF BIAS |
| Alt at al., (2021) | YES | YES | NO | NO | YES | NO | NO | HIGH RISK OF BIAS |
| Thorisdottir et al., (2021) | YES | YES | YES | YES | NO | YES | YES | LOW RISK OF BIAS |
| Chen et al., (2021) | NO | YES | NO | YES | NO | YES | YES | MODERATE RISK OF BIAS |
| Shanahan et al., (2022) | YES | YES | NO | NO | NO | NO | YES | HIGH RISK OF BIAS |
| Magson et al., (2021) | YES | YES | NO | NO | YES | YES | YES | LOW RISK OF BIAS |

**Depression**

Depression was the most widely used outcome (n=8). A wide range of questionnaires were used to measure depression. All of these were self-report and had been checked for reliability and validity which are reported in the respective studies. All studies found an increase in depression when compared pre to post the start of the pandemic (Upon et al., 2021; Essau and de la Torre-Luque, 2021; De France et al., 2022; Romm et al., 2021; Alt et al., 2021; Thorisdottir et al., 2021; Magson et al., 2021; Aleksandrov and Okhrimenko, 2020).

The studies evaluated their data in different ways. Magson et al., (2021) compared means using paired t tests and found a significant increase in depression. Two studies used regression analyses for depression and found that depression uniquely explained a significant proportion of the outcome variance with a medium effect size (Essau and de la Torre-Luque, 2021) and a large effect size for both females and males (De France et al., 2022)

Five studies used a form of linear effect modelling/latent change modelling/latent class analyses/analyses of change which help predict how participants would have been scoring, if it had not been for the pandemic, and whether they deviated from expected trajectories. Depression scores were found to be significantly higher than previous trajectories would have predicted after controlling for other factors (De France et al., 2022). Upton et al., (2021) found a significant increase in mean scores for depression from pre-to post-pandemic, after adjusting for covariates. Alt et al., (2021) also found an intraindividual increase in negative mood and anhedonia. Depression was found to be significantly higher than expected, showing that the pandemic was associated with a steeper rise in depression than the years prior (Thorisdottir et al., 2021). Romm et al., (2021) utilised two follow up groups, one that had completed follow-up measures pre-Covid-19 and another group that had completed measured post-Covid-19. They found greater increases in depression, negative affect and feelings of isolation compared to the post-Covid-19 group.

Upton et al., (2021) also reported that the likelihood of meeting the clinical threshold for depression was significantly higher during the pandemic (2.56; 95% CI 1.54–4.28). The final study also found an increase in depression symptoms but only provided descriptive statistics of the mean and did not report on statistical significance (Aleksandrov and Okhrimenko, 2020).

**Anxiety**

Four studies evaluated anxiety and a wide range of self-report questionnaires were used to measure anxiety symptoms, all of which were checked for reliability and validity. All studies measured generalised anxiety and all studies found a longitudinal increase in anxiety from pre-to post-pandemic (Upton et al., 2021; Essau and de la Torre-Luque, 2021; De France et al., 2022; Magson et al., 2021).

Again, the studies evaluated their data in different ways. Magson et al., (2021) found a significant increase in anxiety using paired t tests. Essau and de la Torre-Luque (2021) used regression models and found that anxiety explained a significant amount of the outcome variance with a medium effect size. Upton et al., (2021) used an analysis of change and reported a significant increase in generalised anxiety from pre-to post-pandemic, after controlling for covariates. They however found no significant increase in the odds of meeting the clinical threshold for anxiety from pre-to post-pandemic. De France et al., (2022) using linear modelling reported that anxiety scores post-pandemic were higher than previous trajectories would have been predicted showing large effect sizes.

**Internalising symptoms**

Shanahan et al., (2022) measured internalising symptoms. Within this construct was both depression and anxiety, as well as suicidal ideation and self-injury. They found that internalising symptoms significantly decreased from pre-to post-pandemic when comparing group means. This is contrary to most other reported data and was undertaken in Switzerland where there were fewer social restrictions in place.

**Psychological wellbeing**

Three studies measured psychological wellbeing directly and one study measured the related concept of life satisfaction. All studies found a significant decrease in psychological wellbeing from pre-to post-pandemic (Chen et al., 2021; Thorisdottir et al., 2021; Romm et al., 2021) and life satisfaction (Magson et al., 2021). One study however utilised a different design and found that this was no longer significant when they compared against their other follow up group who completed follow up measures before the pandemic started (Chen et al., 2021). This study was conducted in Sweden where there were no remote learning measures put in place for schools. Romm et al., (2021) utilised multiple measures of wellbeing, using hedonic and eudaimonic measures. They also had two follow up groups (one completed pre-Covid and one post) as well as a baseline measure. They found significant decreases in positive affect in those who completed their final wave during Covid-19. They also found that dampening of positive affect was a risk factor for worsened mental health and lower wellbeing whereas eudaimonic and hedonic motives acted as protective factors.

Thorisdottir et al., (2021), using linear effects models, were able to show that psychological wellbeing significantly worsened over time when compared to 2016-2018 and 2018-2020, being more confident to attribute changes as possibly due to the pandemic as opposed to time/age effects.

**Stress**

Two studies included established measures for stress. Both found a significant increase in stress from pre-to post-pandemic (Chen et al., 2021; Shanahan et al., 2022). After comparing their two follow up groups (one pre-and one post-Covid-19), this change did not remain significant for the Sweden study (Chen et al., 2021). It is worth noting that Chen et al., (2021) participants were adolescents who did not face remote learning restrictions and Shanahan et al., (2022) participants were emerging adults.

**Anger**

Shanahan et al., (2022) was the only study to measure anger and reported that this significantly increased using t tests from pre-to post-pandemic in their young adult sample. It should be noted that anger is an emotion and not a mental health difficulty as such but is reported here as a variable of interest in the context of a potential emotional reaction related to the pandemic.

**Loneliness**

Two studies measured loneliness, one measured loneliness more directly (Alt et al., 2021) and another measured isolation and friendship (Rom et al., 2021). Using latent change modelling, Alt et al., (2021) found a significant rise in loneliness. They also reported that higher extraversion at time 1 predicted a greater rise in loneliness. Romm et al., (2021) also found a significant increase in isolation and a decrease in friendship. This study controlled for age affects by comparing the adolescents who completed their final wave of data during the pandemic vs prior.

**Psychotic-like experiences**

One study looked at this construct. Sun et al., (2021) measured psychotic-like experiences (PLE’s) using the CAPE-15 questionnaire which has been checked for reliability and validity. They interestingly found that PLE’s before the pandemic were higher than during the pandemic and very few participants had new onset PLE’s during the pandemic. Sun et al., (2021) also found that other psychological symptoms such as depression, anxiety, obsession-compulsion, and hypochondriasis were higher in the persistent PLE group during the pandemic.

**Personality Factors**

Two studies measured personality factors. Aleksandrov and Okhrimenko, (2021) measured multiple personality factors. They found that all subsection indicators of their measure, pre-pandemic, were in the ‘normal’ range (i.e., sincerity, autonomic disturbances, neurasthenia, psychasthenia, histrionic personality, hypochondria, depression, derealisation, and depersonalisation). During the pandemic all means increased, and neurasthenia and psychasthenia reached the level of clinical significance. They however did not use further statistical analyses of comparison on this data, such as t tests, and only provided descriptive statistics for pre-to post-pandemic. It should be noted that generally personality factors are usually seen as enduring psychological aspects as opposed to markers of wellbeing, but it is reported here as a variable of interest that were noted in the studies.

Alt et al., (2021) measured extraversion but only reported on this as a moderating variable. They found that, despite extraversion usually having been a protective factor, during lockdown it was associated with greater increases in negative mood, anhedonia, and loneliness.

**Emotion Dysregulation**

One study measured emotion dysregulation using a measure checked for reliability and validity and found that emotion regulation explained a large amount of the outcome variance for both females and males, showing that emotion dysregulation was higher post-pandemic. Adolescents who reported lower levels of emotion dysregulation at time 1 reported the highest level of symptom increase during the pandemic in relation to their expected scores based on the linear modelling analysis (De France et al., 2022). This is interesting because it does not just report who fares worse, but who has the highest level of symptom increase.

**Moderating factors**

Moderating factors reported in the included studies are reported here if they have not been reported above. Four studies reported that those with higher mental health difficulty pre-pandemic had worse mental health outcomes during the pandemic (Essau and de la Torre-Luque 2021; Magston et al., 2021; Shanahan et al., 2022; Sun et al., 2021). Essau and de la Torre-Luque (2021) found that the high symptom and emotion dysregulation classes at Time 1 were associated with worse mental health outcomes during the pandemic, although the emotion dysregulation class was not related to higher levels of depression. Magson et al., (2021) showed that pandemic related distress significantly moderated greater increases in both anxiety and depression. Shanahan et al., (2022) also reported that pre-pandemic distress and hopelessness during the pandemic were the most strongly associate with pandemic stress, anger, and internalising symptoms.

De France et al., (2022) however found that adolescents who had better mental health (less depression, less emotion dysregulation) pre-pandemic had the highest level of *symptoms increase* during the pandemic. De France et al., (2022) also reported that those who felt that their lives were the most negatively impacting by the pandemic showed the most significant increases in depression and emotion dysregulation.

Rom et al., (2021) found that higher socio-economic status (SES) was associated with greater decreases in negative affect. Chen et al., (2021) however found no significant difference with SES.

Aleksandrov and Okhrimenko, (2021) used correlational analyses over their personality variables and found that the risks of psychasthenia was associated with an increase in isolation, emotional instability, anxiety, timidity, and worry. They also reported that an increase in neurasthenia is associated with an increase in emotional instability, worry and debilitating tension during the pandemic. Aleksandrov and Okhrimenko, (2021) also reported that the risk of increased depression relates to emotional instability and anxiety.

**Gender differences**

Nine studies reported on gender differences, with females having worsened mental health outcomes compared to males in eight studies (Essau and de la Torre-Luque 2021; Romm et al., 2021; Thorisdottir et al., 2021; De France et al., 2022; Alt et al., 2021; Shanahan et al., 2022; Upton et al., 2021; Magston et al., 2021). Specifically, identifying as female was associated with greater increases in negative affect (Romm et al., 2021), anxiety (Essau and and de la Torre-Luque 2021; Thorisdottir et al., 2021; De France et al., 2022; Upton et al., 2021) depression (Essau and and de la Torre-Luque 2021; Thorisdottir et al., 2021; Alt et al., 2021; Magson et al., 2021; Upton et al., 2021), internalising symptoms (Magston et al., 2021), anger (Magston et al., 2021) and lower psychological wellbeing (Essau and de la Torre-Luque 2021) .

There were some exceptions, with Chen et al., (2021) conducted in Sweden, being the only study to *not* find significant differences in gender for their mental health outcomes. Alt et al., (2021) also found no gender differences for loneliness. When examining gender differences, De France et a., (2022) found a significant increase in depression for males but not females, and a significant increase in anxiety for females but not males.

## **Discussion**

This systematic review aimed to explore the impact of the Covid-19 pandemic on adolescents’ and emerging adults’ mental health. To the author’s knowledge, this is the first systematic review that has specifically focused on longitudinal studies within this age range. Longitudinal studies give greater confidence in being able to infer the impact of the Covid-19 pandemic, as well as reducing variance arising from comparing different groups. Young people are already more vulnerable in terms of their mental health than the general population (e.g**.,** Kessler et al., 2007; Kessler et al., 2012) so the research in this area is key to be able to explore the effects of the pandemic and help to inform treatment and policy around their mental health in the future.

**Summary of key findings: Longitudinal naturalistic observations following the onset of the Covid-19 pandemic**

Most studies (n=9) showed a significant increase in mental health difficulties from pre- to post-pandemic with only a few exceptions. An increase was found overall for depression (n=8), anxiety (n=4), emotion dysregulation (n=1), stress (n=1), loneliness (n=2), anger (n=1), personality factors (e.g., neurasthenia and psychasthenia n=1), and a decrease in psychological wellbeing (n=3). This was consistent across different measures of mental health and wellbeing and across countries. Depression, and its related constructs (such as anhedonia) seems to have most reliably increased. One exception was the Chen et al., (2021) study carried out in Sweden, the only country to not impose a full lockdown and remote learning (Kavaliunas et al., 2020). This study did not find a difference for stress or happiness when they compared their follow up groups (one had been measured pre-pandemic and the other post-pandemic) (Chen et al., 2021). Another exception was a study focused on psychotic-like experiences which found that these decreased during the pandemic (Sun et al., 2021). Further, although Shanahan et al., (2022) overall found that stress and anger increased, they also reported a decrease in internalising symptoms in emerging adults. It is worth noting that this study was carried out in Switzerland where Covid-19 measures were again not as strict (Foulkes, 2021).

Where effect sizes were reported (n=4) they ranged from small (n=2), medium (n=1) and high (n=1). Aleksandrov and Okhrimenko, (2021) reported a small effect size related to a correlation between depression and emotional instability, not related to longitudinal impact of the pandemic. Thorisdottir et al., (2021) reported a small effect size for depression increasing and psychological wellbeing decreasing pre- to post-pandemic. Essau and de la Torre-Luque., (2021) report a medium effect size for depression, anxiety and mental distress increasing during the pandemic using regression coefficients. De France et al., (2022) report large effect sizes for anxiety, depression, and emotion dysregulation increasing during the pandemic. The studies also used different and multiple forms of statistical analyses, with some effect sizes not reported and so it is difficult to interpret the effect size of any changes due to the pandemic

Much of these studies took place during the first Covid-19 lockdown in 2019, and so the longer term and more pervasive impact of the Covid-19 pandemic remains unclear. There is some evidence that mental health worsened further into the pandemic for young people (Racine at al., 2021).

**Consideration of Key findings**

***Worsened mental health*:** Overall the systematic review has found evidence for worsened mental health for adolescents and emerging adults in longitudinal studies pre-to post-pandemic. Lockdowns would have led to social isolation to some degree, leaving young people with social media as one of their primary sources of communication with peers (Marciano et al., 2022). It is widely reported that social media can have a negative impact on mental health with increased time spent correlating with depression, anxiety, and distress (Keles, et al., 2020). Qualitative and quantitative research on social media and young people shows that it can have both positive and negative effects and can increase meaningful social connection when used in a certain way (Allen et al., 2014; Radovik, et al., 2017; Latif et al., 2021). However, it can also lead to difficult feelings such as ‘malicious envy’ and unhelpful comparisons (Latif et al., 2021). It is likely that social media may have had both effects on young people, and perhaps overall impacting on mental health negatively due to increased time spent on social media, and decreased time spent connecting with others. In terms of the Covid-19 pandemic specifically, a systematic review found that social media use was associated with ‘ill-being’ (Marciano et al., 2022) and that social media use increased from pre-to post-pandemic (Kerekes et al., 2021). Increases for gaming during lockdown have also been associated with higher depression and loneliness, as well as anxiety related to the pandemic in young people (Fernandes et al., 2020). Further, there is evidence that decreases in physical activity and increases in sitting (Greier et al., 2021) were associated with lower psychological wellbeing during the pandemic (Morres et al., 2021). All of these together are some associated factors for worsened mental health during the pandemic.

The studies reported here also found that feelings of loneliness increased longitudinally (Romm et al., 2021; Alt et al., 2021) being consistent across genders (Alt et al., 2021). Meaningful and satisfying social relationships are imperative for mental and physical health at any age, but particularly for adolescents (Heinrich and Gullone, 2006). Adolescents are likely to become preoccupied with social status (Parkhurst and Hopmeyer, 1999) and intimate relationships are likely to become of heightened importance during adolescence and young adulthood (Erikson, 1963). This is also a time of identity formation (Erikson, 1968), which relates to social relationships (Parkhurst and Hopmeyer, 1999). Loneliness is associated with other poor mental health outcomes, particularly in younger people (Heinrich and Gullone, 2006).Given how important this is for adolescents and emerging adults, it follows that they were amongst the most affected by the pandemic in terms of their mental health in the midst of significant social restrictions (Jia et al., 2020, Alonzi et al., 2020,Evans et al., 2021; O’Connor et al., 2020; Smith et al., 2020). Loneliness was also found to predict problematic gaming and social media use during the pandemic (Rogier et al., 2020) which was also associated with worse outcomes (Marciano et al., 2022).

In this systematic review there were only a few exceptions to the main findings that mental health worsened (Sun et al., 2021; Chen et al., 2021; Shanahan et al., 2022) which, as discussed, mostly seem to be explained by countries with less restrictions (Shanahan et al., 2022; Chen et al., 2021). One of these exceptions was psychotic like experiences which seemed to improve (Sun et al., 2021). Although this needs further research to strengthen these conclusions, it seems that staying at home could have been a protective factor for this specific symptom. Sun et al., (2021) concluded that time spent with family and reduced school stress could have been a protective factor. It would also be important to consider the longer-term impact of the pandemic on psychotic-like experiences as this effect may have been short lived when considered in light of all the other evidence of worsened mental health.

***Depression:*** Depression was most consistently shown to increase from pre-to-post pandemic (Upon et al., 2021; Essau and de la Torre-Luque, 2021; De France et al., 2022; Romm et al., 2021; Alt et al., 2021; Thorisdottir et al., 2021; Magson et al., 2021; Aleksandrov and Okhrimenko, 2020). Most studies also controlled for age effects which is important for increasing confidence to attributing any changes to the pandemic (Romm et al., 2021; De France et al., 2022; Alt et al., 2021; Thorisdottir et al., 2021). Romm et al., (2021) also utilised a strong study design where they had two follow up groups that they compared. Age effects are important because the majority of mental health difficulties are likely to emerge before 26 years of age (McGorry and Goldstone, 2011; Kessler et al., 2005).

It is well established by a long body of previous psychological research that avoidance of meaningful activities can lead to loss of achievement, pleasure, and social connection, and can in turn increase feelings of depression. Avoidance can also leave more ‘room’ for negative thoughts and rumination of painful past events, (Beck et al., 1979, Moulds et al., 2007). Even though lockdown was not necessarily a chosen ‘avoidance’, it is likely that restrictions would have had a similar impact. Behavioural theory also has shown that avoidance leads to negative reinforcement, meaning that avoidance is reinforced creating a vicious cycle, therefore making it more difficult to engage in the avoided activity in the future (Ferster, 1973; Lewinsohn, 1974; Martell et al., 2001) therefore potentially further influencing a longer lasting impact. Engagement in meaningful activity is widely used as a baseline strategy for lifting mood in evidence-based psychological therapies including Cognitive Behavioural Therapy (CBT) within behavioural activation (e.g., Beck et al., 1979; Beck 1987; Beck, 1967), and Acceptance and Commitment Therapy (ACT) in terms of moving towards valued actions, (Harris, 2007), and so largely removing this as an option could understandably have been associated with a struggle with mood. It also would make it more difficult for a mental health professional to target these areas during psychological therapies if/where the young people were seeking support.

***Anxiety:*** All studies that measured anxiety used questionnaires for generalised anxiety and found an increase from pre-to post-pandemic (Upton et al, 2021, Essau and de la Torre-Luque., 2021, De France et al., 2022). This however tended to be a smaller effect when compared to depression (Essau and de la Torre-Luque., 2021; and De France et al., 2022; Upton et al., 2021). This is consistent with another systematic review that found that longitudinal changes were more pronounced for depression, although there were still increases for anxiety (Robinson et al., 2022). This can be understood in terms of the relationship between uncertainty and anxiety. Increased uncertainty, as well as intolerance of uncertainty (here potentially in relation to the impact of Covid-19), is related to increased worry and anxiety (e.g., Dugas et al., 2004). In terms of making sense of why anxiety has typically displayed a smaller increase, there is a well-established body of research into many different subtypes of anxiety which illustrates that not being exposed to anxiety provoking stimuli and events (e.g., social events and going to public spaces), can reduce anxiety (temporarily) as it can act as a safety seeking behaviour (e.g., Salkovskis 1996; Clark and Wells, 1995). Within this idea, it would follow that anxiety could have increased when restrictions eased. Mind’s survey in June 2021 found that 55% of young adults were anxious about restrictions easing (Mind, 2021). Young Minds (2021) qualitative reports from young people also show anxieties regarding lockdown easing, “If you’re feeling anxious about lockdown easing, you’re not alone”, “The easing of lockdown restrictions has conjured up some unexpected feelings of anxiety for me”. Fitting with this idea, these statements are from 2021, more than a year into the pandemic, in contrast to the data reported here from early in the pandemic.

***Psychological wellbeing:*** Measuring psychological wellbeing is important, because is it not simply conceptualised as the absence of psychological distress. Psychological wellbeing involves positive feelings, a sense of purpose/meaning and wellbeing (e.g., Seligman, 2002, 2011, Deiner and Emmons, 1984) and so measuring this as separate construct can help draw firmer conclusions around the pandemic and its impact on mental health. Three studies found a significant decrease from pre-to post-pandemic in psychological wellbeing varying from a small to a medium effect size (Essau and de la Torre-Luque, 2021, Romm et al., 2021, Thorisdittir et al., 2021). Decreases in wellbeing be understood in terms of opportunities for wellbeing being limited such as meaningful connections with others and meaningful activities (Hooker et al., 2019). Positive psychology interventions that have been shown to increase wellbeing, such as building on optimism, cultivating gratitude, strength building and increasing meaning (e.g., Seligman, et al., 2005) would have been much more difficult to engage in during strict lockdowns where options were limited.

***Moderating factors:*** Although it was not a main focus of the review, the longitudinal studies reported here provide an opportunity for a unique insight into moderating factors.Females were found to have worsened mental health outcomes compared to males in eight studies (Essau and de la Torre-Luque, 2021; Romm et al., 2021; Thorisdottir et al., 2021; De France et al., 2022; Alt et al., 2021; Shanahan et al., 2022; Upton et al., 2021; Magston et al., 2021). These results could be indicative of the various inequalities and pressures females face such as heightened body image demands and academic pressures (West and Sweeting, 2003), which possibly worsened during the pandemic. In support of this idea, the only study to report on gender effects and not find any differences was conducted in Sweden (Chen et al., 2021), a country which could be argued to have more gender-equal policies compared with many other countries (Dudman, 2017). It is also widely established in research that females are more likely to experience mental health problems (e.g., Zahn-Waxler et al., 2008). It is also possible that during the pandemic, males and females could also have been affected in different ways, for example, there was some evidence that females are more affected in terms of anxiety and males are more affected in terms of depression (De France et al., 2022). This is line with another systematic review with young people which found that anxiety is more pronounced in females compared with gender differences across depression scores (Samji et al., 2021).

Four studies found that those with worse mental health pre-pandemic had worse mental outcomes post-pandemic (Essau and de la Torre-Luque., 2021; Shanahan et al., 2022; Sun et al., 2021; Romm et al., 2021). De France et al., (2022) however used a modelling technique that showed *steeper increases* in mental distress for those with better mental health at baseline. Cohen et al., (2021)reported similar findings in a study that compared a small group of adolescents diagnosed with clinical mental health difficulties and a non-clinical group pre-and post-pandemic. They found that there were large increases in depression and anxiety in the non-clinical group, whilst the clinical group showed high but stable symptoms over time. A major symptom of both depression and anxiety disorders is avoidance (American Psychiatric Association, 2013). It could be therefore that those without mental health difficulties at baseline saw more significant *changes* to their lives and potentially saw a steeper decline in their mental health. More research is needed in this area to explore.

**Strengths and limitations of included studies**

***Quality of the studies:*** The quality of the studies was variable, and in some instances difficult to ascertain e.g., the original (pre-pandemic) method of collecting data were not always clearly reported, or it was sometimes not clear whether the sampling was representative, and in one case, what the time points of data collection were. Many studies also failed to report effect sizes for primary outcomes, making it difficult to interpret the data fully as any small effects may indicate a more fleeting effect, and larger effects may indicate a more pervasive impact. The overall strength of the studies however is that they tended to either use designs that controlled for age effects, by having two different follow up groups (n=2) (one pre-and one post-pandemic), or by controlling for this in some way statistically (n=6), and therefore most of the studies used relatively advanced longitudinal methodology or analyses. In terms of the risk of bias quality assessment of the studies, results were again variable. This indicates the need for more high-quality longitudinal research to be able to strengthen conclusions.

***Attrition:*** The studies in this review collectively report a relatively high attrition rate. This can be problematic for longitudinal studies if the participants that complete the study are systematically different to those who do not (Pan and Zhang, 2020). Attrition is reported as it usually would be in a longitudinal study, but the unique position of these studies is that the participants would have had to sign up to a second study and so the drop out is by default higher. Attrition varied between 17% and 91.4%. There was also one study where attrition was unclear and the authors implied that there was no drop out (Aleksandrov and Okhrimenko., 2021). Studies with a higher attrition rate tended to be the larger studies (Upton et al., 2021, Essae et al., Sun et al., Alt et al), although two large studies were able to retain more participants (Thorisdottir et al., 2021, Chen et al., 2021). This could have created a bias in the studies.

Males had a higher attrition rate in most studies than females, resulting in most of the studies consisting of predominantly female samples, with females generally also reporting worsened mental health. This may have biased the results of the studies. Further, it could be that those who were struggling with the pandemic were more likely to take part in the study due to increased interest. Additionally, those who were struggling with the *most* severe symptoms may have been less likely to respond due to decreased motivation and increased avoidance that is known to accompany many mental health difficulties (e.g., Beck et al., 1979). Attrition also may have affected representation in terms of ethnicity and socioeconomic status. These factors together will have biased the results and meant that they are less representative of the general population. One study reported that attrition did not affect their sample (Upton et al., 2021) and one study controlled for this using attrition analyses (Essau and de la Torre-Luque, 2021).

**Strengths and limitations of the review**

To the author’s knowledge, this is the only systematic review for adolescents and emerging adults (13-25 years) that includes only longitudinal research. Much of the other systematic reviews on the impact of the Covid-19 pandemic similar age ranges include retrospective reports and current cross-sectional research, and only a few longitudinal studies, if at all, before drawing conclusions (e**.**g., Cielo et al., 2021; Jones et al., 2021; O’Reilly et al., 2020; Chawla et al., 2021; Samji et al., 2021; Loades et al., 2021; Panda et al., 2021; Mao et al., 2021; Nearchou et al., 2020; Panchal et al., 2021; Rajmil et al., 2021; Singh et al., 2020; Marques de Miranda et al., 2020). Most of these reviews concluded by stating the need for longitudinal research. The conclusions drawn here therefore, although encompassing their own limitations, are stronger in relation to ascertaining the impact of the pandemic. The referenced systematic reviews also utilised a different age e.g., just under 18’s or just emerging/young adults. Another strength of the current review therefore is that adolescents and emerging adults are recognised as being a unique and vulnerable population undergoing many cognitive changes and transitions.

Although longitudinal research is the methodological strongest way to interpret the impact of the pandemic, there are still constraints and limitations. Causality still cannot be absolutely inferred because there could be many other confounding variables impacting the change. The participants were not blinded to the aims of the research and therefore they may have been influenced to report on worsened mental health if they believed that this was the motivation of the researcher. Further, the studies here only report on the more immediate impact of the pandemic, and it is important to think about the more pervasive impacts.

Both a strength and a limitation of this review is the criteria for the included studies which are relatively narrow in terms of excluding pre-existing difficulties and excluding a broader age range of young people. Despite being clear clinical reasons for choosing the age range in this review, including factors related to brain development and clinical vulnerability from adolescence to age 25 (Kessler et al., 2007; Kessler et al., 2012), as well as considering emerging adults (18-25 years) as a distinct group with specific challenges and experiences (Arnett, 2000), excluding up to 30 years old omitted a number of studies. This is the same for younger participants that were excluded because they were under 13. The strength however of having a narrower age range is that it was specific enough to draw stronger conclusions around adolescents and emerging adults which was the population of interest. It also means that because studies have been found here globally, and in the general population, the results are more easily generalisable and applicable to adolescents and emerging adults at large. It is likely that the pandemic has affected those with specific difficulties in specific ways, for example, eating disorders (Systematic review: Devoe et al., 2022) and OCD (Systematic Review: Cunning and Hodes, 2021), which have also been found to have worsened during the pandemic, but each have their own unique outcomes and clinical implications. These are very important pieces of research in themselves, but perhaps are more helpful as standalone pieces. Further this review excluded university students, this was because it was felt that they would experience very specific difficulties that would limit generalisability overall (Mao et al., 2021) and because ages not usually reported in these studies. The limitation however of excluding specific populations or difficulties mean that findings here are not easily generalisable to these groups.

A potential limitation of this review is that not all relevant research was identified. Grey research was not searched, with only peer review journals being included, in an attempt to include high quality research. However due to publication bias in quantitative studies in health research (Ayorinde et al., 2020), it is possible that high quality research existed but was not published. Further, including more academic databases in the search could have potentially yielded more results. In an attempt to compensate for this, hand searching of all cited articles for the included articles was carried out. As the research tended to reference each other, this increases confidence that the search was comprehensive. To ensure rigour, a second reviewer who was a Clinical Psychologist in training was utilised to review a proportion of the article and full text screening. Although sometimes a second reviewer reviews all studies (Wright et al., 2007) and so this is a potential limitation of the present review, there was a high level of agreement between the researchers and so it was felt that this was adequately thorough. A second reviewer however could have helped assess the risk of bias for the quality of the studies. Further, there were strengths and limitations of using a newly established risk of bias model. It was useful because it was made specifically for reviewing pandemic longitudinal studies. It however did not include elements such as appropriateness of the statistics used, confounding variables, validity and reliability of psychological measures, or an overall guide for giving a global rating for the studies. These all could have been helpful in assessing the quality of the studies.

Another limitation is the search terms, which overall could have been more thorough. In hindsight there could have been more terms utilised within the search for capturing the age range, for example, for the emerging adult population, the word ‘emerging adult’ could have been used, and for the under 18’s the word ‘children’ could have been utilised. There were also no search terms for specific mental health difficulties other than anxiety and depression, for example, PTSD and mood disorders are not mentioned in the search terms. There were also no search terms for ‘wellbeing’ or ‘psychological disorder’ or the broader concepts which were reported on such as emotion regulation, loneliness, and anger. Although the search was able to pick up on most mental health difficulties and related constructs, this could have biased and limited the results. Hand searching the reference lists was able to somewhat compensate for this, although it remains a limitation and some studies may have been missed.

A further limitation that could have resulted in a bias and missed studies, was only including those studies whose primary research focus was mental health and wellbeing. A strength to this could have been that there were more mental health data and robust measures for mental health used in the included studies, however excluding other studies could have resulted in missed data. It could also have limited the types of populations captured, for example, where the studies main focus was physical health, participants may have been more focused or interested in this area. Only including studies focused on mental health means potentially biasing the results in a way that may only include those with an interest in mental health.

**Directions for future research**

Further research is needed to consider the ongoing and longer-term impact of the pandemic on the mental health of adolescents and emerging adults. Most of the research reported is taken from the initial lockdown in 2020. Whilst the initial lockdown came with its own stresses, uncertainties, and shock, it was at the beginning of what was to become two years of alternating restrictions. It is possible that mental health worsened further into the pandemic (e.g., See descriptive statistics in the attached empirical study). Young people may have struggled to adjust back into schools, sixth forms, colleges, universities, work, and their social lives. Further, mental health difficulties experienced at a young age, create a long-term vulnerability to mental health problems (Paus et al., 2008) and so it is imperative to explore longer term factors.

There is a recent systematic review (including young people and adults) concluding that increases in depression and anxiety were more pronounced earlier on in the pandemic (Robinson et al., 2022). This search however was conducted 9 months prior to the search in this review (January 2021), with the most recent data reported being the summer of 2020 when restrictions eased in most countries. Further, one study in this review found that symptoms were still elevated in late 2020 (Thorisdottir et al., 2021) and there is also some evidence already that mental health worsened further into the pandemic for young people (Racine at al., 2021). After this followed more restrictions, fears around the virus and possible losses. Given the influence of the pandemic, it is possible that specific types of anxiety may have emerged or worsened, particularly in individuals that are more vulnerable e.g., to fears of contamination (see Salkovskis, 1985 model of OCD) or of getting seriously ill (see Warwick and Salkovskis, 1990 model of health anxiety), or of social situations following avoidance (e.g., see Clarke and Wells’s 1995 model of social anxiety) and other difficulties.

These could potentially be a longer lasting impacts of the pandemic. Further, previous research has found that young people respond differently to adults to previous disasters, with more severe and longer-term difficulties such as generalisations of developed fears (Evans and Oehler-Stinnett, 2006;Norris et al., 2002a; Norris, et al., 2002b). It is therefore also important that further longitudinal research focuses on these other symptoms such as obsessive compulsive disorder (OCD), health anxiety, social anxiety, agoraphobia, and trauma symptoms and how these may have changed pre-and post-pandemic in the general population.

It would also be important to explore gender differences, differences across cultures, ethnicities, and different levels of socioeconomic statuses, comparing those with and without pre-diagnosed mental health problems prior to the pandemic. Emerging research is showing that the pandemic has affected these groups differently (e.g., Nonweiler., at al., 2020**,** Turner et al., 2021) and it is important to explore these longer term affects across more diverse groups. It is also important to explore more protective factors (such as resilience) because this could help to inform psychological treatments or future preventative measures.

Future research could also collate richer qualitative information about emerging adults and adolescents in terms of how they have experienced the Covid-19 pandemic. This could explore the impact on their mental health and psychological wellbeing overall. This research could also focus on exploring ways of engaging adolescents and emerging adults in mental health treatments and services, exploring what they find helpful and unhelpful in relation to psychological treatments. This will help to adapt interventions to young people’s needs and preferences. They could also be asked about what would be helpful to have in place for future disasters/pandemics.

**Implications for practice and policy**

The findings here have an implication for increased public provisions for the mental health of young people, for example for Child and Adolescent Mental Health Services (CAMHS), and services/charities specifically aimed and tailored towards emerging adults aged 18-25 years who also have heightened vulnerability and distinct clinical needs (Arnett, 2000). Having easily accessible support and increased availability of evidence-based psychological treatments is imperative. Another option would be providing interventions in schools, universities, and workplaces for the young people but also, for the adults who work with them. This could involve, for example, teachers, lecturers, and employers around adolescent and emerging adult’s mental health. There is a body of evidence in support of School Based Interventions (SBI’s) often grounded in evidence-based approaches such as CBT (see Paulus, et al., 2016 for a systematic review) showing SBI’s have a strong-moderate effect on mental health difficulties which could be another way to address the worsening mental health for teenagers. This approach could also be adapted for other services/universities and work settings for emerging adults. This would be on top of provisions for personalised individual psychological support and community support services for adolescents and young adults.

There are also implications for the future about how to protect and sensitively deal with adolescent and emerging adult’s mental health in the event of future pandemics/disasters, and/or further effects of Covid-19. This may involve setting up online community groups within schools, universities, youth centres and workplaces in the event of a lockdown, improving support to and from teachers and other relevant staff, faster organisation of remote connections in education and mental health care, improved resources for online learning and better public education on mental health. There are also implications for a heightened focus on important relationships and attachments with authority figures and responsible adults, which is even more important for young people who do not have these strong attachments at home. Verschueren and Koomen (2012) discuss the importance of applying attachment theory and research (e.g., Ainsworth, 1990) to shape high-quality teacher-child relationships. This again also applies to emerging adults and any attachment figures.

## **Conclusion**

This review provides an opportunity to thoroughly explore longitudinal studies that evaluate the impact of the current Covid-19 pandemic on adolescents and emerging adults, an already vulnerable population. Despite the large body of research that has emerged on the impact of the pandemic, much of these are retrospective cohort studies or current cross-sectional research designs which have substantial methodological limitations. Longitudinal studies provide an opportunity for higher quality research on the pandemic and can help to draw firmer conclusions. The research in this review consistently illustrates that mental health worsened during the pandemic, in particular depression. There is also evidence for increased anxiety, emotion dysregulation, loneliness, stress, personality difficulties/factors and anger, and a decrease in psychological wellbeing. This could be due to various factors such as increased isolation, increased use of social media and screens, loneliness and decreased meaningful activity. Much of this research is from earlier points during the pandemic and so it would be important to continue to research in this area, with particular emphasis on the ongoing impact of the pandemic on adolescents’ and emerging adults’ mental health.

**Adolescent future thinking, its relationship to wellbeing, and the Covid-19 pandemic**

# **Empirical Paper**

## **Abstract**

An important part of psychological wellbeing, identity development and transition into adulthood for adolescents is future orientation. A factor known to influence future orientation is external stressors and so it is possible that the Covid-19 pandemic has affected/’engulfed’ future thinking. In the present study, relationships between future thinking, Covid-related future thinking, depression, anxiety, and psychological wellbeing are explored. One hundred sixth-form psychology students aged 16-18, from one school (18 males, 81 females and 1 nonbinary), completed a semi-structured interview that required them to generate positive and negative future thoughts in various time periods, as well as rating how ‘Covid-related’ thoughts were. They also completed measures of depression, anxiety, and psychological wellbeing. Future thoughts were later coded into themes. Psychological wellbeing/flourishing was associated with more positive future thoughts. Anxiety was associated with more positive Covid-related future thoughts. When exploring the different time periods, there was some evidence that the nearer future had a stronger association than the distant future on wellbeing. For example, higher flourishing was associated with positive future thoughts in the next week and higher depression was associated with negative future thoughts in the next week. Further, negative Covid-related future thoughts for the next week were associated with higher negative affect and anxiety. Grouping future thoughts into themes revealed that Achievement and Intrapersonal thoughts seemed most important in terms of frequency and relationship to wellbeing. Descriptive statistics showed that there was overall poorer mental health than would be expected for adolescents (when compared with previous data), which could indicate that mental health worsened further into the pandemic. Overall, the findings provide evidence that adolescent future thinking is relevant to wellbeing, in particular thoughts related to the closer future. It is proposed that this is related to cognitive development, differences in time perception and planning in adolescents. There is also some evidence for Covid-19 future thinking ‘engulfment’. The findings have implications for treatments. Further research is needed to further explore these relationships.

## **Introduction**

**The ‘Gen Z’ adolescent’s mental health and wellbeing**

There have been growing concerns over recent decades for adolescents’ mental health, with the world changing and developing at an incredibly fast rate (Bor et al., 2014). This includes the sharp rise and popularity of social media applications such as Instagram, YouTube and TikTok and the rise of increased ‘screens’ (such as smartphones and iPads). This has resulted in decreased physical activity and worsened mental health (Carli, et al., 2014), creating an increasing concern for the most recent generation, commonly referred to as Gen Z. Social media has given adolescents access to a large amount of content that is largely beyond parental controls, and has popularised ‘filters’, making it possible to easily alter appearance. Social media has also normalised the concept of ‘followers’ and ‘likes’, making the idea of ‘popularity’ extend well beyond the school walls. This has given rise to a comparison culture to unrealistic and sometimes fabricated standards and ideals. A recent systematic review on adolescents and social media use found that time spent, activity, investment, and addiction all positively correlated with depression, anxiety, and psychological distress (Keles, et al., 2020).

The rise of technologies however has also made it easier to access information and education and has increased connectivity to social networks. In this way, this internet and social media rise has been somewhat of a ‘double edged sword’. Qualitative and quantitative research on social media and adolescents shows that it can have both positive and negative effects (Allen et al. 2014; Radovik, et al., 2017). For example, social comparison on social media can lead to self-improvement or ’malicious envy’ and gossiping (Latif et al., 2021).

In the last few decades, longitudinal research has shown that mental health is deteriorating, and many put this down to the recent and rapid changes we have seen globally. Levels of depression have increased from 9% for young people born in the early 1990’s to almost 15% for those born at the turn of the millennium, as well as increases in self-harm, insomnia, and body image concerns (Patalay and Gage, 2019). Other research has consistently found that young people’s mental health is worsening globally (Fink et al.2009; Collinshaw et al. 2010; Twenge et al 2010; Hagquist 2010; Bor et al., 2014). Mental health difficulties in adolescence are known to have a lasting impact on later mental health and physical health (Roza et al., 2003; Patel et al., 2007).

**Future orientation/future thinking and its relationship to psychological wellbeing and distress**

Future orientation is a concept that encompasses attitudinal, cognitive, affective, and motivational constructs (Steinberg, 2008). Future thinking is a cognitive element of future orientation, focusing on future thoughts and expectations/anticipations (Gilbert and Wilson, 2007). Future thinking is important because it can explain behaviours in terms of possible futures and relates to perception, cognition, affect, memory, motivation, and action (Seligman et al., 2013). The ability to think in a future orientated way can bring openness to new experiences and is related to a hopefulness, optimism, resilience and lower anxiety and depression (Fortunato and Furey, 2011).

A popular tool for measuring and eliciting future thinking experimentally in research is the Future Thinking Task (FTT) (MacLeod, et al., 1993). Using this task, individuals with both anxiety and depression have been shown to generate more negative future outcomes and less positive future outcomes when compared with non-clinical controls (MacLeod and Byrne, 1996). When individuals with depression only complete the FTT, as compared with non-depressed controls, they have a reduced ability to generate positive future expectations, but interestingly do not differ in their ability to generate negative future expectations (MacLeod and Byrne, 1996;MacLeod et al. 1997a; MacLeod and Salaminiou, 2001;Kosnes, et al. 2013; Bjärehed, et al., 2010). This finding was replicated in para-suicidal adults (Conaghan and Davidson, 2002; MacLeod et al 1997c; O’Connor et al., 2000). This connects to research showing that hopelessness (i.e., less positive future expectations) is associated with higher suicidal ideation (Smith, et al., 2006) and behaviours (e.g., Beck et al, 1974; McCullumsmith et al., 2014; Brown et al., 2006; Kuo, et al., 2004). In non-clinical populations, lower psychological wellbeing is associated with less future positive thoughts (MacLeod and Conway, 2005). These findings strengthen the evidence of the distinction between positive and negative aspects of experience, suggesting that they are separate psychological constructs (MacLeod and Moore, 2000).

In contrast to the reduced capacity to generate positive future thoughts in depression, individuals with anxiety (generalised anxiety or panic disorder) generate more negative future events but do not differ on positive future events when compared with non-anxious controls (Conaghan and Davidson, 2002;Hunter and O’Connor, 2003; MacLeod et al. 1997a; MacLeod and Byrne, 1996). It has been found that depression, reduced positive expectancies and hopelessness go together, whereas anxiety, negative expectancies and worry go together, showing two distinct ways of thinking about the future (MacLeod, et al., 1996). Anxious individuals are also more likely than non-anxious controls to believe that these negative future events will occur (MacLeod and Byrne, 1996;MacLeod, et al., 1996; Wu et al., 2015). This is in line with the idea that anxiety is related to thoughts related to future threat and the exaggeration of its likeliness, awfulness and the under estimation of ‘rescue’ and coping (e.g., Salkovskis, 1996). Overestimating the likelihood of negative future events and underestimating the likelihood of positive future events has been found to reduce motivation, lower mood, and quality of life (Bandura, 1997; MacLeod and Cropley, 1995; Pyszczynski, et al., 1987).

**Future thinking in adolescents**

Future orientation is an important part of identity development and wellbeing for adolescents. Identity development involves the integration of the past and present, with the future self (Erikson, 1968). Adolescents are continuously experiencing many transitions in a short succession of time and are aware of their future adult selves (Cross and Markus, 1991). Greater future orientation in adolescents is associated with clearer life goals, and a stronger ability to plan and overcome obstacles (Johnson, et al., 2014). How adolescents view their future also plays an important role in developing independence (Zimmer-Gembeck and Collins, 2003) and their sense of self (Conway, 2005; D’Argembeau, et al., 2012). Expectancy-value theory proposes that adolescent behaviour is influenced by judgment of future outcomes (Wiccfield and Eccles, 2000) and moderated by how much the outcome is valued (DiClemente, et al., 2009) and the perceived likelihood that the event will occur (Fischhoff, 2008). Greater future orientation in adolescents has links to improved outcomes in health and education (Seginer 2009; Steinberg; 2008; Gushue et al., 2006) and placing importance on life goals related to relationships increases meaning and wellbeing (Gabrielsen, et al., 2012). Common themes in adolescent future thinking are education (Nurmi, 1991, 1992), occupation and family (Cross and Markus, 1991) and leisure (Lanz, et al., 2001,Nurmi, 1991) which illustrate what is important to young people in terms of the concept of their future self and wellbeing.

There are fewer studies using the Future Thinking Task (FTT) with adolescents. One study found no difference between depressed and anxious adolescents (16-18) but found that both groups were able to generate significantly more negative events, but no fewer positive events as compared to a control group (Miles, et al., 2004). These findings do not support the previous research in adults that shows future thinking is distinct in depression and anxiety but supports the idea that future thoughts are overall important for depression and anxiety. Other research using the FTT has found associations between future thinking themes and wellbeing. Seymour and MacLeod (2015) in a non-clinical population found that higher positive affect was significantly associated with dimensions of psychological wellbeing in terms of future thought themes (Personal Growth, Self-Acceptance and Purpose in life), but psychological wellbeing was not associated with the amount of positive future thoughts generated. Whaley and MacLeod (2014) found that higher psychological distress was associated with concerns about future relationships, but there were no significant differences on dimensions of psychological wellbeing on future positive events.

The findings in future thinking research for adolescents are therefore less established and are less clear compared with adults. This could be due to various factors including their cognitive development. It is well established that the brain does not stop maturing and developing until age 25 (e.g., Sylwester, 2007) which includes factors related to abstract thought and cognitive analyses. There is also less research in future thinking and affect when compared to past thoughts and affect (Gilbert and Wilson, 2007), which is important because the ability to predict hedonistic outcomes of behaviours is important for making plans (Bechara and Damasio, 2005; Seginer and Lilach, 2004). The connection between future thinking and psychological wellbeing/distress is important to establish because it has implications for psychological treatments (Seligman and Csikszentmihalyi, 2000). Future thinking themes are also important to elucidate in terms of being able to establish what types of expectancies are important to wellbeing.

**The Covid-19 pandemic and ‘engulfment’**

On 11th March 2020, the World Health Organisation (WHO) declared Covid-19 a global pandemic (World Health Organisation, 2020). Young people may have been amongst the least affected in terms of their physical health, but they have been amongst the most affected in terms of their mental health and quality of life (e.g., Alonzi et al., 2020,Evans et al., 2021; O’Connor et al. 2020; Smith et al., 2020). Further, the overarching theme of longitudinal research on adolescents and emerging adults shows that mental health has worsened (See attached systematic review). Further to this, there is evidence that an illness can influence a person’s sense of self and become ‘engulfed’ in their thinking and their identity (Van Bulck et al., 2019). Illness identity is defined as the degree in which an illness becomes integrated into one’s identity which affects thinking and sense of self (Charmaz, 1995). Engulfment is one form of illness identity which indicates that the illness has dominated identity and therefore daily life and thinking (Oris et al., 2016).

In the present study it is considered, given the impact of the current Covid-19 pandemic on the mental health of young people, that Covid-19 may have resulted in engulfment for adolescents. It has been a prominent feature in their lives with constantly changing restrictions and having been taken physically out of schools. Here future thoughts therefore will be considered in terms of their relatedness to Covid-19 and examined in relationship to depression, anxiety, and psychological wellbeing.

**A model of adolescent future orientation**

The present study is embedded in the Johnson, et al., (2014) model of adolescent future orientation, wellbeing, and successful transition into adulthood, where expectancies of the future, aspirations and planning are influenced by a range of factors. Future thinking is defined here in terms of expectations, under the broader concept of future orientation, and overlapping concepts of aspirations and planning. The model also highlights the importance of early experiences and socio-cultural influences in shaping future orientation. Judgments about how much an outcome is valued and how likely it is to occur are influenced by individual attributes (competences) and environmental influences (opportunities and constraints) (Wigfield and Eccles, 2000). Constraints are conceptualised as coming from many types of ‘forces’ including macro-level forces, which here would include the pandemic and its ramifications. Adolescents who experience high levels of unpredictability and events outside of their control have lower self-efficacy (Bandura, 1977). The pandemic here is considered as being outside of adolescents’ control and accompanies a high amount of unpredictability and uncertainty. Future orientation then connects to psychological wellbeing, mental health difficulties, and behaviour. Ultimately this then results in what is conceptualised as a successful transition into adulthood (Johnson, et al., 2014). Figure 2 below illustrates the Johnson et al., (2014) model of adolescent future orientation.

Given the current concern about young people’s mental health, the study provides an opportunity to explore how future thinking links to wellbeing and distress in young people and how the prevalence of thoughts about a major stressor are linked to those variables.

**Figure 2.** illustrating the Johnson, et al., (2014) model of adolescent future orientation

Diagram

Description automatically generated

In the present study, mental distress and wellbeing variables will be measured. Psychological wellbeing is not simply the absence of distress, but also the presence of positive wellbeing (Diener and Emmons 1984; Seligman, 2002, 2011; Seligman and Csikszentmihalyi 2000**;** Gillham and Seligman, 1999). This is usually indicated by the presence of positive affect (e.g., Thompson, 2007) and the presence of indicators of flourishing (e.g., Diener, et al, 2010). This has not been focused on as much as distress indicators in research and so the present study will focus also on psychological wellbeing for a fuller picture of overall mental wellbeing.

A sample of 16–18-year adolescents were given measures of depression, anxiety, as well as measures of psychological wellbeing (flourishing and affect). They were also asked to complete the Future Thinking Task (FTT) that asks them to generate negative and positive future thoughts, as well as being asked to rate these responses as to the extent to which they were Covid-related. Their future thoughts were also coded later for themes by the researchers. The aims of this study were to (1) explore the relationships between future thinking, psychological wellbeing, anxiety, and depression in an adolescent sample (16-18), (2) explore these variables in the context of the Covid-19 pandemic, notably the extent to which future thinking is related to Covid-19 and whether the prevalence of Covid-related thoughts has a link to the wellbeing variables, and (3) explore the themes of future thinking and to examine these in relation to the wellbeing variables.

It was hypothesised that (1) adolescents who generate more negative future thoughts will have higher levels of anxiety and lower levels of psychological wellbeing, (2) adolescents who generate more positive future thoughts will have lower levels of depression and higher levels of psychological wellbeing (3) Covid-related thoughts will be associated with lower psychological wellbeing and higher depression and anxiety. In terms of emergent future thinking themes, there is no specific hypothesised outcome as this was an exploratory research question only.

## **Method**

**Ethical approval**

The study received ethical approval by the Royal Holloway, University of London Research Ethics Committee in September 2021 (Appendix 1).

**Participants**

Sixth form students were recruited from a secondary school in North London. Participants met the inclusion criteria if they were in Years 12 and 13 (16-18 years old). All the students were studying Psychology at AS/A level. A total of 103 students took part in the study and 100 completed enough data to be included (18male, 81 female, 1 non-binary).

**Power calculation**

To detect a medium effect with a power of 0.80 and alpha of 0.05 using a multiple regression with up to four predictor variables, a sample of 84 participants was required (Cohen, 1988). The effect size was based on previous equivalent studies with adolescents, future thinking, and wellbeing that found a medium effect size when exploring future thinking and wellbeing (Seymore and MacLeod, 2015; Whaley and MacLeod, 2014). Although the analysis plan involves initially exploring the data using Pearson’s bivariate correlations, the power calculation is based on multiple regression, so the study is powered enough to do this if needed.

**Measures and tasks**

***Demographic data***

A questionnaire was constructed based on previous research with adolescent populations (Seymour and MacLeod 2015; Whaley and MacLeod 2014). This gathered information about participants’ gender identity, age, year group, ethnicity, education, and parental/carer/guardian occupation (See Appendix 2 for pack given to participants). The demographic form was adapted to promote inclusive responses and to acknowledge diversity. For ethnicity there was no pre-defined list as using fixed-response categories may fail to offer an inclusive way of identifying (Bradby, 2003). To later describe the sample, responses were put into categories using the Office for National Statistics (ONS) census codes (ONS, 2013). Categories were added to this that that did not seem to clearly fit into another ethnic code e.g., Greek/Turkish Cypriot and Middle Eastern/Arab in order to accurately represent the sample. Participants’ parental occupation data were used as a marker of Socioeconomic Status which is a system widely used in research and were coded using the National Statistics Socio-Economic Classifications system (ONS-SEC, 2020).

***Verbal fluency – Control task***

The FAS task (Lezak, 1995) measures Phonemic verbal fluency and is a controlled word association test that is widely used in neurological assessment (Tombaugh, et al., 1999). In the present study, participants were asked to generate words beginning with F, A and S. They are usually given a minute for each letter to say the words out loud, but as this task was adapted to be written down in a classroom setting, they were given 90 seconds instead. The task is commonly used as preparation for the FTT (e.g., Seymour and MacLeod, 2015) and importantly controls for effects of general verbal fluency in the FTT for the purpose of data analyses (See Appendix 2).

***Future Thinking Task (FTT)***

An adapted version of The Future thinking task (FTT) (MacLeod, et al., 1993; MacLeod, et al, 1998) was used to elicit future events that participants were anticipating (Appendix 2).The FTT has been used previously in clinical and non-clinical studies (e.g., MacLeod and Byrne, 1996;MacLeod and Conway, 2007)as well as in similar classroom settings with adolescents(Whaley and MacLeod, 2014; Seymour and MacLeod, 2015). In the FTT, participants are asked to state positive future anticipated events and negative future anticipated events, in turn, over three different time periods: The next week (including the present day), next year, next five to ten years. The researcher verbally instructed participants in each classroom setting to write down any event that came to mind that they thought was definitely going to happen or at least very likely to happen in the future, regardless of its perceived level of importance or triviality (See Appendix 3). The traditional FTT is an interview and participants are given a minute to respond, but here, as the task was written, they were given 90 seconds. Other research in classroom settings adapted the task similarly (Seymour and MacLeod, 2015)**.** The order of the positive and negative future conditions was counterbalanced across the two groups. The FTT allows the researcher to derive several measures, such as the number of responses and also enables thematic coding of responses.

***Subjective rating of Covid-19 related thoughts***

Participants were asked to code all their responses to the FTT for both the positive future and negative future conditions.

Verbatim instructions*: For each of your responses to the future thinking task you have just completed, please rate using the scale shown, how much the reason you wrote your response was because of the Covid-19 pandemic: 0 not at all, 1 partly, 2 a lot* (Appendix 2).

***Independent Thematic coding of the FTT***

Individual responses to the FTT were coded to allow analysis of emergent themes. A coding system was used that had already been established in previous research that used the FTT (Godley et al.2001).

Table 5 shows the coding system for themes of future-orientated cognitions. The coding was adapted from Godley et al. (2001 pp285) coding system for FTT responses with any adaptions/specifications made for this study shown in italics.

**Table 5:** Coding system for themes of Future-Oriented cognitions

|  |  |
| --- | --- |
| **Category** | **Description** |
| A. Social/Interpersonal | Any item which is social or interpersonal, such as ‘seeing friends’, ‘going to a party’, ‘arguing with someone’, etc. This category also includes marriage, divorce/separation, and having children, since these events involve more than just the subject.  *References to pets included* |
| B. Achievement/Failure | Any academic and job-related achievements such as, getting into university, passing exams, getting a new job, getting a pay rise, and any academic and job-related failures such as, failing exams, being sacked, being unemployed. Also included are items such as going to school, having a good/ bad job.  *A levels, studying, school and university references coded under achievement unless another area is specified such as ‘meeting new people at university’ would be coded as social* |
| C. Intrapersonal | Any item which has to do with the subject and nobody else such as being tired, depressed, happy, sad, etc.  *References to becoming independent, having more freedom, references to body image.* |
| D. Leisure/Pleasure | Any events which are done for pleasure or leisure such as sport, travelling, holidays, watching television, shopping, dinner, going out, etc. The events may be sociable; however, since nobody else is mentioned and because it is possible to do all these things alone, they are coded in this category. |
| E1. Own Health | Any item relating to the subject themselves getting ill, mental health problems, dying, having accidents, getting pains, symptoms of eating disorders, etc.  *Any reference to gym where it doesn’t relate to body image.* |
| E2. Health of Others | Any item relating to other people, relatives, friends, etc., getting ill, mental health problems, dying, having accidents, getting pains, etc.  *References to others catching Covid, or references to future lockdowns and outbreaks of Covid* |
| F1. Financial and Home | Any items relating to money matters, moving house, decorating, etc. |
| F2. Other | If the coder is in any doubt under which category an item should be coded, then this classification can be used. |

Codes were checked for inter-rater reliability by a second researcher (a Clinical Psychologist in training) who had used the coding system independently. The second coder blind-coded 16% of the participants, and 410 individual responses overall. The inter-rater agreement for the two raters was kappa=0.916, indicating a high level of agreement between the raters and therefore high reliability.

***Psychological wellbeing – Flourishing***

The Flourishing Scale (FS; Diener et al., 2010)is a brief 8 question self-report measure of psychological wellbeing based on the domains of relationships, self-esteem, purpose, feelings of competence and optimism (Ryan and Deci 2000, Ryff, 1989). The FS is based on eudaimonic theories of wellbeing. The scale produces a single wellbeing score, and each item is rated from 1-7 where 1 is *strongly disagree* and 7 is *strongly agree*. Items can be scored from 8-56, where a high score is representative of an individual with multiple psychological strengths and resources. The scale has been shown to have good psychometric properties, with a Cronbach’s alpha of higher than 0.80, showing high internal consistency and reliability in US college students. The FS also has high levels of convergent validity with other established wellbeing scales (Diener et al, 2010). A further study added evidence to the internal consistency and reliability (α = .91) and showed strong positive correlations between the FS, happiness and life satisfaction measures supporting convergent validity in an adult sample (Hone, et al., 2014). There is also further evidence for the validity of the scale in adolescents (Romano et al., 2020). In the present study internal consistency was again high (Cronbach α = .83) (See Appendix 2 for FS scale).

***Psychological Wellbeing – Affect***

The Short Positive and Negative Affect Scale International (Short PANAS international; Thompson, 2007) is based on hedonic theories of wellbeing and measures affect. This brief self-report measure is based on the original PANAS (Watson et al., 1988) which is a widely used wellbeing scale and involves the self-rating of 5 items for each positive (PA) and negative affect (NA) based on a circumplex model by Larsen and Diener (1992). These scales are added separately to give a separate score for NA and PA where high scores on respective scales indicate a high amount of affect. The two scales are relatively uncorrelated. Mackinnon et al. (1999) reviewed the scale for validity and reliability in adults. They found that the measure was robust to differences in age, sex, education, marital status, and financial hardship. The PANAS in general has been widely used in adolescent populations and is considered to have good psychometric properties (Huebner, 1995;Melvin and Molloy, 2000). The international short form PANAS has a high test-retest reliability at .84 (p<.01), and high convergent validity when compared against other well established wellbeing measures, as well as high cross-cultural validity in a primarily young adult sample from 38 different countries (Thompson 2000). In the present study internal consistency was good for NA (Cronbach α = .77) and PA (Cronbach α = .71) (see Appendix 2 for Short PANAS International)

***Anxiety***

The GAD-7 is a widely used self-report tool for measuring symptoms of generalised anxiety developed for use in primary care and specifically relates to the DSM-IV criteria (Spitzer et al., 2006). Participants rate on a scale their frequency of distressing symptoms over the past two weeks and allows for identifying mild, moderate, and severe levels of anxiety. The measure has good reliability and good construct, criterion, factorial, and procedural validity. For example, the internal consistency was very high at (Cronbach α = .92) and test-retest reliability was also good in adults (intraclass correlation = 0.83). Convergent validity was good, as demonstrated by its correlations with two other well established anxiety scales in adults (Spitzer at al., 2006). Tiirikainen et al., (2019) reported that the scale shows good psychometric properties in adolescents that are similar to those reported for adults. It is therefore commonly used in research and can be used in older adolescents/young adults. In the present study internal consistency was again high (Cronbach α = .84) (See Appendix 2 for GAD-7).

***Depression***

The Patient Health Questionnaire-8 (PHQ-8, Kroenke et al., 2009) is an adapted version of the PHQ-9 (Kroenke, et al., 2001) which has been adapted for research. The PHQ is a widely used self-report questionnaire developed for primary care and has been used with adults and adolescents. The original version lists the 9 DSM-IV criteria for depression and has good diagnostic validity in adults (Spitzer et al. 1999). It has also been shown to have excellent construct and criterion validity when correlated against other well established depression measures (Kroenke, et al., 2001) as well as high test-retest reliability in adults (Lowe et al. 2004). The measure allows for identifying mild, moderate, moderately severe, and severe depression, and asks specifically about the last two weeks. The PHQ-8 is identical to the PHQ-9; however, the last question asking about suicidality is taken out. It has been highlighted as a potential problem where suicidal ideation may be indicated but support is then not then able to be provided e.g., in research (Shin et al. 2019). It has been demonstrated that Cronbach’s α for the PHQ-8 is 0.88 and that for the PHQ-9 is 0.89 in adults (Shin et al. 2019) and it was concluded that the PHQ-8 is just as useful as screening for depression. Richardson et al., (2010) tested the scale for reliability and validity in adolescents and concluded that the sensitivity and specificity was similar to that in adult populations. In the present study internal consistency was again high (Cronbach α = .86) (See Appendix 2 for PHQ-8 questionnaire).

**Recruitment**

A state school in north London was approached and agreed to take part in the study. The school had been awarded a cultural diversity quality standard award and was chosen based on inclusivity. It was agreed, together with the school that parental consent would not be required due to the age of the participants, however a letter was sent out to parents along with the information sheet (Appendix 4). The participating school was offered a workshop on careers in Clinical Psychology and general mental health as an incentive to take part. The participants were recruited from all Psychology students (AS and A level), of which the school had around 200 total. The study was presented beforehand to the students in classes. Students were offered the information sheet and consent forms in advance.

**Ethical considerations**

It was confirmed with the senior staff at the school that the data would be anonymised so that the students could not be identified from their data. As the students were asked about their mental health and wellbeing, it was agreed that it would be helpful to offer general information on the debrief sheet about how to seek help if they were concerned (Appendix 5). This included details of how to access help in their borough, as well as crisis contacts and helplines. The participants were told that if taking part in the research had made them feel lower or more worried than usual that they could speak to a trusted teacher, the school Counsellor, or the researcher at the end of the session. It was also agreed that a teacher would be present on the day of the research session.

**Piloting**

The research session length, content, and wording for tasks (e.g., the FTT) were based on similar previous studies (Whaley and MacLeod, 2014; Seymour and MacLeod, 2015). This helped to explore what had been learnt from previous pilots and what had been feasible for the same age group. The research session was also piloted on four young adults to gain time estimations and to ensure that the wording was clear. Comments were also gathered from the school about the process, methods, and content of the study.

**Procedure**

Data were collected on one day in October 2021, in two 50-minute research sessions, with 49 and 54 students in attendance respectively. The students were back at school in person and there was no lockdown, although some Covid-19 restrictions were in place.

A short talk was given to introduce the researcher and the study and students were given the information and consent forms (Appendix 6 and 7). They were given the opportunity to ask questions after each task. Participants first completed the demographic form. Following this, the FAS and FTT were completed, with the order of presentation of positive and negative conditions counterbalanced. Upon completion of the FTT participants were asked to go back over their responses and rate each of their answers with the Covid-related ratings. Finally, they completed the GAD-7, PHQ-8, the Flourishing Scale and the Short PANAS (Appendix 3). Participants were fully debriefed and given a debrief sheet (Appendix 3 and 5).

**Analysis plan**

The first aim of the study was to explore the relationships between; future thinking, psychological wellbeing, anxiety, and depression. For this aim, Bivariate Pearson’s correlations were used to explore the relationship between the dependant variables measuring wellbeing, and the number of thoughts in the positive and negative conditions of the future thinking task. The plan was that if the correlations showed multiple significant relationships between the variables, then multiple regression would have been used with verbal fluency entered at step 1 and the number of positive and negative future thoughts at step 2.

The second aim was to Explore these variables in the context of the Covid-19 pandemic, notably the extent to which future thinking is related to Covid-19 and whether the prevalence of Covid-related thoughts has a link to the wellbeing variables. To explore this, the mean number of Covid-related thoughts for the positive and negative condition were calculated individually. Bivariate Pearson’s correlations were again used to explore the relationship between the dependant variables measuring wellbeing, and the mean number of Covid-related thoughts in the positive and negative condition. Similarly, to the first aim, if there had been multiple significant results shown by the correlational analyses, a multiple regression would have been run over the data.

The final aim was to explore the themes of future thinking and to examine these in relation to the wellbeing variables. Codes used not at all or just once by 50% of the participants or more were not taken forward for further analyses. Following this, to explore themes, the relative frequency of the codes was calculated. For each of the dependent variables, a standard multiple regression was performed with the positive and negative relative frequency scores. Exploratory analyses were also performed to explore relationships between the dependant variables and the individual time periods of the future thinking task using Bivariate Pearson’s correlations.

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## **Results**

**Overview**

The data were analysed using the Statistical Package for Social Sciences version (IBM SPSS Statistical Data Editor Version 25).Descriptive statistics are reported to one or to two decimal places, statistical results are reported to two decimal places, and exact p-values are given. The threshold for statistical significance was set at p<.05, Hypothesis testing was two-tailed.

**Data screening and missing data**

From 103 participants that took part, 3 left out entire questionnaires within their dataset, and so their data was not used, leaving 100 overall participants. Four participants left out an item on the PANAS. For this missing data adjusted means were computed. All data were checked for accuracy.

The distributions for each variable were checked for normality. Five variables were found to be skewed; (1) the total score of the FTT negative condition for next year (z=3.93), (2) the mean Covid-rating for the next week in the positive condition (z=7.60), (3) the mean Covid-rating for the next 5-10 years in the positive condition (z= 4.66) (4) the mean Covid rating for the next week in the negative condition (z=4.75), (5) the mean Covid rating for the next 5-10 years in the negative condition (z=3.75). Where they were skewed, square root transformations were affected (Field, 2017). After transformation, all skewed variables were within normal bounds.

**Participant demographics**

The sample consisted of 18 males, 81 females and 1 nonbinary participant (n=100). The age range was 16-18 with 46% of the sample representing 16-year-olds, 49% representing 17-year-olds and 5% representing 18-year-olds. The participants were across Year 12 (51%) and Year 13 (49%). A total number of 19 ethnic groups were represented in the sample, as well as an ‘unknown’ or ‘prefer not to say’ group who left the question blank. Table 6 shows the ethnicity of the participants.

**Table 6. Ethnicity of participants**

|  |  |
| --- | --- |
| **Ethnicity** | **Frequency** |
| White British | 28 |
| White Irish | 4 |
| Other White | 8 |
| Indian Asian | 5 |
| Bangladeshi Asian | 2 |
| Pakistani Asian | 2 |
| Other Asian | 7 |
| Chinese | 1 |
| Black Caribbean | 1 |
| Black African | 7 |
| Other Black | 3 |
| Mixed, White, and Black African | 1 |
| Mixed, White, and Asian | 4 |
| Other mixed | 1 |
| Arab‎/middle eastern | 5 |
| Greek Cypriot | 6 |
| Turkish Cypriot | 5 |
| Prefer not to say | 6 |
| Azerbaijan | 1 |
| Turkish | 3 |
| Total | 100 |

Parental occupations were coded into eight different categories or classes based on the self-coded National Statistics Socio-Economic Classifications system (ONS-SEC, 2020), as well as a category for unknown occupation and unemployed. Table 7 shows parent’s occupation.

**Table 7. Parent’s occupation**

|  |  |  |  |
| --- | --- | --- | --- |
| **Socioeconomic status/occupation category** | **Frequency for father** | **Frequency for mother** | **Frequency of the parent with the highest SES score** |
| Higher Managerial and Administrative and Professional Occupations | 13 | 6 | 14 |
| Lower managerial, administrative, and professional occupations | 21 | 27 | 33 |
| Intermediate occupations | 22 | 27 | 25 |
| Small employers and own account workers | 14 | 7 | 9 |
| Lower supervisory and technical occupations | 4 | 2 | 4 |
| Semi-routine occupations | 13 | 7 | 8 |
| Routine occupations | 0 | 3 | 1 |
| Never worked and long-term unemployed | 2 | 12 | 1 |
| Unknown | 11 | 9 | 5 |
| Total | 100 | 100 | 100 |

**Anxiety, depression, and wellbeing variables**

The mean for anxiety was 10.81 (Standard Deviation, SD 5.05), depression was 12.04 (SD 5.99), psychological wellbeing (Flourishing Scale FS) was 38.07 (SD 8.03), Positive affect (PA) was 14.93 (SD 4.01) and negative affect (NA) 13.43 (SD 4.37) (for information about how to interpret the measures, please see methods). Table 8 shows intercorrelations of the dependent variables.

**Table 8. Bivariate Pearson’s Intercorrelations of the dependent variables (anxiety, depression, and wellbeing variables)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Anxiety | Depression | FS | PA | NA |
| Anxiety |  | .72 (p<.001)\*\*\* | -.50 (p<.001)\*\*\* | -.14 (p=.168) | **.**67 (p<.001)\*\*\* |
| Depression |  |  | -.66 (p<.001)\*\*\* | -.28 (p=.005)\*\* | **.**63 (>.001)\*\*\* |
| Flourishing (FS) |  |  |  | .50 (p>.001)\*\*\* | -.57(p>.001)\*\*\* |
| Positive Affect (PA) |  |  |  |  | -.13 (p=217) |
| Negative Affect (NA) |  |  |  |  |  |

*\*Indicates significant result for p value .05, \*\* for .01 and \*\*\* for .001*

The dependent variables are intercorrelated with each other in the expected way for all variables.

**Anxiety, depression, wellbeing, and number of positive and negative future thoughts**

Bivariate Pearson’s Correlations were used to examine the relationships between the dependent variables (the mental health measures for anxiety, depression, and wellbeing) and total number of positive and negative future thoughts. Note that for all Bivariate Pearson’s correlations, in order to interpret effect size, any r value equal or above; .1 is small, .3 is medium and .5 is large (Cohen, 1988).

Table 9 below shows correlations between the five wellbeing variables (FS, PA, NA, depression, anxiety) against the total scores (things looked forward to) from the FTT positive condition and FTT (and things not looked forward to) negative condition. There was little support for the hypotheses in that only flourishing was related to positive future thinking.

**Table 9. Bivariate Pearson’s correlations for anxiety, depression, wellbeing, and number of positive and negative future thoughts**

|  |  |  |
| --- | --- | --- |
|  | Number of things looked forward to (positive FTT condition) | Number of things not looked forward to (negative FTT condition) |
| FS | .25(p =.01) \*\* | -.08 (p = .427) |
| PA | .14 (p = .176) | -.001 (p = .991) |
| NA | -.05 (p = .641) | -.11 (p = .27) |
| Depression | -.04 (p = .66) | -.16 (p = .112) |
| Anxiety | -.03 (p = .801) | -.12 (p = .231) |

*\*Indicates significant result for p value .05, \*\* for .01 and \*\*\* for .001*

Correlations were conducted between verbal fluency (FAS scores) and FTT totals. Total positive future thoughts correlated with verbal fluency (r (98) = .31, p=002) as did total negative future thoughts and verbal fluency (r (98) = .36, p<.001). For this reason, variability or contributions from verbal fluency were extracted from the relationships by partial correlations. A correlation remained significant between flourishing and number of things looked forward to after verbal fluency (FAS) was partialled out (r (98) = .26, p=.009). The other non-significant relationships remained non-significant when partial correlations were run to partial out the contribution of verbal fluency (FAS).

**Covid-relatedness of future-thoughts and links to anxiety, depression, and wellbeing**

The mean scores of Covid-related ratings were calculated by dividing the total Covid-related score by the number of items on the FTT. This helped to accurately reflect the extent to which future related thoughts were related to the Covid-19 pandemic.

Bivariate Person’s Correlations were used to examine the relationships between anxiety, depression, and the wellbeing variables with the mean Covid-19 ratings on the FTT task (mean Covid-19 ratings for the FTT positive condition (all 3 time periods) and the mean Covid-19 ratings for the FTT negative condition (all 3 time periods) were calculated individually). This is shown in Table 10.

**Table 10. Bivariate Pearson’s correlations for mean Covid-relatedness of future-thoughts and anxiety, depression, and wellbeing**

|  |  |  |
| --- | --- | --- |
|  | Mean Covid rating of number of things looked forward to (positive FTT condition) | Mean Covid rating of number of things not looked forward to (negative FTT condition) |
| FS | -.08 (p = .446) | .06 (p = .572) |
| PA | .15 (p = .151) | .14 (p = .164) |
| NA | .13 (p = .211) | .13 (p = .185) |
| Depression | .04 (p = .701) | .002 (p = .983) |
| Anxiety | .20 (p=. 043)\* | .17 (p= 102) |

*\*Indicates significant result for p value .05, \*\* for .01 and \*\*\* for .001*

The hypothesis was not supported. The only significant correlation was anxiety with Covid-related positive future thoughts showing a positive relationship (r (98) = .20, p=.043). This shows that for those who were more anxious, more of their positive thoughts were ‘captured’ by Covid. None of the other predicted correlations were significant.

**Thematic content of positive and negative future thinking**

A final aim of the study was to explore emergent themes in the dataset to help ascertain what was important to the adolescents, as well as any of the themes’ relationships to anxiety, depression, the well-being variables and the FTT. Table 11 shows the frequency of use for each theme.

**Table 11. Frequency (shown as the mean) of themes for positive future thoughts (top row) and for negative future thoughts (bottom row)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Social/  Interpersonal | Achievement/  Failure | Intrapersonal | Leisure/  Pleasure | Own Health | Health  of  Others | Financial/  Home | Other |
| 3.45 | 4.35 | 1.49 | 3.50 | .39 | .01 | 1.30 | .08 |
| 2.14 | 6.00 | 2.48 | .53 | .78 | .57 | .89 | .12 |

Some of the codes were used much more than others, for example Achievement/Failure, Social/Interpersonal, Leisure/Pleasure and Intrapersonal, which therefore seemed especially relevant to the sample overall.

Some code frequencies were very low and therefore of little importance to the participants in this context, as well as not providing enough variance to be used for analyses. For example, 92% of participants did not use the code ‘Own health’ at all or only once in the positive condition and 100% of participants did not use the code ‘Health of others’ at all or only once in the positive condition. Codes that were not used at all, or only used once, by at least 50% of the participants or more (a cumulative percent score of 50% or over) were not taken forward for further analyses. The codes not taken forward for further exploration from the positive condition were Intrapersonal, Own Health, Health of Others and Financial/Home. The codes not taken forward for further exploration from the negative condition were Social, Leisure, Own Health, Health of Others and Financial/Home. Therefore, the codes that seemed relevant and important to the participants from the positive condition were Social, Achievement and Leisure, and from the negative condition were Achievement and Intrapersonal.

For each of these five codes that were more important to the adolescents, a new variable was computed from the original variable. This was done by dividing the code frequency by the total number of items, giving a *relative* frequency of the code for each person.

Following this, for each of the dependent variables (anxiety, depression, FS, PA, and NA), a standard multiple regression was performed with the positive and negative relative frequency scores.

For the positive condition, there were 5 regressions run in total, with each of the anxiety, depression, or wellbeing variables as a dependent variable and the three relative frequency scores for the codes as predictor variables. There was no significant effect in any of these regressions. Therefore, this shows that none of the relative frequency scores of Social, Achievement and Leisure were significantly associated with any of the dependent variables measuring anxiety, (R2 = .03, adjusted R2 = .004; F (3,96) =1.13 , p=.34), depression (R2 = .001, adjusted R2 = -.03; F (3,96) =.04 , p=.989), psychological wellbeing (R2 = .006, adjusted R2 =-.03; F (3,96) = .21, p=.892), positive affect (R2 = .03, adjusted R2 = .002; F (3,96) = 1.07, p=.368), or negative affect (R2 = .04, adjusted R2 = .01; F (3,96) = 1.47, p=.229).

For the negative condition there were another 5 regressions run, with the 5 dependent variables as above, and the two relative frequency scores for the codes as predictor variables. For depression (R2 = .07, adjusted R2 = .05; F (2,97) = 3.83, p=.025), psychological wellbeing (R2 = .03, adjusted R2 = .01; F (2,97) = 1.62, p=.204), and positive affect (R2 = .01, adjusted R2 = -.01; F (2,97) =.53, p=.591) there were no significant effects. However, for anxiety, relative frequency scores for Intrapersonal and Achievement together accounted for a significant amount of the variance (R2 = .11, adjusted R2 = .09; F (2,97) = 6.03, p=.003). The effect size for this regression is small (F2 = .12). The partial regression coefficients showed that the proportion of negative achievement codes had a significant unique negative relationship to anxiety (B = -7.90, β = -.33, t (98) = -3.16, p=.002) in that the more negative achievement codes, the lower anxiety. The partial correlation coefficient was r=-.31 showing a medium effect size. The proportion of negative intrapersonal codes however was not independently associated with anxiety, after controlling for negative achievement codes (B = .08, β = .002, t (98) = .02, p=.985). The partial correlation coefficient was r=002. For negative affect, relative frequency scores for Intrapersonal and Achievement together accounted for a significant amount of the variance (R2 = .18, adjusted R2 = .16; F (2,97) = 10.56, p<.001). The effect size for this regression is medium (F2 = .22). The partial regression coefficients showed that the proportion of negative achievement codes had a significant unique negative relationship to negative affect (B = -5.02, β = -.24, t (98) = -2.42, p=.018) in that the more negative achievement codes, the lower negative affect. The partial correlation coefficient was r= -.24 showing a small effect size. The proportion of negative intrapersonal codes was also independently associated with negative affect, after controlling for negative achievement, this time showing a positive relationship (B = 8.82, β = .26, t (98) = 2.57, p=.012) in that the more negative intrapersonal codes, the higher negative affect. The partial correlation coefficient was r=.25 showing a small effect size.

**Exploratory analysis**

Further exploratory analyses using Bivariate Pearson’s Correlations were performed to examine the relationships between the dependent variables (FS, PA, NA, depression, and anxiety) and the individual time periods of the FTT (the next; week, year, and 5-10 years), in the positive and negative conditions in terms of number of thoughts and mean Covid-related thoughts. There is not generally a difference found between time periods using the FTT in the adult research reported but it may be the case with younger people due to cognitive differences.

Table 12 shows correlations between the five wellbeing variables (FS, PA, NA, depression, anxiety) against the different time periods of the FTT (positive and negative conditions for the next week, the next year, and the next 5-10 years). Flourishing was positively correlated with number of things looked forward to in the next week (r (98) = .30, p=.002), and the next 5-10 years (r (98) = .24, p=.015), as well as depression being positively correlated with number of things not looked forward to in the next week (r (98) = .21, p=.038). This shows slightly more support for the hypotheses around future thinking and the wellbeing variables.

**Table 12. Bivariate Pearson’s correlations for anxiety, depression, wellbeing, and number of positive and negative future thoughts in each time FTT time period (*top row positive condition and bottom row negative condition)***

|  |  |  |  |
| --- | --- | --- | --- |
|  | The next week | The next year | The next 5-10 years |
| FS | .30 (p=.002)\*\*  -.122 (p=.228) | .08 (p=.404)  -.09 (p=.363) | .24 (p=.015)\*  -.01 (p=.940) |
| PA | .11 (p=.264)  -.10 (p=325) | .12 (p=.169)  .07 (p=.476) | .10 (p=.329)  .02 (p=.882) |
| NA | -.10 (p=.332)  .16 (p.112) | .10 (p=.336)  .14 (p=.180) | -.11 (p=.275)  .01 (p=.913) |
| Depression | -.14 (p=.178)  .21 (p=.038)\* | .09 (p=.389)  .16 (p=.118) | -.05 (p=.599)  .07 (p=.502) |
| Anxiety | .02 (p=.880)  .13 (p=.186) | .12 (p=.239)  .16 (p=.110) | -.06 (p=.529)  .03 (p=.744) |

*\*Indicates significant result for p value .05, \*\* for .01 and \*\*\* for .001*

Table 13 shows correlations between the five wellbeing variables against the mean Covid-related future thoughts for each time period. There is slightly more evidence for the hypotheses for Covid-related thoughts when looking at individual time periods. Positive affect is positively correlated to Covid-related thoughts in the negative next year condition (r (98) = .22, p=.029). Negative affect (r (98) = .20, p=.05) and anxiety (r (98) = .21, p=.04) are positively correlated to Covid-related thoughts in the negative next week condition.

Overall, when distinguishing the different time periods, there is some evidence that the nearer future has a closer relationship to the dependent variables.

**Table 13. Bivariate Pearson’s correlations for mean Covid-relatedness of future-thoughts for each FTT time period, and anxiety, depression, and well-being *top row positive condition and bottom row negative condition)***

|  |  |  |  |
| --- | --- | --- | --- |
|  | The next week | The next year | The next 5-10 years |
| FS | -.06 (p=.553)  -.05 (p-.651) | -.02 (p=.857)  .13 (p=.212) | -.05 (p=.617)  -.05 (p=.657) |
| PA | .15 (p=.144)  .04 (p=.671) | .22 (p=.029)\*  .09 (p=370) | .00 (p=.977)  .10 (p=314) |
| NA | .14 (p=.172)  .20 (p=.050)\* | .11 (p=.271)  .06 (p=.570) | .08 (p=.411)  .13 (p=.188) |
| Depression | .11 (p=.260)  .06 (p=580) | -.03 (p=.773)  -.03 (p=750) | .02 (p=870)  .07 (p=.480) |
| Anxiety | .20 (p=.052)  .21 (p=.040)\* | .15 (p=.127)  .12 (p=.252) | .09 (p=.374)  .14 (p=.159) |

*\*Indicates significant result for p value .05, \*\* for .01 and \*\*\* for .001*

## **Discussion**

**Summary of the results**

The present study aimed to explore the relationship between future thinking (number of thoughts, Covid-related future thoughts, and future thinking themes), depression, anxiety, and psychological wellbeing in an adolescent sample. The first predicted outcome that adolescents who generate more negative future thoughts will have higher anxiety and lower wellbeing was not supported. The second predicted outcome was that positive future thoughts will be associated with lower levels of depression and higher levels of wellbeing. This was only partially supported with one aspect of psychological wellbeing (flourishing) being significantly positively correlated with positive future thoughts with a small effect size. The third predicted outcome was that adolescents who have more Covid-related future thoughts will have lower wellbeing and higher depression/anxiety scores. The results again did not support the hypothesis. Covid-related thoughts in the positive condition of the FTT were significantly positively correlated with anxiety again with a small effect size. The final aim was exploratory and related to future thinking themes. Common themes included Achievement/Failure, Leisure, Interpersonal/Social and Intrapersonal. Those who had higher negative affect had a higher proportion of negative Intrapersonal thoughts and a lower proportion of negative Achievement thoughts (illustrated with a medium effect size for the regression and a small effect for the partial correlation coefficients individually). Those with higher anxiety also had a lower proportion of negative Achievement thoughts (illustrated with a medium effect size).

When exploring the data further there was more support for the hypotheses, with some evidence that the nearer future had overall a stronger association with wellbeing with one exception. Flourishing was associated with positive future thoughts in the next week with a medium effect size and depression was associated with negative future thoughts in the next week with a small effect size. Flourishing was also associated with more positive future thoughts in the distant future (5-10 years) with a small effect size. Negative Covid-related future thoughts in the next week were associated with higher negative affect and anxiety both with a small effect size. Positive affect was associated with more Covid-related thoughts in the negative next year condition with a small effect size.

**Consideration of key findings**

***Future thinking, depression, anxiety, and psychological wellbeing:*** Higher levels of eudaimonic psychological wellbeing (flourishing) was associated with more positive future thoughts, but no fewer negative future thoughts. This partly supports previous research showing that higher levels of psychological wellbeing are associated with more positive future thoughts and fewer negative future thoughts in adult populations (Macleod and Conway, 2007;Macleod, 2013)**.** There were no relationships found with anxiety, depression or positive or negative affect in relation to positive and negative future thinking conditions overall. This is contrary to a large body of evidence in adults that depressed participants generate fewer positive future events (MacLeod and Byrne, 1996**;** MacLeod et al. 1997b; MacLeod and Saliminiou 2001),and no more negative events (MacLeod and Salaminiou, 2001; MacLeod and Conway, 2007;MacLeod et al. 1997c**;** MacLeod, et al., 1993). This also contrasts with previous evidence that anxious participants generate more negative events, but no fewer positive events than controls (MacLeod et al, 1997c; MacLeod and Byrne 1996).

The fact that no other significant relationships we found here with the overall FTT positive and negative conditions could indicate that the same relationship that exists in adults does not exist in adolescents, at least not in the same way. Seymour and MacLeod (2015) also did not find all expected relationships in a similar study and concluded that future thinking may not be as relevant to adolescents’ wellbeing. This can be explained by cognitive development research, showing that adolescents have not fully developed their operational thinking styles (Greene, 1986) and that their pre-frontal cortex is still developing (Steinberg, 2008). Adolescent future thinking is therefore more ‘present focused’ in that they are not as able to consider future consequences when problem solving (Pfeifer and Blakemore, 2012)**.** Adolescents are therefore more presently oriented (Siu et al., 2014). Further, adolescents may perceive time differently, meaning that the future seems further away to them, and therefore it could be that future thoughts are less relevant to their mental health (Laureiro-Martinez, et al., 2017). Their more immediate future thoughts therefore could be more related to their mood and anxiety than the later time periods in the FTT. This may result in the FTT used as an overall measure, being less relevant to adolescents, or less accurate.

The exploratory analyses showed some support for the idea that the nearer future was more important to adolescents. Flourishing was associated with more positive future thoughts in the next week and depression was associated with more negative future thoughts in the next week (and not in any other FTT time period). The nearer future therefore had more influence on their wellbeing and mood. There was one exception here with flourishing also being associated with more positive thoughts in the distant future (5-10 years) which indicates that flourishing overall has a stronger association to future thinking than the other wellbeing variables. The fact that depression was associated with more negative future thoughts (and not anxiety as with adults) is also consistent with Miles et al’s (2004) findings with the same age group, in that higher negative future thoughts was also associated with higher depression. This again points towards cognitive differences in adolescents compared with adults, but still supports the idea that future thinking is associated with depression and anxiety.

Further, expectancies on the FTT were clearer and more detailed in the nearer future conditions compared to the distant future. For example, they tended to look forward to specific events in the next week such as going to the cinema/dinner or a party with a friend/family whereas the distant future thoughts tended to be vague and more abstract such as, I am looking forward to a career or having a long-term partner. In line with this, it has been shown that young people think about the near future more frequently and clearly than the distant future (Tonn and Conrad, 2007; D’Argembeau and Van der Linden, 2004). This again seems to explain why the distant future had a generally weaker association with depression, anxiety, and wellbeing.

Overall, flourishing showed the strongest association with positive future thinking in adolescents. A similar study in schools using the FTT reported that in post-research feedback sessions, participants said they found the study ‘pessimistic’, in that they hadn’t really thought about negative things that might happen to them. The study concluded that therefore that adolescent future positive thoughts could be more accurately represented (Whaley and MacLeod, 2014). This could provide an explanation of this association found with flourishing both overall in the positive condition and in two different time periods for both near and distant futures. There is also evidence that adolescents are more focused on negative *past* events than adults (Laureiro-Martinez, et al., 2017) which may have a stronger association to their feelings of depression, explaining why depression and negative affect were not overall associated with future thoughts. Kagan, et al., (2004), also concluded that depressed adolescents may be partially protected from future pessimism, compared to adults, due to having a more fixed and general script about the reasons why future events might happen.

***Covid-related future thoughts and mental health***: Considering Covid-related thoughts was the most novel element of the study. Findings were unexpected with only one variable showing a relationship to Covid-related future thoughts. Higher anxiety was related to more *positive* Covid-related future thoughts. Qualitatively, when looking at the types of responses within Covid-related positive future thoughts, they tended to be activities or events that had not previously been possible due to restrictions and were therefore seen as Covid-related. These were things like going to see family, including vulnerable family members who may live abroad, going on holiday, travelling, and seeing friends. It seems that perhaps events that were previously more ordinary are now considered more novel and therefore conceptualised as Covid-related. The study did not ask the participants how much they believed the events would occur and for this reason it is possible that these codes relate to a certain element of anxiety and worry over whether, for example, they will be able to go on the holiday they are looking forward to. This makes sense in light of rapidly changing rules at the time. The results here also could be reflecting the notion that the more ‘engulfed’ or ‘pre-occupied’ of Covid, the higher anxiety. This is in line with longitudinal research showing that the pandemic has detrimentally affected the mental health of young people (see attached systematic review). This could also be made sense of by previous findings suggesting that anxiety is related generally to an amplification of negative *and* positive emotions (Skowronski et al, 2014; Walker et al. 2014) and therefore high anxiety may influence positive future thoughts as well as negative (related to positive and negative emotions).

Other mental distress/wellbeing variables did not show any relationship with Covid-related future thoughts in the positive of negative FTT conditions. This could connect with explanations around cognitive development, time perception and reduced importance of more distant future thoughts for adolescents as previously discussed. This idea is supported by the exploratory analyses which separated out the different time periods within the FTT, showing that the nearer future was more relevant for Covid-related thoughts and wellbeing, with the majority of variables being associated with the nearer future. Covid-related negative future thoughts for the next week were associated with higher negative affect and anxiety. Covid-related negative future thoughts for the next year were also associated with higher positive affect. This overall shows more evidence of ‘engulfment’ (Van Bulck et al., 2019) in relation to the pandemic, and that this is associated with wellbeing, and more prominently in the near future. Negative Covid-related thoughts in the next week tended to be things like catching Covid-19 (themselves or family/friends), and/or related to pandemic restrictions. Next year future thoughts tended to be things like going on holiday, again being considered Covid-related as they were previously restricted from doing so, which makes sense in terms of being associated with positive affect.

Methodological constraints could have affected the ability to capture any possible relationships. A study looking at psychological wellbeing, depression and anxiety related to past and future thoughts where participants were directly asked about the pandemic, found that negative future thoughts were rated as more emotionally impactful than positive future thoughts, and were associated with higher levels of depression (Niziurski and Schaper 2021). It could be therefore that the task used was not ‘sensitive’ enough to capture Covid-related thoughts overall. Perhaps including additional question/s related to the pandemic to elucidate these thoughts would have been more accurate than retrospectively rating responses. Further, due to the experimental nature of the task, the thoughts elicited generally may have less impact on wellbeing.

***Emergent themes and their relationships to their variables:*** Common themes for adolescents were around Achievement/Failure in both the negative and positive future thinking conditions. Content tended to reference A Levels, going to university and careers in the more distant future. This is in line with previous research showing future orientated thoughts relate to Education and Occupation (Sundberg, et al., 1983; Nurmi, 1991, 1992; Cross and Markus, 1991) and is similar to themes found in a more recent study (Seymour and MacLeod, 2015) showing that this is consistent over time. In line with ideas on developing identity and future selves, it seems this is a pertinent area.

Interpersonal and Leisure were other areas that the adolescents looked forward to, with content such as wanting to watch movies, shopping, parties and seeing their friends and family. This is in line with previous research showing common themes relate to family (Cross and Markus, 1991) and leisure (Lanz et al. 2001; Nurmi, 1991). In terms of the negative codes, Intrapersonal was the most frequent theme, and was also associated with heightened negative affect. Content emerged such as being lonely, getting older, struggling with becoming independent, feeling anxious and never having good mental health. It therefore seemed that a lot of their concerns were ‘meta’ (thoughts about thoughts/emotions about emotions) and therefore their relationship/tolerance to their ‘negative’ thoughts and feelings. This relates to the well-established concepts of emotional or cognitive ‘fusion’ in Acceptance and Commitment therapy (ACT) (e.g., Harris, 2007) and emotions about emotions in Compassion Focused Therapy (e.g., Gilbert 2010).

Negative Achievement/Failure future thoughts showed an interesting relationship with negative affect and anxiety, where the more negative future thoughts related to Achievement/Failure, the lower the anxiety and negative affect. Because this study did not ask about how much the participants believed their negative future thoughts were likely to happen, it is unclear how pertinent these thoughts were, which could partly explain the negative relationship shown. It could also be ‘relative’ in the sense that, compared to other negative codes, these future thoughts impacted less on anxiety and mood. For example, Intrapersonal future thoughts are related to gaining independence which is known to be a huge developmental task (e.g., Zimmer-Gembeck and Collins, 2003), and previous research in adolescents has found that high distress is associated with more Interpersonal thoughts (Whaley and MacLeod, 2014). Achievement/Failure was also a broad category and therefore may not have been able to capture context and nuanced detail. Participants also tended to repeat what they had said in the positive condition but reversed e.g. ‘I am looking forward to going to university’ and ‘I won’t get into university’. It is difficult to see from this which scenario they think is more likely. It has been shown in previous research that those who are anxious and depressed think that negative events are more likely to happen and that positive events are less likely (MacLeod et al., 1997b).

***Poor mental health***: Despite it not being the primary focus of the study, an interesting and somewhat unexpected finding was the descriptive statistics of the participants’ mental health and wellbeing scores. The means for anxiety and depression were above the set clinical cut-offs and therefore were considerably higher than what would be expected in a non-clinical population. A total of 73% of the participants met the threshold for probable generalised anxiety disorder (GAD) and 67% met the threshold for probable clinical depression. Compared to longitudinal research on the impact of the Covid-19 pandemic, there is higher depression and anxiety shown here compared with pre-and post-pandemic data (Upton et al., 2021; Lau, et al., 2021; Koenig et al., 2021). A few studies showed scores that were more similar to the current sample (i.e., means above clinical cut-offs) but were still lower than were found here (Jia et al., 2020; Pieh et al., 2021). It should be noted that the reported studies measured mental health earlier in the pandemic than the present study. The adolescents also had lower psychological wellbeing and positive affect than in the original study for the Flourishing Scale (Diener et al., 2010) and for adolescents (Romano, et al., 2020), and higher negative affect (Thompson 2007).

These results could be explained by the fact that adolescents and young adults have been amongst the most adversely affected in terms of their mental health during the Covid-19 pandemic (e.g., Alonzi et al. 2020;Evans et al. 2021; O’Connor et al., 2020; Smith et al., 2020). The sample was also mostly female and teenage girls have been more negatively affected in terms of their mental health during the pandemic compared to boys (Samji et al., 2021; attached systematic review). Due to the timing of the present study, this data could indicate that the effects of the pandemic on mental health are harsher and became pervasive as the pandemic continued. Much of the research into the pandemic (see attached systematic review) was carried out in the initial stages of the pandemic and there is currently a lack of information about mental health as the pandemic continued. Pressures as the pandemic continued, potentially include the repeated on and off lockdowns where morale and hopes of a rapid return to normal dwindled over time.

**Statistical limitations and considerations**

In this study many correlations were run as per the analyses plan. As only one variable was significant for each hypothesis (for number of future thoughts and then for the Covid-related thoughts against the wellbeing variables), further regressions were not run. Exploratory analyses were also run over the individual time periods which increases the risk of bias and Type 1 error. In order to account for this Bonferroni corrections could have been applied by dividing the p value (0.05) by the total amount of additional tests. When this is done (0.05/60), the new p value is 0.0008 and therefore creates an extreme p value which increases the likelihood of type II error. As a compromise adopting a p value of .001 means that none of the additional tests remained significant. It is important to note that this limits the conclusions drawn. It should also be noted that the majority of effect sizes found in this study are small, and therefore these significant findings should be interpreted with caution.

For the Pearson’s Bivariate correlations, the main form of data analysis used, the assumptions for the tests were checked and met. For the multiple regressions (which were performed for the codes only), the normality of distributions had been checked and met, but the other assumptions were not fully checked which is another limitation of the data analyses.

**Overall limitations**

The sample used here is limited due to its relatively small size and because it reflects only a specific geographic population in a north London school. Further to this only psychology students were included. The generalisability of the findings, for example to other cultures, younger adolescents, wider ethnic backgrounds, socioeconomic status, neurodiversity, and disability, are therefore limited. The sample is also mostly female, which at least in part relates to the sample being psychology students only. It is often found that adolescent girls report worse mental health than boys. This has been found before the pandemic (e.g., Sadler et al., 2018) and during the pandemic (e.g., Stroud and Gutman, 2021) which may have biased to results**.** Older adolescents are also known to report worsened mental health, (Samji et al., 2021) which may have further influenced the data. Being a psychology student may have also biased the results to those who were more interested in mental health, which may relate to personal experience of mental health difficulty. Other confounders include that the sample was mostly representative of British participants who were of European descent and who were ‘middle class’. This limits generalisability to other cultures, other socio-economic statuses, and ethnicities.

Further, physically being at school may have influenced the participants to give academic related answers to the FTT (e.g., Achievement/Failure themes) and may have influenced the research environment to feel more like an exam. As the task was written, it also meant that some responses were much shorter than others (e.g., ranging from some are written in full sentences and others in just one word). This would then influence the count of responses. There was also no opportunity for the researcher to ask for clarification on an ambiguous response. In terms of coding, it was difficult to pick up context and nuances. Overall, because the task experimentally elicits future thoughts, they may be less accurate or impactful than ‘naturally occurring’ thoughts.

The research session took around an hour to complete and required sustained concentration which may have led to fatigue or boredom effects. The ability to think about the future is an ability that generally increases across adolescence (Nurmi, 1991). Even though an older adolescent sample was used here, there could have been large differences in future orientation ability within the sample. Further, as there was no lockdown imposed at the time of the research session, the participants may have been less likely to have Covid-related future thoughts and it overall limits the generalisability of the data in relation to the pandemic.

Another limitation is the relatively low response rate to the study which was around 50% of possible students. As the study took place at the same time as other classes or a free period, it is difficult to ascertain the exact reasons why others chose not to attend, but it could relate to many reasons such as young people not being interested in the study, feeling anxious about missing a class or not wanting to give up their study/free time. It may be more helpful in the future to run a research session outside of a usual lesson to open the study up to more potential participants. This study asked for gender identity but not sex and therefore this limits the study’s ability to accurately describe the sample.

**Implications**

The findings overall show that future thinking could be important for adolescent psychological wellbeing (specifically in relation to flourishing) . This has implications for how future thinking could be targeted in psychological therapies for adolescents, for example by targeting negative future thoughts in terms of reframing, and to focus on increasing future positive thoughts. In adolescents it could be especially important to focus on the near future. It could also be important to focus therapeutically on generating a ‘positive’ representation of a future self for adolescents. Future thinking could also be included in measures as outcomes to mental health therapies. Further, the future thinking themes have implications, for example in values-based approaches for adolescents (e.g., Acceptance and Commitment Therapy, Harris 2007).

The descriptive mental distress and wellbeing data when compared with data in similar samples *could i*ndicate pervasive effects of the pandemic. This could have wider implications for public funding and policy for the psychological and social interventions for better mental health outcomes for young people. This could look like funding and provisions for Child and Adolescent Mental Health Services (CAMHS) and interventions in schools. This might look like the introduction of more evidence-based School Based Interventions (see Paulus, et al., 2016 for a Systematic review) and thinking about the importance of the maintenance of secure attachments. Verschueren and Koomen (2012) discuss the importance of applying attachment theory and research (e.g., Ainsworth, 1990) to protect current and future mental health. This might look like focusing on relationships generally, and in the event of future disasters providing safeguards such as online community groups, improving support from key adults, and providing more easily accessible personalised online mental health support. This needs further research as the data in this study is only from 100 psychology students in one specific school and is not longitudinal.

**Future research**

Further research is needed on future thinking in adolescents to ascertain whether a relationship exists with anxiety and depression, and how strong this relationship is. It would be important to confirm if in adolescents, higher depression *and* anxiety is connected with more negative future thoughts and thus whether this is different to adults. It would also be helpful to explore whether the findings are repeated for psychological wellbeing. One way of researching adolescent future thinking in the future could be to compare non-clinical groups with clinical groups experiencing anxiety and depression separately as has been researched in adults. Adolescents could also be asked about the perceived likelihood of events occurring for potentially clearer results. Additionally, it would be helpful if clearer instructions could be given for the FTT e.g., around writing in full prose sentences. Given the current research on adolescent cognitive development and some evidence here for near-future thinking, it would also be important to explore whether this can be repeated and therefore whether there is further evidence for immediate future thoughts having more of a significant relationship to mental distress and psychological wellbeing. In terms of Covid-related future thoughts and their relationship with mental health, perhaps a better way generally to start exploring this is to conduct qualitative or mixed methods research in adolescents in relation to the pandemic. Qualitative questions could explore the impact of the pandemic and how this has affected future thinking and mental health. This could provide some richer information and groundwork in the area.

It would also be important to consider the longer-term impacts of the pandemic on the mental health of young people as much of the research is from earlier in the pandemic (see systematic review) and has already shown detrimental effects on mental health. Emerging research is also showing that the pandemic has affected more vulnerable groups differently (e.g.,Nonweiler at al., 2020, Turner et al., 2021) and so it would also be important to explore these longer term affects across diversity.

## **Conclusion**

It was found that more positive future thinking was associated with higher levels of psychological wellbeing in relation to eudaimonic wellbeing (flourishing) as predicted, but no other relationships were found between future thinking and depression/anxiety or affect in the positive of negative future thought conditions. One of many possible explanations for this are cognitive differences in adolescents, for example, where the near future is more clearly represented and more salient than the distant future. Further analyses provided some support for this with positive future thoughts in the next week being associated with flourishing and negative future thoughts in the next week being associated with depression. Flourishing was also associated however with the distant future (the next 5-10 years) which indicates a stronger association to future thinking. Covid-related thoughts also did not show predicted relationships overall. Having more Covid-related positive future thoughts were found to be associated with higher anxiety which could be explained by thinking more generally about the pandemic and engulfment relating to higher anxiety. The near-future in terms of Covid-related thoughts also seemed more important to the adolescents, with the negative future ‘next week’ condition being associated with higher negative affect and anxiety. Covid-related negative future thoughts for the next year were associated with higher positive affect. All together this shows some evidence for adolescent future thinking in the closer future having a stronger connection to wellbeing, and some evidence for the concept of engulfment in the Covid-19 pandemic. Notable findings with themes were that adolescents who had more ‘Intrapersonal’ themed future thoughts displayed heightened negative affect. It seemed overall adolescents were more concerned with Achievement, Leisure, and Interpersonal areas of their lives in terms of their ‘future selves’ developing. Descriptive statistics of the sample showed that the adolescents had very poor mental health and wellbeing. This is an important finding and suggests that more research is needed to ascertain the longer-term and ongoing effects of the Covid-19 pandemic.

# **Integration, impact, and dissemination**

## **Integration**

The overall aim of the systematic review was to critically evaluate and synthesise information on adolescents’ and emerging adults’ mental health, in the wake of the current Covid-19 pandemic. The systematic review helped to ascertain the impact of the Covid-19 pandemic on this age group using longitudinal research only, as opposed to retrospective reports/cross-sectional research. The systematic view provided a helpful background for the empirical study and helped me to understand the impact of the pandemic. It also helped to strengthen hypotheses in the empirical review in terms of providing evidence for the pandemic being an external macro-level stressor in the Johnson et al., (2014) model of future orientation in adolescents.

The findings from the systematic review also helped to consider whether the pandemic was salient enough for adolescents’ mental health to result in ‘engulfment’. Evidence that the pandemic had affected youth negatively helped to me be more confident of the hypotheses related to Covid-related future thinking as engulfment involves a negative aspect of thinking in relation to an illness identity (Van Bulck et al., 2019). The research and literature searching carried out for the systematic review, was helpful in interpreting the descriptive statistics of the sample in the empirical. It helped to consolidate the information and to hypothesise that the pandemic may have been even more negatively impactful to mental health as it continued.

The empirical study expanded on the findings from the systematic review and studied mental health in the context of future orientation, specifically future thinking and in relation to wellbeing, depression, and anxiety. This element of the empirical was quite separate to the systematic review and was influenced by a separate body of research. The empirical project contributed to both the future orientation and future thinking research in adolescents, and the pandemic research into young people’s mental health. It also related to positive psychology research as it includes measures on psychological wellbeing and considers this as a sperate construct than simply the absence of distress (Seligman, 2002).

The descriptive statistics of the adolescent’s mental health reported in the empirical study also helped me to form hypotheses and ideas for further research for the systematic review. As they had shown evidence of poor mental health in the sample, and in comparison, poorer than in the start of the pandemic, it made me think of how the pandemic could have worsened mental health as time continued and could had more pervasive effects than what I was able to report in the systematic review. Of course, this is only one sample, and more research is needed, but I still felt this was important to explore.

**Research challenges and their implications for the project**

For this project, 100 participants completed enough of their packs for their data to be used for analysis. From the power calculation for the empirical project, I needed 84 participants. This was close enough to ensure that this study was powered enough to find any significant relationships within the data avoiding a type 2 error. The sample size also does not significantly exceed the power calculation and therefore this also avoids a type 1 error (Cohen, 1988).

There were however methodological limitations which may have impacted the results. For example, the school were only able to provide a relatively small room with chairs that had mini fold-out desks attached. This may have somewhat compromised the confidentiality of the study because the students may have felt more anxious about their answers being seen for the tasks and questionnaires. I was also not aware of the exact numbers that would attend the research session and so I did not pursue another school until I was certain about whether I would need more. The limitations of having all the students from one school are that the results become less generalisable across other teenagers and locations. The students may have also felt pressured to attend the research session as it was in place of their usual Psychology A level lesson. This may have meant that the students who attended were less motivated and therefore less invested in the present study which would have biased the results.

For the Covid-related thoughts I originally had considered, alongside my supervisor, that an independent coder would code the Covid-relatedness of the future thoughts and that we would create a coding system for that to happen. We however eventually decided against this because we thought that it would not be possible to provide reliable ratings. For example, it may be impossible for an independent observer to know whether a participant looking forward to seeing a family member or going on holiday was Covid-related or not because it is a personal and abstract concept that only the participant themselves would know. Ultimately this seemed to be a helpful decision as much of the teenagers Covid-related thoughts were not obvious. As reported in the study, they tended to be very normal things that did not have an obvious relation to Covid-19. There were some however that were clearer such as ‘I will catch Covid-19’ but these were far and few between.

Another challenge of the empirical study was related to the timing of the research session. When ethical approval was granted, it was during the school summer holidays and so data collection was not possible until the term started, and then I worked around timings that worked best for the school. For this reason, I did not know how much the pandemic would be affecting their lives at the time of the research session, whether it would have to take place online and what restrictions, if any, would be in place. It is likely that the Covid-related element of the study, and the descriptive statistics of depression, anxiety, and psychological wellbeing, could have looked different if the study had been conducted during a lockdown. There was a lockdown before this period and there were also restrictions put in place again following data collection. It could be that if the empirical study had taken place during a time involving more restrictions, it is possible that there would have been a greater proportion of Covid-related thoughts.

The main challenge in writing the systematic review was that it was difficult to sort through the dense amount of research and articles written about the pandemic and young people in the initial stages. It was often unclear in the abstract if a study was longitudinal or the exact age range. As mentioned in the systematic review, I would have included more search terms specifically for emerging adults now that I am aware of the terminology commonly used in the studies after reading them through. I am however confident that my search was comprehensive enough for the review. After searching through citations, I found two more studies, and the research tended to reference each other. Another challenge of the systematic review was the timeline. My database search took place in September 2021,but by the time I was able to complete the systematic review, it is likely that there could have been more longitudinal research published that would have been relevant to Ie and may have been helpful in reaching conclusions about the longer-term impact of the pandemic. This is due to the relatively large amount of research conducted in the area that takes a while to reach an academic journal.

**Reflections**

The area that I am most interested in clinically is working with adolescents and emerging adults, which is initially what drew me towards this age bracket. Having worked in Child and Adolescent Mental Health Services (CAMHS) during the Covid-19 lockdowns and in the aftermath of these, I have seen first-hand the impact that it has had on children and teenagers, as well as their families and relevant systems. I am also aware of the pressures on emerging adults who are often expected by societal narratives to easily transition into adulthood after turning 18, and that this is can, at times, be an unhelpful cultural narrative that disregards the unique pressures, challenges, and key developmental milestones of this time (Arnett, 2000).

I am currently on placement in a CAMHS service and all the young people on my caseload have difficulties that relate back to the pandemic. These relate to things like never being able to take any exams and now struggling with anxiety related to sitting them, struggling in friendships, struggling with social anxiety in terms of going to school and sometimes avoiding this entirely, struggling to transition to secondary school, body image issues, losses or trauma due to Covid-19, and many others. I have adapted my formulations to take this into consideration, that understandably this has been a difficult time for young people. My experiences made me consider how important it was to explore this academically and integrate this into psychological models and theory.

## **Impact**

The Research Excellence Framework defines successful impact as reaching many different levels beyond the world of academia, such as economical, societal level, cultural, public policy, and services (Penfield, et al., 2014). The findings overall have highlighted the importance of focusing on improving adolescent and emerging adults’ mental health in the aftermath of the Covid-19 pandemic. This affects not only the young people themselves, but their families, their relevant systems and the broader culture and society that they live in. They also highlighted the importance and relevance of future thinking in mental health and psychological wellbeing and how the nearer future may be more important to adolescents. This has important implications for the adolescents themselves, their families, and systems such as schools, and any professional working with adolescents. It also has implications in academia for further research. The systematic review findings have a much broader impact and can have many different types of implications, whereas the empirical potentially has more specific impacts e.g., in psychological treatments.

A useful way of thinking about impact is the ecological systems perspective (Bronfenbrenner, 1992) which conceptualises impact on four levels including micro-level (the individual, their family), the meso-level (community), the exo-system (large social networks e.g., adaptions made to services and organisations), and the macro-system (cultural level, laws, policy changes and public health initiatives). This poses a comprehensive way of considering research impact on many possible levels and considers the many different levels that Clinical Psychologists might be working in or be able to influence clinically (Browne, 2017). It also means that the research is more likely to make a significant impact.

***Micro-level (individuals and families)***: Both the systematic review and empirical project have the scope to impact at the individual and family level. The family level may be even more important for those under 18 and legally under the care of their parents or guardians. For the young people themselves, it would be important to normalise the impacts of the pandemic, especially for those who are particularly struggling. This in itself can be a powerful intervention to start to reduce suffering, by helping an individual feel less alone and appraise themselves less harshly. Normalising can also reduce secondary emotions such as feeling anxious about anxiety and depressed about feeling depressed and is a tool commonly utilised within evidence-based psychological therapies, for example in Cognitive Behavioural Therapy (e.g., Dudley et al., 2007; Veale, 2007). Normalising in this way may also be helpful for families to help reduce stigma and feelings of blame or shame. It could also help ‘externalise the problem’ as with approaches like narrative therapy in establishing a context which separates young people from their mental health difficulties (Morgan, 2000). The empirical study results may also help a teenager consider how important their future thinking is, in relation to their identity, sense of self and psychological wellbeing. Putting more attention to this area by the individual could in itself at have a positive impact. This is in relation to the idea of psychoeducation, which often has a positive impact on individuals struggling with their mental health (Sarkhel et al., 2020). The findings may also encourage an individual or family to seek appropriate support.

There are implications for adapting interventions at an individual and/or family level. From the systematic review findings, this may look like exploring the impact of the pandemic in clinical assessments and working on such difficulties in psychological therapies. It would be important to include the effects of the pandemic into the formulation and acknowledge the resulting systematic pressures on the individual and family. In terms of the empirical study, there are direct implications for adapting therapies, for example, by emphasising the importance of targeting future thinking to increase flourishing/wellbeing. This could be done by reframing negative future thoughts, increasing positive future thoughts and by connecting this to positive identity development, goal setting and transition into adulthood. This can be achieved in existing therapies, such as working with cognitions (e.g., Beck et al., 1979) or by working with scrips and life stories in narrate approaches (e.g., Morgan, 2000). It may also be important to focus on the nearer future for teenagers. This could be done in clinical practice as a way to build hope, which could be particularly important when working with risk and hopelessness. The future thinking themes also have implications, for example in values-based approaches for teenagers (e.g., Acceptance and Commitment Therapy, Harris 2007). This may translate into what forms important values, therapeutic goals, and achievements. Future thinking could also be included in measures as outcomes to mental health therapies, for example, questions such as, how often have you felt positive about your future, had positive thoughts about your future etc. Further, positive future thinking can be incorporated into goal-based or strength-based measures which are often used when working clinically/therapeutically with young people (Tsang et al., 2012).

***Meso-level***: Because mental health has generally been found to have worsened, this has implications for interventions at a community level. It provides motivation for systems to support young people and to hopefully create positive change. The most immediate communities and systems relevant for for adolescents and emerging adults are schools, colleges, sixth forms, youth centres, youth charities, youth services, employers of young people and universities. There is scope for education about mental health for staff at these communities and for evidence-based school-based interventions (SBI’s), not just in schools, but in the other areas for the other relevant adolescent and emerging adults’ services, educational settings, and initiatives. SBI’s have a large body of evidence in support of creating positive change for mental health (Paulus, et al., 2016). These SBI’s could also include interventions and psychoeducation on future thinking and future orientation. Relevant systems could also create the existence of peer support groups for young people to experience community support. Peer support groups can have a positive impact on mental health (Shalaby and Agyapong, 2020). The systematic review findings could also hopefully encourage employers of young people and charities to create more opportunities for emerging adults. This may look like employment schemes, mentoring and training.

***Exo and Macro-level***: At the broadest level are macro level impacts which include policy makers and media. Any impacts at this level can travel down to the other areas and of course this relationship is bidirectional so can move between the levels. An impact at this level is important because it can make change possible. It is being increasingly recognised that Psychologists have the ability to impact at a macro level (Browne, 2017). A positive impact at this level would be to increase public funding and provisions for adolescent and emerging adult mental health which has the potential to make a big difference at the exo-level and so forth. More fundings and provisions could, for example, help make services more accessible, and have the potential to increase service remits (for example, if public services have more funding, they may be able to cover a larger remit of mental health problems), reduce waiting lists and increase types of support available for young people. Some NHS boroughs have also set up services specifically for emerging adults and young people transitioning from CAMHS services. More provision of these types of services could be increasingly helpful for providing a more personalised way of working which seems appropriate and needed for emerging adults. This is evidenced by both the systematic review and empirical study, showing that the pandemic has impacted this age group specifically and that there are clinical and cognitive differences shown in late adolescence. Public policy could also help provisions for CAMHS services to place Clinical Psychologists in more school and educational settings.

There are also implications from the research about how to sensitively deal with young people’s mental health in the event of future pandemics/disasters, or/and further effects of Covid-19 at the macro level. It is possible that worsened mental health during the pandemic could be at least partly connected to disrupted ‘formative’ relationships with important figures such as teachers, mentors, youth workers, mental health professionals, social workers etc. Disrupted relationships would be even more impactful for young people who do not have strong attachments at home. The findings therefore could have important implications for young people’s attachments and feelings of security or having a ’safe base’ in the face of similar situations in the future. Verschueren and Koomen (2012) discuss the importance of applying attachment theory and research (e.g., Ainsworth, 1990) to shape high-quality teacher/adult-child relationships, how to sensitively respond to a young person’s needs and how important this is in terms of current and future mental health of the individual. At the exo-level, this may look like learning from the past by setting up online community groups within schools in the event of a lockdown, improving support from teachers and school staff, faster organisation of remote connections in education and mental health care, improved resources for online learning, and better public education on mental health.

## **Dissemination**

Meaningful dissemination is key in terms of maximising reach and meaningful positive impact of the work (Penfield et al., 2014). Sharing results with the study participants is ethically imperative (Fernandez et al., 2003) and interaction with the end-user is key to the successful dissemination of findings (Wilson et al., 2010). The initial dissemination strategy therefore involves providing a lay summary of the findings to the students who took part in the study, as well as the staff at the school.

I plan to discuss the findings in person with the students at the school which seems like a sensitive and helpful approach, especially in terms of feeding back the descriptive statistics around mental health and wellbeing. It could also provide a useful place to discuss what this means to them, as well as a space for a reflective and hopefully containing discussion. This would give me the opportunity to signpost to mental health support for any teenager who feels they are struggling and would like to pursue this. I have discussed with the school that the Psychology A level students can also make their own posters and present this back to other students if they wish. The school has felt this could be a useful way to help to young people engage with this content and make it feel more meaningful. The students may also be interested in future thinking and wellbeing and how this relates to them. They may also be interested in the results of the systematic review and may want to think more about the pandemic and how this may or may not have affected their mental health. It would be important to hear from them about what types of support and services would be helpful and meaningful. Service user involvement has been shown to increase self-esteem, confidence, and wellbeing, (Minogue et al., 2005) as well as of course helping professionals to create useful services.

Disseminating the lay summary to the school staff is also important. This helps to inform the teachers and staff about the young people they are working with and helps to promote mental health support either by the staff themselves or by relevant signposting. The teachers themselves may even become a source of dissemination to the students.

Findings from the empirical study have also been disseminated to trainee and qualified Clinical Psychologists at Royal Holloway via an interactive presentation, including allocated time for questions and reflections. I hope that the presentation piqued the interest of the audience to want to work with young people and to be aware of the impact of the pandemic during their clinical work and to ask about this in assessments and psychological therapy. I also hope that the clinicians would hold in mind the findings and the literature in relation to future thinking and how important and relevant this is to the mental health of teenagers. The work will also be presented at the CAMHS service where I am currently on placement and circulated to the multi-disciplinary team such as Psychiatrists, Clinical Psychologists, Child Psychotherapists, Mental health nurses, Family Therapists and Social Workers. I hope that this will be able to influence their work, especially with older teenagers, considering that future thinking may be especially important for psychological wellbeing, and again considering that their subjective experience may be different when thinking about the nearer and more distant futures. I will also send information to the team following the presentation. This helps to impact at a broader level.

For impact to reach a bigger or exo-level, I will also be aiming to disseminate findings to CAMHS services, youth centres, adolescent and/or emerging adults’ charities (e.g., Young Minds, The Prince’s Trust, ChildLine, Mind). One of the messages that I will be aiming to communicate is that the mental health and wellbeing of young people is paramount at this time. Ways of communicating to relevant individuals and organisations initially are emails, or presentations and further writing if requested. The organisations may be interested, and wiling to publish results of the systematic review and/or empirical study in their newsletters, websites and/or social media channels to further disseminate the findings/conclusions. Of special interest to these youth organisations would be the systematic review. As the topic discussed here is topical, current, and relevant to all adolescents and young people, it might also be that news outlets and publications are interested in discussing the findings, again especially in the findings of the systematic review. The lay summary could also be sent to them if they are interested in reporting on it further on their websites or social media. Newspapers such as The Guardian are currently reporting on the ‘child mental health crisis’ and reference the Covid-19 pandemic as being a contributor to this, (Campbell, 2022a) as well as reporting on CAMHS referrals ‘snowballing’ (Campbell, 2022b). The current research could help contribute towards similar articles. Articles like this can help influence the macro level as they increase public awareness and helps to engage influential individuals such as journalists and policy makers.

Dissemination to a broader and more academic audience involves publication routes through the submission of the systematic review and empirical project to established peer reviewed journals for adolescent mental health, young adult, and psychological wellbeing journals e.g. The British Journal of Clinical Psychology, Public Health, International Journal of Adolescence and Youth Cognition and Emotion, Clinical Psychology and Psychotherapy, Cognitive Theory and Research and Journal of Adolescence and Child and Adolescent Mental Health. The research will also be submitted for presentations at conferences in relation to young people’s mental health and/or the Covid-19 pandemic e.g., CAMHS National Summit Transforming Mental Health Services for Children & Young Adults

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# **Appendices**

## **Appendix 1: Ethical approval**

Ethics Application System <ethics@rhul.ac.uk>

Wed 08/09/2021 12:02

To: Titmus, Angelica (2019); [A.Macleod@rhul.live.ac.uk](mailto:A.Macleod@rhul.live.ac.uk); Ethics

PI: Prof Andrew MacLeod  
Project title: Adolescent future thinking, its relationship to wellbeing and the Covid-19 pandemic  
  
REC ProjectID: 2540  
  
Your application has been approved by the Research Ethics Committee.  
Please report any subsequent changes that affect the ethics of the project to the University Research Ethics Committee [ethics@rhul.ac.uk](mailto:ethics@rhul.ac.uk)

## **Appendix 2: Participant pack including demographics, tasks and questionnaires.**

**Demographic questionnaire**

Gender identity:

Age:

Year Group:

Ethnicity: page129image22544016page129image22541936

Occupation of mother/guardian: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Occupation of father/guardian: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Note: if you have one parent/guardian, please fill in one of these that is the most relevant*

page129image28613376page129image28616064

**FAS task**

*Please wait for instructions from the researcher before completing*

F

A

S

**THE FUTURE THINKING TASK**

**FUTURE POSITIVE**

*Please wait for instructions from the researcher before completing*

The next week

The next year

The next 5-10 years

**FUTURE NEGATIVE**

*Please wait for instructions from the researcher before completing*

The next week

The next year

The next 5-10 years

**COVID-19/PANDEMIC RATINGS**

For each of your responses to the future thinking task you have just completed, please rate using the scale shown from 0-2, whether the reason you wrote your response was because of the Covid-19 pandemic:

0 not at all (to do with the pandemic)

1 partly (due to the pandemic)

2 a lot (due to the pandemic)

***Please clearly mark a number next to each of your responses.***

*NOTE you do not have to do this for the FAS task at the beginning.*

**GAD-7**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Over the last 2 weeks, how often have you been bothered by any of the following problems?** | | Not at all | Several days | More than half the days | Nearly every  day |
| 1 | Feeling nervous, anxious or on edge | 0 | 1 | 2 | 3 |
| 2 | Not being able to stop or control worrying | 0 | 1 | 2 | 3 |
| 3 | Worrying too much about different things | 0 | 1 | 2 | 3 |
| 4 | Trouble relaxing | 0 | 1 | 2 | 3 |
| 5 | Being so restless that it is hard to sit still | 0 | 1 | 2 | 3 |
| 6 | Becoming easily annoyed or irritable | 0 | 1 | 2 | 3 |
| 7 | Feeling afraid as if something awful might happen | 0 | 1 | 2 | 3 |
|  |  |  | | |  |

**PHQ-8**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Over the last 2 weeks, how often have you been bothered by any of the following problems?** | | Not at all | Several days | More than half the days | Nearly every  day |
| 1 | Little interest or pleasure in doing things | 0 | 1 | 2 | 3 |
| 2 | Feeling down, depressed, or hopeless | 0 | 1 | 2 | 3 |
| 3 | Trouble falling or staying asleep, or sleeping too much | 0 | 1 | 2 | 3 |
| 4 | Feeling tired or having little energy | 0 | 1 | 2 | 3 |
| 5 | Poor appetite or overeating | 0 | 1 | 2 | 3 |
| 6 | Feeling bad about yourself — or that you are a failure or have let yourself or your family down | 0 | 1 | 2 | 3 |
| 7 | Trouble concentrating on things, such as reading the newspaper or watching television | 0 | 1 | 2 | 3 |
| 8 | Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual | 0 | 1 | 2 | 3 |

**Text, letter

Description automatically generated**

**The International Positive and Negative Affect Schedule Short Form (I-PANAS-SF)**

**Graphical user interface, text, application, letter, email

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## **Appendix 3: Instructions for researcher including verbatim instructions**

**Instructions for researcher**

**Study title: Adolescent future thinking, its relationship to wellbeing and the Covid-19 pandemic**

**Introduce study and time to go over information sheet**

***5 minutes***

* Thank you for being here today and for your interest in the study
* The research aims to explore the relationship between how young people think about the future and their well-being, particularly in light of the Covid-19 pandemic.
* Emerging research on the effects of the pandemic is starting to show that young people are amongst those who have been most affected in terms of their mental health.
* This research will look at another aspect that we know is related to well-being – how someone imagines their future looking and what they think is likely to happen
* You will be asked to complete several questionnaires, which will ask you about your mood, anxiety, and positive feelings. You will also be asked to think about things you might be expecting to happen in the future
* There are no right are wrong answers to the tasks/questionnaires
* Please work on your own
* The first half will be timed and I will give you instructions on how to complete the task, if you’re confused please let me know and I can clarify
* I will give you instructions after this on how to complete the rest of the questionnaires

**Questions?**

***2 minutes***

**Consent forms**

***2 minutes***

* Please read through the consent forms and tick the boxes/sign
* IGNORE THE PARITICPANT NUMBERS, THIS IS FOR ME TO ANONYMIISE YOUR DATA LATER ON
* Remind students that they can withdraw their consent at any time without giving a reason
* Those who choose not to take part can leave and do what they would normally be doing at this time

**Demographic questionnaire**

***1 minute***

* Please fill in the demographic questionnaire with what fits best for you.

**NB:** anyone who didn’t finish is able to come back to this later

**FAS**

***5 minutes***

* Let’s move on to our first task. This is a verbal fluency task
* In your packs, you should see something called FAS.

Instructions for FAS:

*"First I'd like you to think of as many words as you can beginning with a certain letter of the alphabet. I will ask you to do this for 3 different letters. You will have 90 seconds in each case to think of as many words as you can beginning with that letter. Please write your answers down.*

*The words can be anything that comes to mind except that they shouldn't be proper names, that is names of people or places, or numbers or sequences involving the same basic word, for example, run, runner, running, and so on.*

*When I say go, I want you to write down as many words as you can beginning with the letter F".*

* Participants are asked to do this for the letters F, A and S in that fixed order and given 90 seconds to think of words for each of the letters). The Researcher keeps the participants to time and the participants write down the words.

**Future thinking task FTT**

***11 minutes***

* Participants are given three future time periods (the next week, the next year, the next five to ten years) and asked to try to think of positive things (things they are looking forward to) and negative things (things they are not looking forward to) for each of those time periods.

Instructions for FTT:

*"Now I'd like to ask you to think* ***about things that might happen to you*** *in the future. I will give you 3 different time periods in the future, one at a time, and I'd like you to try to think of things that might happen to you in those time periods. Like before, I will give you 90 seconds to try to think of as many things as you can. It doesn't matter whether the things are trivial or important, just write what comes to mind. But, they should be things that you think will definitely happen or are at least quite likely to happen. If you can't think of anything or if you can't think of many things, that's fine, but just keep trying until the time limit is up.*

*First I'm going to ask you to think of* ***positive things*** *in the future. So, I'd like you to try to think of things that you are looking forward to, in other words, things that you will enjoy. So, I want you to write down as many things as you can that you're looking forward to over the next week including today when I ask you to start".*

*ANY QUESTIONS?*

(R gives 90 seconds)

*Now, I'd like you to do the same but this time I want you to write down things that you're looking forward to over the next year.*

(R does same as for one year)

*Now, I'd like you to do the same but this time I want you to write down things that you're looking forward to over the next five to ten years.*

(R does same as for previous)

*"Now, I'd like you to think of things that you're worried about or not looking forward to, in other words, things that you would rather not be the case or rather not happen. So, I want you to write down as many things as you can that* ***you're worried about or not looking forward*** *to over the next week including today when I ask you to start".*

(R does same as for previous )

*"Now I want you to write down as many things as you can that you're worried about or not looking forward to over the next year"*

(R does same as for previous)

*Finally, I want you to write down as many things as you can that you're worried about or not looking forward to over the next five to ten years"*

(R does same as for previous)

**The order of presentation of negative and positive conditions should be counterbalanced across subjects, although within each condition the time periods are always presented in the same order (week, year, 5-10 years).**

If subject says during the thinking time that they can't think of anything or, for example, that there is nothing that they are looking forward to over the next week, say "*that's OK, but just keep trying to think until I tell you to stop"*.

**Coding**

***Give around 5 minutes***

**COVID-19/PANDEMIC RATINGS**

For each of your responses to the future thinking task you have just completed, please rate using the scale shown from 0-2, whether the reason you wrote your response was because of the Covid-19 pandemic:

0 not at all (to do with the pandemic)

1 partly (due to the pandemic)

2 a lot (due to the pandemic)

***Please clearly mark a number next to each of your responses.***

*NOTE you do not have to do this for the FAS task at the beginning.*

QUESTIONS?

**Remainder of questionnaires**

***Around 12 minutes***

* Please now spend some time completing the final four questionnaires. You will find that these questionnaires are asking you to rate things on a scale and for each questionnaire this is different.
* *if you still need to do your Covid ratings, feel free to pause whilst I explain the rest and you can continue coding afterwards*
* The pack should explain how to answer each questionnaire, for example for two of them are asking you to rate the frequency of how often you’ve been bothered by certain symptoms of difficulties in the last 2 weeks only. The others are statements about your life or emotions about how you feel generally and is not confined to just the last two weeks
* please complete all the questions, it is important that you don’t leave one blank
* there are no right or wrong answers
* don’t spend too long on each question, it is designed for you to put down your first sense of what you think the answer is
* if you have a question at any point, please raise your hand and I will come and help

**Debrief (45 minutes or 50 minutes in latest)**

***2 minutes***

* Thank you for taking part in the research
* Remember that you can withdraw at any time
* Your data will be anonymised, and no one will be able to identify you, the school will also be anonymised
* There is more information ab out the study on your debrief sheet. Essentially, we are interested to see how you think about your future and its relationship to Covid, and to see whether your amount of Covid related responses relates to your mental health
* If a anyone has any further questions you are welcome to speak to me or a teacher
* If you feel more anxious or lower than usual, you are welcome to speak to me or a teacher
* I have left details on how to seek help if you would like to for your mental health
* Please leave your packs on your desks and I will collect them. Please come and take a debrief sheet on your way out.

**Approximate timing table**

|  |  |
| --- | --- |
| Task | Time (mins) |
| Introduction and overall task | 5 |
| Questions? | 2 |
| Consent form | 2 |
| Time to complete demographic questionnaire | 1 |
| FAS – (timing based on doing an intro to task – 1 minute for each letter and allowing some transition time between each) | 5 |
| FTT– (timing based on doing an intro to task – 1 minute for each section and allowing some transition time between each) | 11 |
| Coding task | 5 |
| GAD7 | 3 |
| PHQ8 | 3 |
| Flourishing scale | 3 |
| PANAS | 3 |
| Debrief | 2 |

## **Appendix 4: Letter for parents**

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Dear parents,

I am writing to you to let you know about some research I am carrying out as part of my thesis (Doctorate in Clinical Psychology, DClinPsy) at Royal Holloway University of London. I am doing this research with my supervisor, Professor Andy MacLeod. My research aims to explore the relationship between how young people think about the future and their well-being, particularly in light of the Covid-19 pandemic.

As you will know, the pandemic has had a notable impact on young people, with many restrictions put in place time for them time and time again. For the first time, young people were taken out of their school setting for extended periods of time and asked to stay at home. Emerging research on the effects of the pandemic is starting to show that young people are amongst those who have been most affected in terms of their mental health, including feelings of loneliness, anxiety, depression, and insomnia. This research will look at another aspect that we know is related to well-being – how someone imagines their future looking.

For more information about the study, please see the information sheet attached which is written for the students to read and decide whether they would like to take part in the study. This research has been approved through the ethics department at Royal Holloway University of London. The students will be asked to attend a ‘research session’ in a group with other students, lasting no longer than 50 minutes. I will be guiding them through some questionnaires about their well-being and asking them to describe how they see their futures, all with very commonly used measures. These will be written and handed to me at the end. I will also be available for them to ask me questions or to come and speak to me afterwards if they wish to.

Please note that because the students are 16 or over, the consent to take part comes from them, which explains why the consent forms are addressed to the students and not to yourselves. We do not need anything more from you; this letter is just to let you know about the study.

If your child would like to take part in the study, they will not be personally identifiable (I will be anonymizing their data), and they can withdraw from the study at any time. For more details on this, please see the information sheet. If they do take part they will be contributing to important research about mental health and the pandemic which will not only help provide information but may help contribute towards more provisions/treatments being available for adolescents in future. The students will also have an opportunity to gain more insight into academic psychological research in the field of clinical psychology.

I will also be providing an information session/talk with all the students about careers in Clinical Psychology and on how to look after their mental health as a ‘thank you’ for those taking part in the study.

Best wishes

Angelica Titmus

Trainee Clinical Psychologist

Royal Holloway, University of London

## **Appendix 5: Debrief sheet**

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**DEBRIEF SHEET**

**Department of Psychology**

**Adolescent future thinking, its relationship to wellbeing and the Covid-19 pandemic**

Thank you for taking part in the research. This research aims to explore the relationship between future thinking, wellbeing, and the Covid-19 pandemic. The pandemic has had a huge impact on young people, with many restrictions put in place time and time again. For the first time, young people were taken out of their school setting for extended periods of time and asked to stay at home. This research aimed to explore how much of adolescent’s current thoughts about the future were related to the pandemic. It then aims to explore how these thoughts will relate to positive feelings/psychological wellbeing, and symptoms of depression and anxiety. We will look to see if there is a relationship between feelings of depression and having fewer positive thoughts about the future and feelings of anxiety and having more negative thoughts about the future. The demographics provided may be used to run further analyses e.g., to see if the pandemic has affected genders differently. Understanding the effects of the pandemic is important as not much is currently known about its affects as it is so new. You are contributing towards this knowledge and potentially helping Clinical Psychologists develop interventions for adolescents in the future, especially in the wake of the pandemic.

As a reminder, have a right to withdraw your data from the study at any time. If you have any further questions, please approach me at the end of the session. You can take any further questions about the study to me at [angelica.titmus@live.rhul.ac.uk](mailto:angelica.titmus@live.rhul.ac.uk) or my supervisor at [a.macleod@rhul.ac.uk](mailto:a.macleod@rhul.ac.uk). As described on your information sheet, all information with be completely anonymised and your school will also not be identifiable.

If you feel low or more worried after taking part in the questions and tasks, then please bring this to the attention of your teacher or to me. If answering questions about your mood and anxiety has been difficult or made you question if you might be struggling with your mental health, please tell a teacher or me at the end of the session. You can seek help for your mental health by making an appointment with your GP and asking for a referral to your local CAMHS (Children and Adolescent Mental Health Services). If you are 18 or over, the service for you is IAPT (Improving Access to Psychological Therapies). You can also ask your teacher about speaking to your school counsellor.

ChildLine is a 24/7 helpline you can call at 0800 1111. If you need urgent support and are feeling in crisis, you can call your local crisis team on 0800 151 0023 at any time of day, 7 days a week.

## **Appendix 6: Information sheet**

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**PARTICIPANT INFORMATION SHEET**

**Department of Psychology**

**Study title: Adolescent future thinking, its relationship to wellbeing and the Covid-19 pandemic**

**What is this study about?**

We are interested in finding out how people feel when they think about positive and negative events that might happen in the future and how this relates to the current Covid-19 pandemic.

This study is being carried out by Angelica Titmus, a Trainee Clinical Psychologist under the supervision of Professor Andy MacLeod, as part of the Doctorate in Clinical Psychology.

**Why am I being asked?**

We are recruiting a sample of students aged 16-18 to take part in the study.

**What would taking part involve?**

If you decide to take part, you will be asked to complete several questionnaires, which will ask you about your mood, anxiety and positive feelings. You will also be asked to think about things you might be expecting to happen in the future. This will be done during your class/at school and should take around 50 minutes.

**What will happen to the data collected?**

All of the information collected during this study will be kept confidential. Your scores on questionnaires will be anonymised using a unique code and stored on a password-protected database separate to your consent form, so that they are not linked directly to personal identifying information. Hard copies of questionnaires will be kept in a secure location and destroyed once entered into a data file. Consent forms will be kept for five years then destroyed.

**What are the possible benefits of taking part?**

Although this study is not designed to benefit participants directly, your participation in this study may help us to better understand and develop strategies for young people in thinking about the future, and also to better understand the impact of the pandemic on young people. You will also be given the opportunity to attend a workshop on mental health/careers in Clinical Psychology.

You will be given the opportunity to take part in the dissemination of the results of this research if you wish (e.g., sharing the result with your school).

**What are the possible costs of taking part?**

We do not anticipate any negative consequences as a result of participating in this study. However, you will be asked to think about events that could happen in your future, which might produce momentary changes in how you feel. You will be in control of the events you choose to describe and, should you feel distressed at any time, you can choose to stop the task and you may withdraw from the study at any time without giving a reason.

**What will happen if I don't want to take part in the study?**

You do not have to take part in this study if you do not want to. If you decide to take part but later change your mind, you may withdraw from the study at any time without giving a reason. You are also free not to answer any question in the study should you not want to.

**What will happen to the results of this study?**

The results of this study will be written up and submitted as a doctoral thesis for the Doctorate in Clinical Psychology. The results may also be submitted to a peer-reviewed academic journal for publication. Upon completion of the study at a later date, participants who expressed interest in hearing about the results will also receive a brief summary of the results via email. Due to the nature of this research, it is possible that other researchers may find the data collected to be useful in answering future research questions. Any request from other researchers for access to the anonymised group data will be considered by the research team.

**How can I find out more information about the study?**

You can retain this information sheet for reference and contact us ([Angelica.Titmus.2019@live.rhul.ac.uk](mailto:Angelica.Titmus.2019@live.rhul.ac.uk)) if you have any questions about the study. If you would like to complain about the study, please contact Professor Andy MacLeod ([A.Macleod@rhul.ac.uk](mailto:A.Macleod@rhul.ac.uk) ).

**General; Data Protection Information**

Royal Holloway, University of London is the sponsor for this study and is based in the UK. We will be using information from you in order to undertake this study and will act as the data controller for this study. This means that we are responsible for looking after your information and using it properly. Any data you provide during the completion of the study will be stored securely on local servers. Royal Holloway is designated as a public authority and in accordance with the Royal Holloway and Bedford New College Act 1985 and the Statutes, which govern the College, we conduct research for the public benefit and in the public interest. Royal Holloway has put in place appropriate technical and organisational security measures to prevent your personal data from being accidentally lost, used or accessed in any unauthorised way or altered or disclosed. Royal Holloway has also put in place procedures to deal with any suspected personal data security breach and will notify you and any applicable regulator of a suspected breach where legally required to do so. To safeguard your rights, we will use the minimum personally-identifiable information possible (i.e., the email address you provide us). The lead researcher will keep your contact details confidential and will use this information only as required (i.e., to provide a summary of the study results if requested and/or for the prize draw). The lead researcher will keep information about you and data gathered from the study for 5 years after the study has finished. Certain individuals from RHUL may look at your research records to check the accuracy of the research study. If the study is published in a relevant peer-reviewed journal, the anonymised data may be made available to third parties. The people who analyse the information will not be able to identify you. You can find out more about your rights under the GDPR and Data Protection Act 2018 by visting https://[www.royalholloway.ac.uk/about-us/more/governance-and-strategy/data-protection/](http://www.royalholloway.ac.uk/about-us/more/governance-and-strategy/data-protection/) and if you wish to exercise your rights please contact [dataprotection@royalholloway.ac.uk](mailto:dataprotection@royalholloway.ac.uk).

## **Appendix 7: Consent form**

**CONSENT FORM**

Participant identification number: \_\_\_\_\_\_\_\_\_\_\_

**Study title:** Adolescent future thinking, its relationship to wellbeing and the Covid-19 pandemic

**Name of researcher: Angelica Titmus**

Please **tick the box if you agree** with each statement.

1. I confirm that I have read the information sheet about the above study.
2. I have had the opportunity to ask questions and have had these answered satisfactorily (more opportunity to ask questions will be provided on the day of the study)
3. I understand that my participation is voluntary, and I am free to withdraw at any time without giving any reason.
4. I understand that information collected about me will be used to support other research in the future and may be shared anonymously with other researchers.
5. I understand that all data will be kept confidential and that no personal identifying information will be disclosed in any reports of the research or to any other party.
6. I understand that my scores, anonymised and as part of the overall data set of all participants, may be made available to other researchers upon request.
7. I agree to take part in the study.

Please note, we will send your school a brief summary of the results of the study upon completion to share with you to view if you are interested.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_/\_\_\_\_\_\_/\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name of participant Date Signature