

MAIREAM MOHAMMED

**FEAR OF SOCIALIZING IN THE POST COVID-19 PERIOD: A
SYSTEMATIC REVIEW OF ASSOCIATED BEHAVIORS**



UNIVERSITY OF ALGARVE
FACULTY OF ECONOMICS

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**Master's in management (Health Care)
Dissertation made under the supervision of: Lara Noronha
Ferreira**



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Work Authorship Declaration

I declare to be the author of this thesis, in its uniqueness and unprecedented nature. All authors and works are duly and properly cited in the text and can be found in the list of references.

MAIREAM MOHAMMED ALI

(Signature)

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Dedication and Acknowledgement

I would like to thank my supervisor, Professor Lara Noronha Ferreira, for her support and help with this project, special thanks to my husband!

RESUMO

Contexto geral: A interação social e a conectividade são essenciais para o bem-estar humano. A pandemia de COVID causou perturbações socioeconómicas globais, tendo sido impostas medidas severas de contenção que restringiram a participação e a interação social. Somos levados a acreditar que o consenso predominante na visão social e no sentido da experiência foi de aplicação de restrições, distanciamento social e isolamento – uma prolongada e indesejável dificuldade que teve de ser suportada até que o perigo diminuísse, tendo como objetivo o bem individual e coletivo.

Durante a pandemia, surgiram evidências de um aumento drástico nos problemas de saúde mental, no isolamento social, no medo e nos indicadores comportamentais associados a uma potencial disfunção, incluindo abuso de drogas, privação de exercício físico, alimentação e atividade na internet. Especificamente, havia algumas evidências de que, após essas várias e persistentes interrupções ao longo de anos sucessivos, muitas pessoas estavam a viver uma apreensão generalizada, medo e ansiedade relacionados com o retorno ao trabalho e ao retorno à vida social em geral – um medo ou ansiedade geral de socialização, participação social e interação em muitos níveis. Este medo ou ansiedade parecia ser aparentemente partilhado por muitos estratos da sociedade e em muitas áreas geográficas.

Neste estudo, foram formulados dois objetivos e duas hipóteses com base nesses objetivos. A primeira hipótese afirmava que um aumento do medo e da ansiedade entre a população em geral levou à interrupção da interação social, tendo estes sentimentos persistido. A segunda hipótese afirmava que essa rutura da interação social também se manifestava em comportamentos de saúde associados à rutura.

Metodologia: Foi realizada uma revisão sistemática da literatura para investigar o impacto da pandemia de COVID-19 na ansiedade, medo e saúde mental. Após uma revisão da literatura de fundo, foram definidas metodologias de revisão que permitiram pesquisar a literatura relevante em quatro bases de dados: a *PubMed*, o *Scopus*, a *Web of Science* e o *Google Scholar*.

Resultados: As pesquisas produziram um total de 4.346 referências que foram importadas para o instrumento de avaliação “*Covidence*”. Após a aplicação dos critérios de inclusão e de exclusão, foram selecionados 50 artigos para revisão completa, extração de dados e avaliação da qualidade, como base para a síntese e conclusões da dissertação. Destes, 27 estavam relacionados com a interrupção da interação social e 23 estavam relacionados com comportamentos associados específicos, como a atividade física, a alimentação, os comportamentos sedentários, o consumo de

álcool e/ou tabaco e a utilização das redes sociais.

Os resultados permitiram confirmar ambas as hipóteses. O surgimento e aumento da ansiedade social e outros problemas de saúde mental, também levaram a um aumento na interrupção da interação social e afastamento social que persistiu e ainda é evidente.

O afastamento social e a redução ou perda da interação social e dos relacionamentos estão altamente correlacionados com a ansiedade. Confirmámos ainda diferenças de género, demográficas e socioeconómicas. As mulheres, os jovens e as pessoas com menores recursos financeiros apresentaram maior vulnerabilidade.

É importante realçar que vários artigos apresentam novas aplicações de técnicas existentes para da ênfase a essa hipótese de disrupção da interação social. Um estudo em particular relatou a medição da redução de ação social pós-pandemia e o desenvolvimento de uma escala e de uma ferramenta específicas para o estudo da mesma. O estudo concluiu que a ansiedade social foi correlacionada com o afastamento social muitas vezes não relatado quando medido com precisão. Este resultado está diretamente relacionado com a falta de relatórios sobre este tema específico da dissertação.

Confirmámos ainda que indivíduos com maior resiliência e maior interação social, redes sociais e conectividade estavam mais protegidos contra distúrbios mentais e que, em alguns grupos da população, essa proteção levou a um desenvolvimento positivo do crescimento pós-traumático.

Em vários estudos, a ansiedade social e outros problemas de saúde mental foram correlacionados com eventuais resultados positivos, como o crescimento pós-traumático e a qualidade de vida enriquecida através de atividades de vida mais variada e em maior escala, como a atividade física, as artes e o relacionamento social mais seletivo. Em muitos casos, este resultado positivo e de desenvolvimento, tal como acontece com o desenvolvimento de ansiedade e problemas de saúde mental em geral, foi mediado através de variáveis individuais e psicológicas, incluindo a resiliência e a presença e acesso a capital social.

Os resultados de vários estudos mostraram que a atividade física, a alimentação, o comportamento sedentário, a falta de exercício físico, as comunicações digitais e o uso das redes sociais foram particularmente problemáticos, aumentaram e levaram a distúrbios da saúde mental e a mais ou menos graus de desconexão social e diminuição das relações sociais.

Conclusão: O surgimento e o aumento da ansiedade social e de outros problemas de saúde mental durante e após a pandemia, levaram à interrupção da interação social, tendo essa interrupção persistido, sendo ainda evidente atualmente. Este fenómeno de ansiedade social, associado à

perturbação da interação social é pouco compreendido, estudado e relatado na literatura. Embora existam e comecem a surgir artigos dispersos relacionados com vários aspetos do tema, estes resultados díspares exigiram agregação e coordenação intelectual. Esta dissertação procura agregar esses resultados díspares e provar as hipóteses e o seu mérito para futuras investigações.

Este trabalho apresenta algumas limitações, como o desenho do estudo, a recolha de dados, a qualidade dos estudos analisados, o período de publicações abrangido, o âmbito limitado do estudo e a heterogeneidade e o tamanho da amostra.

Os resultados preliminares desta dissertação, quando colocados no contexto da riqueza existente de estudos sobre o aumento alarmante e a persistência da ansiedade social e outros problemas de saúde mental relacionados durante e pós-pandemia, apontam para a necessidade urgente de estudos futuros nesta área.

Os resultados deste estudo indicam ainda que o capital social, o apoio social e a formação de redes sociais impactam positivamente a qualidade de vida durante crises como esta e chamam à atenção para a importância de fatores individuais e comunitários na esfera social.

As pessoas de todas as idades e níveis económicos devem ser incentivadas a participar em atividades cívicas, proporcionando assim uma distração positiva e uma ligação social e comunitária significativa. Esses resultados podem ser úteis para intervenção clínica direcionada, desenvolvimento de políticas sociais e de saúde pública e alocação de recursos governamentais.

ABSTRACT

Background: Social interaction and connectedness are essential for human well-being. The COVID-19 pandemic has caused global socio-economic disruptions. Severe containment measures restricted social participation and interaction.

The prolonged period of physical and social isolation contributed to a significant increase in fear, anxiety, and mental and physical health issues in the general population and specific subgroups. We formulated two hypotheses. Hypothesis 1 stated that an increase in fear and anxiety among the general population led to social interaction disruption and persisted. Hypothesis 2 stated that this social interaction disruption manifested in associated health behaviors.

Methods: A systematic review of the literature was performed to investigate the impact of COVID-19 on anxiety, fear, and mental health. Following a scoping review of background literature a series of search strings were created and adapted for search in four databases PubMed, Scopus, Web of Science, and Google Scholar.

The searches produced a total of 4346 references that were imported to the Covidence assessment tool. Following the application of screening and inclusion and exclusion criteria, 50 papers were subsequently approved for full review, data extraction, and quality evaluation as the basis for the dissertation's synthesis and conclusions.

Result: Both Hypothesis were confirmed. We further confirmed gender, demographic, and socio-economic differences. Women, younger people, and persons of lower financial means all exhibited greater vulnerability.

We further confirmed that individuals with greater resilience and higher social interaction, social networks, and connectedness were more protected against mental disturbance and that in some portion of the population, this protection led to a positive development of PTG (Post Traumatic Growth).

Conclusion: The emergence and rise of social anxiety and other mental health issues during and post-COVID Covid including loneliness and depression led to a rise in social interaction disruption, social disengagement, and avoidance, and that persisted and is still evident today.

Keywords: COVID-19, Associated behaviors, social anxiety, social phobia, general population, pandemic

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LIST OF ABBREVIATION

PTG.....	Post Traumatic Growth
WWII.....	World War Two
WHO.....	World Health Organization
PRISMA... ..	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
MeSH... ..	Medical Subject Headings
CINAHL.....	Cumulative Index to Nursing and Allied Health Literature
NLM	National Library of Medicine
MEDLINE.....	Medical Literature Analysis and Retrieval System Online
MEDLARS.....	Medical Literature Analysis and Retrieval System
PDSS	Pandemic Disengagement Syndrome Scale
DASS-21... ..	Depression Anxiety Stress Scale-21
GAD-7.....	Generalized Anxiety Disorder Assessment
CRIS-8.....	Child Revised Impact of Events Scale
BRIEF-COPE... ..	Coping Orientation to Problems Experienced
PHQ-9.....	Patient Health Questionnaire
PTGI.....	Post Traumatic Growth Inventory
PTGI-SF... ..	Post Traumatic Growth Inventory-Short Form
PSS.....	Perceived social support
SS	Social Support
MENA.....	Middle East and North Africa
O2OFD	Online-to-Offline food delivery
MVPA.....	Moderate to Vigorous Intensity Physical activity
SDOH... ..	Social Determinants Of Health
SAD.....	Social Anxiety Disorder

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The world emerged from COVID-19 (hereinafter Covid) pandemic on May 5th, 2023, after two years of socio-economic disruption unparalleled in the modern post World War Two(WWII) era and characterized by restricted travel, work, and business restrictions and cessation, mandated and enforced lockdowns, shelter-in-place, masking, mass vaccinations, and social and physical distancing on a global level.

We are led to believe that the consensus predominant societal view and sense of the experience was one of enforcement, mandate, restrictions, deprivation, enforced periodic and repetitive distancing, and isolation – a prolonged and unwelcome hardship that had to be endured until the danger subsided for the individual and common good. We were led to believe that society longed to return to normalcy and pre covid patterns of behavior and lifestyle (Wu-Ouyang, B. and Hu, Y., 2022)

This dissertation will follow a systematic review approach to examine those assumption, and specifically to research and review whether Covid caused an increase in fear, anxiety, and mental health issues in the general population and more importantly, whether these anxieties and mental health issues persisted post lockdown (the mandated period) and post-pandemic cessation as declared by World Health Organization (WHO) in 2023 (World Health Organization, 2022).

Specifically, this dissertation systematically reviews the literature to determine whether fear, anxiety, and deteriorating mental health were associated with the advent and experience of Covid in the general population and led to a fear of socializing and reduced social interaction/avoidance and that was reflected in changes in specific associated behaviors - eating/sedentary and physical activity, alcohol and tobacco consumption, digital and social media patterns – that persisted post lockdown and potentially beyond to the post-pandemic era.

Evidence emerged during the pandemic of a dramatic rise in mental health issues, in social isolation,

fear, anxiety, depression, and associated behavioral indicators of potential dysfunction including substance abuse, physical exercise, eating, and internet and social media activity. Specifically, there was some evidence that following these various and persistent disruptions over successive years many people were experiencing widespread trepidation, fear, and anxiety related to return to work and reentry into society generally – a general fear or anxiety of socializing and social participation and interaction on many levels and seemingly shared by many strata of society and across many geographical areas (Chigwedere, O.C., Sadath, A., Kabir, Z. and Arensman, E., 2021)

That so many varied and diverse feelings emerged during the pandemic because of the hardships may not be unexpected given prior literature on other epidemics and emergency or catastrophic experiences (Chigwedere, O.C., Sadath, A., Kabir, Z. and Arensman, E., 2021) although the extent, proportion, and speed of emerging mental health issues caused initial widespread alarm.

Subsequently, however, reports and scattered studies appear of the persistence of these mental health issues post-confinement phase and potentially post-pandemic (Sanchez-Ramirez, D.C., Normand, K., Zhaoyun, Y. and Torres-Castro, R., 2021) Many people in the general population, in addition to subgroups with prior conditions or other comorbidities, continued to experience elevated and protracted mental health issues, including fear and anxiety and issues of specific and general social re-entry (Benke, C., Asselmann, E., Entringer, T.M. and Pané-Farré, C.A., 2022).

Finally, these specific issues and their persistence harmonize with a general body of theory and prior research in the field of social determinants of health and loneliness, social isolation, and social participation as important variables of physical and mental health (Tarlov, A.R., 2002).

This thesis therefore carried out a systematic review of the literature to determine if issues concerning mental health generally and fear and anxiety of social interaction specifically did indeed occur and increase during the pandemic and more importantly persisted post-confinement/post-lock-down thereby creating both potential reentry and enduring problems of sustained social interaction and participation.

Additionally, as isolation, social withdrawal, and diminished social engagement correlate with other dysfunctional health behaviors (Yang, L., Yang, Z. and Xia, Y., 2022). we searched the literature for indications of change in four important health behaviors - eating, physical activity/exercise, sedentary behavior, substance abuse of tobacco and alcohol consumption, and physical and social interaction displacement analogs viz increased social media and digital communications/usage.

Importantly, we are still quite proximate to the pandemic and much research relating to the pandemic

phase has not yet been undertaken, is still in the pipeline, or continues to be published. Much of the observation, research, and publishing of longitudinal and lasting effects of phenomena that occurred during, or because of the pandemic remains to be carried out and completed.

Typically, in the study of social phenomena, there is a lag time of years at a minimum for research only and the publication process itself (Cacciattolo, Karen. (2022)). We are still in the very early days of post-Covid research and therefore much research can be expected going forward.

Due to this limited, early, or inadequate research we also therefore consider the proxies or indirect and early indicators of this mental health anxiety effect in a variety of areas, general population subgroups, and age groups and determine whether, on the systematic weight of evidence, fear of social interaction occurred, persisted and therefore requires further research generally or on prioritized areas and issues as surfaced by this dissertation work.

1.2 Objective of the Study

1.2.1 General Objective

This dissertation aims to investigate the impact of the Covid pandemic on the prevalence and increase of mental health issues related to fear, anxiety, and social interaction in the general public through a systematic review of four major databases. We examine if and how the pandemic influenced or impacted the occurrence and increase of background mental health issues and specifically the idea and behavior of socializing or social interaction (hereinafter used interchangeably) in the general population or subgroups of the general population.

1.2.2 Specific Objectives

1. Examine the hypothesis that social interaction disruption occurred and persisted during Covid and post-Covid lockdown and pandemic, and its inverse, the emergence and persistence of positive change as indicated by Post Traumatic Growth (PTG).
2. Examine the hypothesis that social interaction disruption also manifested in specified associated health behaviors during covid and persisted post lockdown and post Covid pandemic-physical activity and sedentary behavior, eating disruption, tobacco and alcohol consumption, excessive and problematic digital and social media use as both coping mechanisms for and indicators (or proxies) of that social interaction anxiety and avoidance during Covid and post-Covid lockdown and post pandemic.

1.3 The limitation of the work

The dissertation author draws attention to several limitations of this systematic review including:

- Study Design - The studies included are predominantly cross-sectional and do not establish cause-and-effect relationships between social anxiety and pandemic experiences.
- Data Collection - Many studies relied on self-selecting and self-reported surveys, which can be prone to bias.
- Study Quality – The majority of studies were of low self-reported and/or detected bias and high limitations leading to low composite quality score.
- Timing - Many studies were conducted during or early in the pandemic and lacked long-term perspective or were temporally asynchronous with the dissertation’s main period or focus.
- Limited Scope - Few studies focused specifically on post-pandemic social anxiety and its impact on social interactions and the social sphere.
- Heterogeneity - The included studies used diverse methodologies, hindering quantitative analysis, and limiting the strength of conclusions that can be drawn through narrative synthesis.
- Sample Size - Many studies had small sample sizes, raising concerns about statistical power and generalizability.
- Focus on Mental Health - Many relevant studies primarily explore mental health outcomes, with less emphasis on social anxiety's impact on social interactions and the social sphere.
- Limited Reporting - Due to the pandemic's recency and other ensuing world crises, research in this dissertation's specific area of interest is limited or may not yet be well-researched.

These limitations highlight the need for further research with stronger experimental design and with a primary focus on social anxiety’s impact on social interaction, and social connectedness in the post-pandemic landscape.

1.4 Significance of the Study

Specifically, the main significance of this research is to understand and document an increase in social interaction disruption as caused by social anxiety that emerged in reaction to socioeconomic conditions during covid and that may have persisted post-lockdown and confinement conditions and further into the formal cessation of the pandemic and return to normalization and reentry.

We hypothesize and discuss the social isolation and distancing and associated fear or anxiety that manifested in increased mental health problems and mental health deterioration including loneliness, agitation, withdrawal, and social avoidance and disengagement, and further impact to associated health related behaviors.

1.5 Scope of the Study

This study will look at the phenomena of post-COVID-19 and the fear and anxiety of socializing and its relationship to behaviors that persisted or worsened after the lockdown was lifted. Our study will concentrate on the general public, examining how individuals who experienced social isolation and disruptions to routine, how they have developed coping behaviors during this lockdown and the disruption to routines during lockdowns that persisted post-lockdown and how this is potentially leading to anxiety in socializing and potentially leading to chronic social isolation.

1.6 Study Structure

The study was grouped into six chapters.

- Chapter 1: Gives the introduction and the background of the study, the objective of the study, the significance of the study, the scope of the study, and the organization of the study.
- Chapter 2: Gives a comprehensive review of literature linked to the research topic, fear of socializing in the post-COVID period, and associated behaviors as well as associated publications on the background knowledge of socializing.
- Chapter 3: Gives the methodology, research design, sample, and sampling tool and procedure used for the study.
- Chapter 4: Gives the findings of the study which is the results and discussion of the dissertation.
- Chapter 5: Gives a conclusion and recommendation.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Social connection is a fundamental human requirement that contributes significantly to both mental and physical health. Research has demonstrated the benefits of social connections, such as reduced stress, enhanced mood, and higher cognitive performance. In contrast, social isolation and loneliness have been related to an increased risk of sadness, anxiety, and even physical health problems (Friedmal et al., 2024)

This literature review delves into the topic of post covid fear, anxiety, and avoidance of social interaction. We will investigate how disturbances to social patterns and enforced isolation caused by lockdowns may contribute to these anxiety and avoidance behaviors in the broader population. Understanding these possible long-term impacts may help us create techniques to reduce social anxiety and promote healthy social reintegration in the post-pandemic society and other emergency and crisis situations.

2.2 Overview

covid, In recent decades, the Social Determinants of Health (SDOH) - the non-medical factors that influence health outcomes. - have gained increasing prominence as a foundational population and public health concept in academic literature and international policy documents (Navarro, V., 2009).

In 2003, WHO suggested that the social determinants of health included: the social gradient, stress, early life, social exclusion, work, unemployment, social support, addiction, food, and transportation (Wilkinson, R.G. and Marmot, M. eds., 2003).

The range and scope of social determinants of health has expanded considerably over the last decades. Although some imprecision around scope and enabling principles exists the concept is expanding as both a research topic and policy and funding rationale in areas ranging from birth outcomes to medication and health access and employment and educational disadvantage (Lucyk, K. and McLaren, L., 2017)

Importantly, this proliferation of research, findings, and associated policy, has been driven by an expansion and articulation of more and more aspects of the ‘social’ and social sphere – of ‘the social interaction’ and alleged components of social interaction including for example social capital, social

connectedness, and others (Gizdic, A., Baxter, T., Barrantes-Vidal, N. and Park, S., 2023).

Much of the work has as its implicit or explicit starting point a concept of ‘social’- a social interaction or relationship between an individual and another individual or group or society at large. This concept of social interaction may involve varying levels of social participation at a physical and/or emotional level.

An important body of work, including meta-analytic studies, stretching back almost 50 years now, has evidenced the importance of social interaction, social participation and social relationships and connectedness as a determinant of health regardless of age, gender, and health baseline. (House, J.S., Landis, K.R. and Umberson, D., 1988).

More recent work has evidenced the influence of social relationships on the risk of morbidity and death and that they are comparable with well-established risk factors for mortality such as smoking and alcohol consumption and exceed the influence of other risk factors such as physical inactivity and obesity (Holt-Lunstad, J., Smith, T.B. and Layton, J.B., 2010). Social interaction and participation matter to various and many aspects of health and wellbeing. The first issue therefore is the understanding of the meaning, scope, and functional effect of social interaction.

Importantly, much work has been done on the positive, therapeutic, palliative, and preventive impact of social relationships, social interaction and connectedness and the support that stems from these, particularly during time of need. Social interaction and connectedness can drive and improve a range of health outcomes and health and wellness behaviors (Cohen, S., 2004).

Friedman et al., evidenced the importance of positive relations with others, a component of a well-lived life that describes sustained investment in social relationships that are mutual and trusting and is associated with two key health outcomes in aging adults: functional limitations and longevity (Friedman, E., Franks, M., Teas, E. and Thomas, P.A., 2024).

However, the converse unfortunately also holds true and is also widely supported in the literature - disruption of social interaction, connectedness and relationships have a negative effect on and consequence for state of health, wellbeing, morbidity, mortality, and negative adaptive health behaviors (Frick, U., Irving, H. and Rehm, J., 2012).

Social disruption-associated or caused negative behaviors and outcomes include loneliness, anxiety, addictive or health and wellness dysfunctional behaviors including eating, exercise/physical activity and tobacco and alcohol use (Heider, F., 2013).

Recent literature on social interaction therefore has focused on expanding the scope of the

foundational concept and has delineated the existence and importance of several aspects of social contact including social connectedness, social capital, socializing, social isolation, and social relationships. Hall et al., (2018) provide an excellent summary and review of the development of the concept of social interaction and its components and domain spread over the last decades (Hall, J.A., 2018).

However, despite this proliferation of research and academic activity the lack of clarity on the specific definition and domain of social interaction has also been well documented and consistently alluded to in the literature. Clarification of the taxonomies and building blocks of social interaction persist even in recent literature (Hoppler, S.S., Segerer, R. and Nikitin, J., 2022).

For this dissertation, we adopt the approach of many researchers in the field by focusing on those aspects of social interaction that allow the most comprehensive, inclusive research approach and that draw in the most relevant findings (Yoo, J., Miyamoto, Y. and Ryff, C.D., 2016). Socializing or Social interaction therefore, as stated in this dissertation covers and encompasses all these constructs – whether it be emotional and/or physical interaction one on one with another person or group or digital and internet or cyber-based interaction.

Social interaction is an event that happens between two or more individuals, a process of engagement and mutual influence between two people regardless of venue or place and includes both face-to-face encounters in which people are physically present but also social encounters that are technologically mediated like texting, phone conversations or interactions that may be temporally asynchronous such as Facebook (Reis, H.T. and Wheeler, L., 1991).

This phenomenon therefore of social interaction and its attendant behaviors and/or coping mechanisms in the context of a global social crisis and emergency setting – the covid pandemic - in which normal practices, habits and behaviors were disrupted is the specific focus of this paper (Fullana, M.A., Hidalgo-Mazzei, D., Vieta, E. and Radua, J., 2020).

We propose that fear, anxiety and the disruption and/or avoidance caused by the fear and anxiety of social interaction were manifest and had various negative and positive effects on the general population (Xiong, J., Lipsitz, O., Nasri, F., Lui, L.M., Gill, H., Phan, L., Chen-Li, D., Iacobucci, M., Ho, R., Majeed, A. and McIntyre, R.S., 2020).

We have addressed the central concept of social interaction. We now therefore turn to a brief articulation of the other central concepts of this dissertation – fear, anxiety-associated behaviors and/or coping mechanisms and general population - and their brief discussion and precise meaning and scope

in the context of this dissertation. As with social interaction, each of these areas has a long and extensive body of literature underpinning them and a comprehensive review is beyond the scope of this dissertation.

The purpose of this summary is merely to highlight their major aspects and the context in which they are relevant to the precise focus of this dissertation in the context of Covid. Generally stated, fear is an intense biological response to immediate danger, while anxiety is an emotion regarding things we think or worry about may happen, usually in the future (Salvador, L.L., 1997).

These terms -fear and anxiety- are frequently used interchangeably in popular culture and everyday conversations. However, the concepts have been traditionally differentiated in the scientific and medical literature, although some researchers have challenged this separation and highlighted complications concerning this separation, as well as overlaps or commonalities between the definitions and experiences of fear and anxiety (Tovote, P., Fadok, J.P. and Lüthi, A., 2015).

Fear and anxiety overlap, but are generated by different neurobiological networks and serve different evolutionary goals performing different and incremental functions. Fear is triggered by our senses and often happens automatically and as part of a fear or flight response, which is presumably why we feel unable to control the response or view it as being more external, threat-based, and, while emotional, ironically more logical, or rational (Wu-Ouyang, B. and Hu, Y., 2022).

Anxiety, on the other hand, can be seen as a coupling of fear or fear elements with some anticipation of a future event or threat that may or not be explicit or specified or as yet manifest in the environment and hence the potential quality of a more irrationality and illogical or disproportionate response to an unclear or imagined future stimuli (Steimer, T., 2002).

Fear and anxiety can be adaptive responses or behaviors as can be the associated or downstream responses or behaviors, for example fear can be seen as an adaptive response to a legitimate imminent threat such as assault with a gun or knife as can a general anxiety over fear of unemployment and a potential response to better one's performance or productivity to both subjectively allay that fear and improve one's standing with one's employer (Daniel-Watanabe, L. and Fletcher, P.C., 2022).

Anxiety can also have positive future planning and management type qualities employed in the avoidance or lessening of the emotional disturbance associated with some future or as yet 'unhappened' event. Fear and Anxiety are almost always adaptive or cause adaptive behaviors or coping mechanisms either functional or dysfunctional (Rosen, J.B. and Schulkin, J., 1998).

Additionally, research has consistently demonstrated that levels of moderate anxiety versus low or

high anxiety, or repetitive anxiety as in social anxiety disorder (SAD) are optimal for tasks such as test-taking, and recovery from serious illness. Anxiety and fear can under different circumstances be functional or dysfunctional (Öhman, A., 2008).

The correlated existence and increase of negative associated behaviors of alcohol and tobacco consumption in tandem with excessive eating and or decreased physical activity (Robertson, M.C., Lee, C.Y., Wu, I.H.C., Liao, Y., Raber, M., Parker, N., Le, T., Gatus, L. and Basen-Engquist, K.M., 2022). during and after Covid would also signal and document the simultaneous manifestation of increased anxiety and loneliness in that same population (Almeda, N. and Gómez-Gómez, I., 2022).

This dissertation is not specifically concerned with clinical or medical conditions of fear and anxiety-related disorders nor with the subpopulations of people unfortunately afflicted with these conditions and who were most certainly incrementally negatively impacted by the onset of Covid and the socio-economic restrictions that ensued including rest in place, lockdown, social distancing, and isolation.

This dissertation is concerned with the almost common sense and everyday understanding – in the general population – of fear and anxiety, as understood and experienced by the general population, as a reaction to an adaptive behavior or coping mechanism to and for the disruption to social interaction caused by covid and the potential persistence of that anxiety in the transition back to normality post Covid (Jawad, M.J., Abbas, M.M., Jawad, M.J., Hassan, S.M. and Hadi, N.R., 2021).

Fundamentally, we look for increased anxiety, avoidance of social interaction, the increase in use of adaptive behaviors or coping mechanisms and/or the adoption of new or adaptive behaviors because of that social anxiety, either functional (post-traumatic growth or increased training or wellness orientation or improved eating/nutritional patterns) or dysfunctional (increased use of tobacco or alcohol, decrease in physical activity, poor or overeating) (Bovero, A., Balzani, S., Tormen, G., Malandrone, F. and Carletto, S., 2023).

We are not researching and documenting fear of Covid only (fear of the virus itself and infection) and its artefacts both during and after the pandemic. This unspecific anxiety has been well documented and is the subject of many systematic reviews and meta-analyses (Kindred, R. and Bates, G.W., 2023) Rather and more importantly, we are focusing essentially on fear and social anxiety in relation to the pandemic's impact (the lived experience of the pandemic and its social impact) on one precise social determinant of health – social interaction (as discussed above), its potential persistence post confinement and the cessation of the pandemic and the impact of that hypothesized persistent disruption on various but limited associated behaviors and coping mechanisms (Randall, A.K., Leon,

G., Basili, E., Martos, T., Boiger, M., Baldi, M., Hocker, L., Kline, K., Masturzi, A., Aryeetey, R. and Bar-Kalifa, E., 2022).

Concerning associated behaviors, the meaning is straightforward. Various dictionaries relate the word to ‘connected’, ‘relative and relevant to’, ‘joined to or stemming from’. ‘Associated’ refers by definition to a thing, object or behavior that is connected to and with another thing (English, H.B. and English, A.C., 1958). and in the context of this dissertation relates specifically to adaptive behaviors stemming from fear or anxiety of social interaction in the context of the covid pandemic (and its socio-physical artifacts such as social isolation, lockdown and distancing) and further downstream consequential attitudes and behaviors resulting from that fear and anxiety including impacts on eating patterns, physical activity, tobacco and alcohol use (Harper, C.A., Satchell, L., Fido, D. and Lutzman, R., 2020) and the persistent adherence (either emotional or physical) to social isolation (distancing, reduced physical contact, mask-wearing, etc.) even beyond the mandated time and with almost none existent risk of viral infection (Dictionary, M.W., 2002).

The general population has two related meanings: as in Webster’s dictionary for example, involving or relating to most or all people, things, or places, especially when these are considered as all the people living in a particular country, or area (Dictionary, M.W., 2002). and the more specialized narrowing by the social and medical sciences as in ‘the general population’ is the entire population of individuals with a characteristic of interest (Tran, V., Gellman, M.D. and Turner, J.R., 2013).

This dissertation specifies the general population as all members of the population generally apart from those subgroups with preexisting mental health diagnoses and conditions. By general population therefore we mean the normal general population of relatively healthy and stable individuals affecting no obvious or diagnosed mental disorder prior to covid. Some of the studies cited may unintentionally include various individuals with various diagnosed or existing mental health issues due to limitations of study design.

The researcher acknowledges that there are many subgroups and patient groups that were differentially and negatively impacted by covid including all with preexisting mental health and physical chronic morbidities and groups that developed disorders or conditions during the covid period including so-called ‘long covid’ and other groups exposed to differentiated levels of pressure and stress including healthcare workers and first responders (Huang, J., Huang, Z.T., Sun, X.C., Chen, T.T. and Wu, X.T., 2024).

These groups are potentially important as indicators or breadcrumbs of a potentially additional and

separate issue in the general population and their experiences will be noted however this dissertation will focus firstly and primarily on the general population as specified above and the impact of fear and anxiety caused by those socio-economic disruptions to the general population.

This dissertation will seek to provide systematic evidence from the literature in the context of Covid that social connection and participation is a basic human need that promotes well-being and mental health and that a lack of socializing can lead to feelings of loneliness, despair, and a lower overall quality of life (O'Rourke, H.M., Collins, L. and Sidani, S., 2018).

Moreover, secondary dysfunctional health behaviors relating to diminished physical exercise, eating and substance abuse (tobacco and alcohol) and increased use of social media and digital communications may likely be correlated with this increased anxiety. (Nur-A Yazdani, D.M., Abir, T., Qing, Y., Ahmad, J., Al Mamun, A., Zainol, N.R., Kakon, K., Agho, K.E. and Wang, S., 2022).

Based on the above brief literature review of the central concepts and the resulting bounding and scoping of the dissertation research focus we turn now to the articulation of database search strings and keywords and the methodology for their selection, pairing, and iteration

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The current chapter entails the methodological approach employed to investigate the phenomenon of fear of socializing post covid and its associated behaviors. It details the design of the research, data collection and instrument, and data analysis, and explains the rigorous and objective approach to gathering and interpreting data and the outline of our PRISMA model assessment.

3.2 Research Approach

This dissertation is a systematic review of the relevant literature on the fear of social interaction and associated behaviors in the post covid era. A systematic review is a comprehensive, organized, rational, and authoritative account of a topic, subject, or body of findings - reduced to precise general and specific questions and objectives – using reliable, reproducible methods and peer-accepted research practices to identify all relevant publications and pronouncements on a topic or area of study.

Through a systematic review, this research work aims to critically examine and interpret those relevant findings in a manner that both summarizes and combines the found results and current body of information such that new insight and knowledge on this topic may be created and new avenues for further research suggested.

3.3 Study Design

The systematic review focused on the fear of social interaction and selected associated behaviors that emerged in the general population as a result of the covid pandemic and that may have persisted post-lockdown and post-pandemic. The systematic review utilized a literature review across four databases – PubMed, Scopus, Web of Science, and Google Scholar.

Covidence, an online and automated Quality Assessment tool, was selected based on literature review benchmarking of systematic review methodologies and tools (Babineau, J., 2014). and trial

usage – Covidence for example is Cochrane compliant and recommended Cochrane tool. Covidence utilizes the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) data collection and extraction process and also auto-generates a PRISMA flowchart.

The first section of this Chapter covers the development of keywords, terms, and search strings, the selection of the databases, and the process for deployment and customization of search strings to meet database-specific requirements and limitations, e.g. controlled language versus natural language. The second section of this Chapter looks at the screening and quality assessment tool utilized and the process of final selection of included papers for this dissertation's systematic review.

Section One

The validity, vigor, and reliability of the systematic review method depends disproportionately on the rigor of the actual search itself and by extension the design of the search strings, and their application to selected databases. Moreover, the search string/s created should be amenable to modification and customization across the unique attributes and limitations of the four selected databases and the specific topic being researched (Owens, J.K., 2021).

While the search and search strings should typically be as similar as possible across each database, different databases use different search syntax, operators, and default search fields. Adaptation may be required depending on the functions within each database, especially those databases with a controlled vocabulary such as MeSH. Particular attention was given by the researcher to the adaptation of these keywords and search strings and the database field codes and controlled vocabulary as required.

This researcher adopted this approach monolithically iteratively utilizing multiple broad and narrowed keywords and search strings in databases that have different filing and recovery nomenclature. The search design and methodology used to create, implement, and retrieve the background papers, the search string form, as well as the formation and categories of keywords, are reviewed in Appendix 1 provides a categorized list of keywords and a visual representation of search strings for each database. Early scoping research identified difficulties we would face due to the limited and insufficient data available in the research area of focus. As a result, we drove the search methodology to prioritize inclusion rather than sensitivity.

3.4 Data Collection

The general research process involved three critical steps:

Step 1 - Preliminary scoping research was carried out on four different databases, Web of Science, Google Scholar, PubMed, and Scopus.

A review of these preliminary results was crucial to understanding the background of the focal area's background, which included theoretical foundations, preceding empirical research, and a preliminary cross-section of articles directly related to the research premises.

This stage cleared up any confusion and offered a summary of the literature available on the study topic. As a result of this first scoping, the researcher was able to fine-tune the hypothesis, general and particular objectives, and, most significantly, key ideas, keywords, and search terms.

Step 2 - Understanding and becoming familiar with the selected databases and creating categories and labels (e.g. broad versus narrow), keywords, and search strings for each database was critical to the commencement of the actual search and the retrieval of a substantial number of papers from all four databases.

- Importantly when creating keywords and search strings for different databases, they need to be uniquely tailored to ensure accuracy. For instance, when searching for relevant research topics on PubMed, utilizing MeSH (Medical Subject Headings) to precisely select appropriate terms is crucial for achieving accurate results. We conducted multiple searches on PubMed using the MESH (Medical Subject Heading) terminology thesaurus available on the database to find the keywords and comprehend their meanings.
- We also reviewed the CINAHL database and use of Headings, the degree of overlap between CINAHL Headings meanings and usage and MeSH terms in PubMed, and the overlap of papers generated.
- Secondly, when constructing search strings for different databases Boolean operators (AND, OR, and NOT) played a crucial role.
 - For example, Web of Science and Scopus work well with Boolean operators, and using more operators, quotation marks, and brackets such as this one: {},() made the searches more specific and more accurate. (Li, K., Rollins, J. and Yan, E., 2018).
 - On the other hand, Google Scholar, keywords, and Boolean operators are useful but the database's broader search capabilities and the use of natural language terminology make the operators more imprecise.

- In all databases the use of additional filters such as publication date, and source type, enables the filtering of unrelated papers and the retrieval of a narrower, more precise set of papers (Anders, M.E. and Evans, D.P., 2010).
- Although the keywords used in all databases were essentially the same or similar, the way they were linked and applied differed, resulting in different numbers and types of papers that were collected from each database. This was true for each search in each database.

The search process comprised two basic levels of search in each database at the *Title* and *Main Text* levels utilizing keywords and various research-generated terms. Searching Title first identified papers that had one or more of the searched terms as the primary focus of research – a potentially enriched result pool versus secondly searching the main Text to draw in any further papers that peripherally touched on the searched terms as connected findings in the main body of the text.

In the context of limited available papers on the core hypothesis and the need therefore to forage and aggregate disparate findings across many papers, the researcher erred on inclusion and potentially false positives that would require further individual (not automated) screening. This was deemed a critical requirement to meet the maximum inclusion threshold.

All the databases and the number of databases were selected based on the advice of Department professors, research papers on database attributes, strengths, and weaknesses (Berkman, L.F. and Syme, S.L., 1979). and their unique and relevant characteristics as determined by the researcher post scoping search. Namely, the final databases selected and used were PubMed, Scopus, Web of Science, and Google Scholar:

- PubMed is a comprehensive database dedicated to biomedical and life sciences (Lauren Z. Atkinson & Andrea Cipriani Bramer, W.M., Rethlefsen, M.L., Kleijnen, J. and Franco, O.H., 2017). and our primary and preferred database around which the other databases were selected for complementarity. PubMed allows for the search and collection of a wide range of medically related literature for deep analysis of this research topic. PubMed was instrumental in the initial identification and selection of keywords and key terms that made up the final search string combinations. Additionally, the conversion of searched words and terms to MeSH terms in this database and the ability to iteratively refine the search strings based on both MeSH terms and their search results assured early rigorous inclusion.

- One of the design criteria of this research was to use MESH as well as CINAHL subject heading where appropriate and possible. CINAHL database's main focus is on nursing and healthcare-related literature such as physical therapy, nutrition, nursing, and many other healthcare disciplines (Zhao, J.G., 2014). and this orientation both compliments the medical-centric focus of PubMed's MeSH disposition but may also touch on additional potentially relevant convalescent and community-oriented research.
- PubMed recognizes MESH terms which is a controlled vocabulary thesaurus used by the National Library of Medicine (NLM) for indexing citations in PubMed (Baas, J., Schotten, M., Plume, A., Côté, G. and Karimi, R., 2020). Therefore, these MeSH terms were used to retrieve papers from this specific database. In this manner, and by using PubMed as a search engine and entry point, the researcher was able to access and draw on a variety of research-strengthening features including.
 - MESH terminologies.
 - MEDLINE (Medical Literature Analysis and Retrieval System Online, or MEDLARS online)
 - CINAHL database.
- Although PubMed and CINAHL are two separate databases, PubMed sometimes includes links to "similar articles" or "cited by" sections that lead to articles indexed in CINAHL, even though they are not fully accessible on PubMed. Therefore, to gain a general understanding and familiarity with CINAHL and CINAHL terms the researcher carried out scoping searches on CINAHL using common terminologies. This helped to generate different types of CINAHL subject headings which were explored separately on the CINAHL database as well as through PubMed Medline(EMBASE, Cochrane Controlled Trials Register, Ovid, Google Scholar, and some specialty databases).
- Finally, we hand-selected the most appropriate MeSH-based words and terminologies that were related to our research topic. We complimented and strengthened this by adding natural language All FIELDS-friendly words and terminology relevant to the research area and that PubMed recognized. These keywords were used to create distinct PubMed search strings covering all relevant aspects of the research but were also used to drive a subcategory of searches on the other three databases. The other databases may or not have recognized MeSH terms or similarly defined them but did recognize the PubMed natural language ALL FIELDS words and terms. Google Scholar for

example recognizes all terms and merely matches papers to the used terms or approximates the next nearest words or terms deemed proximate in meaning by Google Scholar.

- Scopus is a powerful citation database that indexes a vast collection of peer-reviewed scholarly literature across a wide range of disciplines, with comprehensive coverage in the life sciences, social sciences, and physical science (Haddaway, N.R., Collins, A.M., Coughlin, D. and Kirk, S., 2015).
- Web of Science database offers multidisciplinary citation indexes and uses a common search language making the process of searching for general background information very effective (Bramer, W.M., Rethlefsen, M.L., Kleijnen, J. and Franco, O.H., 2017). Web of Science is a good resource for researching established areas, particularly in the social sciences, and facilitates quick access to the backbone of a focus area.
- Google Scholar is an invaluable tool for conducting a more general natural language search (Zhu, J. and Liu, W., 2020).and provides access to open-access journals and pre-print repositories that may not be in the library databases. However, many of the materials on Google Scholar are not scholarly, not necessarily peer-reviewed, and are often available only in abstract form. Results may vary considerably in quality and quantity depending on slight variations in natural language usage and may contain a cross-section of variably relevant sources including citations, cited references, and books, and may contain duplicates, various editions of work at variance with later found full-text versions in other databases. Nevertheless, regardless of this lesser precision Google Scholar is a formidable database and it was still necessary to form keywords and methods to search through this database and retrieve as many research papers as possible and reviews on the topic (Zhu, J. and Liu, W., 2020)

Step Three - The final step was to record and track all search strings in an Excel (the ‘tracking sheet’), see – appendix 2 file them, retrieve them, and run them on their respective databases. To be clear, as search strings were conceived, generated, refined, and trial run they were added to an Excel database of search strings. Once all search database strings were finalized the entire search string list for each database was run and their search results – number found per string- were noted and tracked in Excel (for transparency, later verification, and reproducibility, as required).

Therefore, after the initial work of conceiving, fine-tuning, and ‘locking’ the search string, the search string would be recorded in the Excel tracking sheet. Once all search strings for each database were

finalized it was necessary to run each search string again, evaluate and include all papers and research that might be relevant – based on the complete inclusion principle. Once each string was run, the results were immediately imported into Covidence for screening, final selection, and quality assessment. This tracking approach was later further tracked by Covidence and PRISMA flow charts. This process resulted in the collection of approximately 3773 papers from all four databases including duplicates, papers that eventually were unavailable for various reasons, and of course papers that were outside the scope of this research.

As stated earlier given the limited quantity and nature of the directly relevant found papers during scoping search a design decision was taken to include all search results in our assessment tool and to make a final assessment for relevancy in the sharable online screening and assessment tool, Covidence. Following the aggregation of all papers in databases-specific ready-to-upload file format, all papers were then uploaded/imported into Covidence for processing - applied selection criteria and assessed the quality of the papers - and final selection. Finally, all relevant information was extracted and synthesized for the research.

The next section of this Chapter now turns to an explanation and review of the screening and assessment tool, and the screening and assessment process including extraction and synthesis.

3.4.1 Quality Assessment

Section Two

After selecting the relevant articles for a systematic review, the next step was to screen each paper for relevance and assess the quality of each paper extracted from the databases. The process of assessing the relevance and credibility of peer-reviewed papers, evaluating, and documenting the potential biases, and making the decision to finally include them in the systematic review results and synthesis is called Quality Assessment and is a significant and predominant aspect of systematic review research. Since systematic reviews rely on data from other studies, the evidence presented in a systematic review is only as reliable and unbiased as the studies that were included in the review. (Siddaway, A.P., Wood, A.M. and Hedges, L.V., 2019).

3.5 Quality Assessment tool

Quality assessment tools are standardized measures used for evaluating the methodological quality of research investigations. They play a vital role in upholding the credibility and integrity of research findings. By identifying the potential for bias and methodological errors, quality evaluation

tools help researchers recognize studies that offer dependable evidence, while also highlighting areas for future research development (Bowden, V.R. and Bowden, A.G., 2022). As a result of prior design choices and early scoping research that signaled low research activity in the topic area and limited directly relevant peer-reviewed published papers

3.6 Covidence

3.7 Covidence And the Assessment Method and Methodological Quality Assessment

The Covidence assessment tool is a newly developed web-based software that aids quality assessment and data extraction process in a very simple and transparent way. It was designed and developed by Covidence, a not-for-profit social entrepreneurial company founded in 2013 and led by a team in Melbourne, Australia. The Covidence tool is meant to be flexible and adaptable, with a simple importing procedure and clear and visible tracking of all steps. Furthermore, Covidence is efficient and quick, allowing for a competent evaluation procedure (Kellermeyer, L., Harnke, B. and Knight, S., 2018).

This speed, flexibility, and automation were vital to our research in an area that had not previously been extensively explored and published, therefore we prioritized inclusion above specificity, resulting in more included articles (possible false positives) for screening and assessment. Elements of the systematic review that can be conducted via Covidence are citation importing and screening, full-text review, study selection, quality assessment, data extraction, and data exporting.

Covidence and the PRISMA guidelines both urge transparency, completeness, and efficiency when conducting systematic reviews and meta-analyses (Kellermeyer, L., Harnke, B. and Knight, S., 2018). Various aspects of the Covidence process and tool follow the 27-item checklist PRISMA guidelines to generate a PRISMA-compliant flow diagram documenting the flow of imported papers and their movement through screening, determination as to irrelevant or excluded, quality assessment, and data export.(Babineau, J., 2014).

3.8 Eligibility Criteria

To ensure that the research findings are reliable, impartial, and up-to-date, well-defined inclusion and exclusion criteria were established beforehand. Consequently, the studies selected for review fulfilled requirements relating to the following criteria- population, intervention, comparator, outcome, study characteristics, and others. Further details are provided in the sections discussed below, including lists of topics and focus that are given by the researcher to the tool as shown in Figure 1.

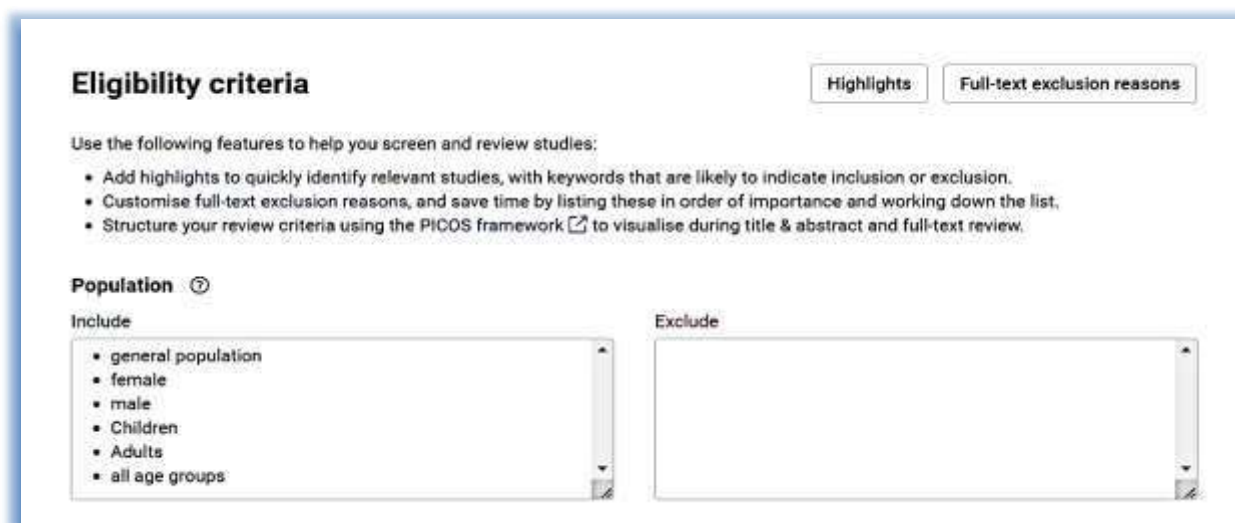


Figure 2.1 Eligibility Criteria

3.8.1 Population

The Population can be set as an inclusion/exclusion and includes aspects of the population relating to gender and age group including the general population, females, males, children, adults of all ages, etc. No exclusion settings for the population were set. See – Appendix B

3.8.2 Intervention/exposure

This pertains to the specific treatment, exposure, or assessment being evaluated in the review. In this review, the intervention/exposure criteria that were included were: see – Appendix B

- fear of socializing post Covid,
- social anxiety
- social anxiety and associated behaviors
- alcohol consumption
- tobacco consumption
- sedentary and fitness

3.8.3 Comparator/Context

- The comparator or context is the standard or reference point against which the intervention or exposure is being evaluated the major goal of this inclusion criterion is to be able to compare and gather articles that discuss the stated themes and relate them to the research topic we are investigating. See – Appendix B

The comparator criteria included:

- socializing before covid-19,
- socializing during covid-19
- fear of socializing
- and other associated behaviors before, during and post covid-19.

3.8.4 Outcome/s

Outcomes are the specific results or effects that are measured or evaluated as a result of the intervention or exposure. and for this focal point, the included result elements were four particular aspects analyzed and investigated during this review. See – Appendix B

- fear of socializing,
- social, and physical isolation,
- exercise and eating (disrupted) patterns and consumption of alcohol and tobacco detect

3.8.5 Study Characteristics

This encompasses the specifics of the research methodology used to answer the research questions and includes the type of study design but can also include other features. For this component of the eligibility criteria, three research characteristics were allocated to the inclusion side of the list: systematic reviews, qualitative studies, and quantitative studies. In the case of quantitative studies, as this is a narrative-only systematic review only thematic and qualitative results and findings were utilized. See – Appendix B

3.8.6 Other

This section is for any other type of inclusion or exclusion criteria that do not fit into the above categories. Concerning this specific review, this section included all sorts of sampling methodologies published between March 2020 and October 2023. See – Appendix B

3.8.7 Exclusion Criteria

This review only considered studies that investigate the research hypothesis related to the impact of COVID-19 on social interaction and specified associated behaviors, as indicated in the inclusion criteria.

Various subgroups not deemed to be representative of the general population – e.g. first responders, covid patients – were excluded. See – Appendix B

Studies that do not meet these specific inclusion criteria have been individually identified, depending on the stage of the decision, and are either deemed irrelevant or excluded during the screening process.

3.8.8 Duplicates Removal Process

Once the citations have been imported into Covidence, the data is sorted and filtered, with duplicates automatically detected, classed as such, and removed from further review. The remaining data/papers are then sent to the text and abstract screening section. Should the software be unable to identify a duplicate, there is an additional manual sorting process that occurs and can be utilized. The manually sorted duplicates are included in the "manually marked duplicates" section and also removed from further review. See – Appendix B

3.9 Title And Abstract Screening

At this step of the review, articles are examined and classified as "Yes", "No", or "Maybe". If the article was irrelevant, "No" was picked, and the document was immediately transferred to the irrelevant area. If the paper is relevant, "Yes" was chosen, which indicates. Following this step, the remaining papers are immediately transferred to the next screening stage. This is the full-text review screen. See – Appendix B

3.10 Full-Text Review

The 'full-text screening' method is similar to the 'title and abstract screening' procedure, except that it incorporates a study of the complete text and a conclusion of whether or not inclusion requirements are satisfied. Reviewers can eliminate citations by choosing from a drop-down menu of rejection grounds such as 'wrong focus, incorrect group, underpowered study' and others. The researcher can also add custom rejection reasons to the rejected articles. The PRISMA flowchart keeps track of selected exclusion grounds and records them by category and quantity. See – Appendix B

3.11 Data Extraction

At this stage of the evaluation process, data extraction was carried out from each paper. The review template used for this purpose is divided into four subsections. The first subsection is for extracting general information about the research. The second subsection is for noting the characteristics of the studies included. The third subsection is for gathering information on the participants and data collection methods used in the paper. And finally, the fourth subsection is for extracting the results and conclusions of the paper being reviewed. For examples of these templates - See Appendix B.

3.12 Quality Assessment Template

Following the completion of the Data Extraction Template, a Quality Assessment Template was created consisting of three important sections with specific detail requirements posed as questions as one reviewed and assessed the included papers for various attributes including outcome data and judgments as to both reported and non-reported limitations and bias.

The first section was a complete outcome data assessment, which evaluated the level of completeness of the data outcome stated in the research objective section. This assessment was scored with choices of High, Low, or Unsure, and was supported by a text explaining the judgment given. The second

section of the quality assessment template evaluated the primary limitation of the research and the extent of that limitation. This section was also scored with options of HIGH, LOW, or UNSURE and was accompanied by a written explanation justifying the given rating. The final part of the assessment examined whether the author had declared any other sources of bias in the paper and the degree of bias, if any, present in the paper. This was also supported by the options of HIGH, LOW, UNSURE, and a corresponding text justifying the choice - See Appendix B

3.13 Grouping of Data and Export Process

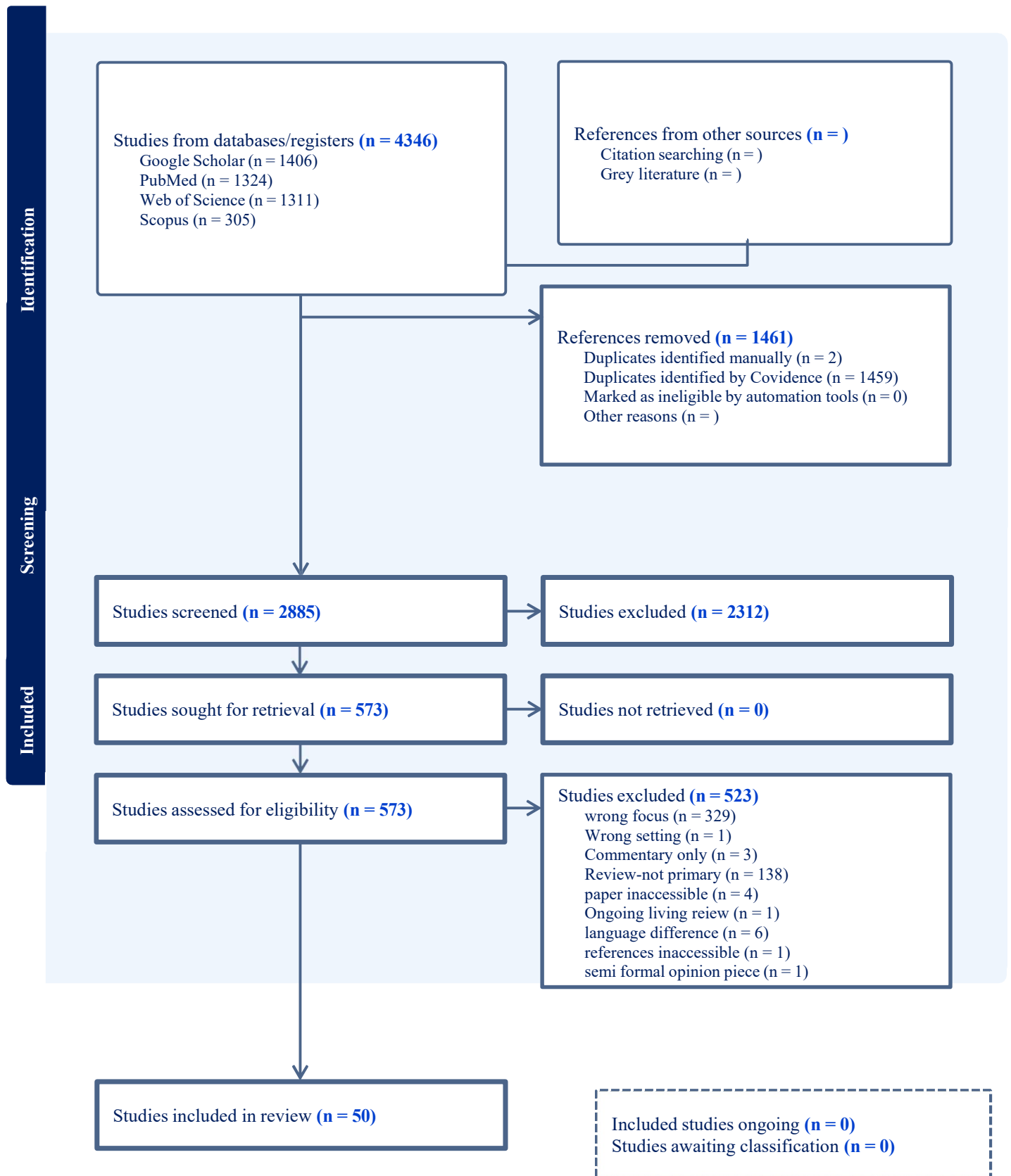
Following the export of data/papers to Excel format, the papers were recategorized and aggregated according to population, e.g. by 'adult', 'Children', etc. This merely enabled more control over the sorting, generation of descriptive statistics and synthesis of findings thereby enabling the next and critical two chapters of the dissertation, Results and Discussion.

Importantly, all groups for which data was gathered regardless of age are deemed to be merely age-defined subgroups of the general population that include adults, young adults, adolescents, and children. Moreover, even papers that limited their study and data acquisition to specific subgroups such as university students for example were upon full-text review deemed to nevertheless be members of the general population and not separated by any outlying or unusual cohort characteristic such as chronic sickness that would predispose them to experience the study phenomena asynchronously or asymmetrically to the larger general population. For example, as already stated, first responders or front-line Hospital/Healthcare were deemed to be at risk of conditions extreme and abnormal enough to potentially generate elevated levels of stress, anxiety, and other mental conditions that would skew their representativeness. Similarly, long Covid patients and patients with existing mental conditions such as Social Anxiety Disorder (SAD) were also excluded. See - Appendix B

The researcher noted potential aligned findings in these groups but did not include them in the final paper selection and assessment.

The tracking and results of the full screening and assessment are included in the Results discussion and PRISMA flowcharted in the figure below.

Figure 3.1 PRISMA flowchart



CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

There hasn't been much study done about post-covid fear of social engagement and the associated behaviors. The researcher did find 50 papers that were relevant to the topic at hand, of which 27 discussed social withdrawal/avoidance, anxiety, depression, and loneliness; the remaining 23 discussed the behaviors that are associated with these conditions and will be covered in more detail below. -See- Table 4.1.

The study design and characteristics of these papers that were involved in this dissertation include both longitudinal and cross sectional. -See- Table 4.2. and were conducted in a number of different countries, including Spain, Greece, Canada, China, Latvia, the UK, the USA, Croatia, India, Bangladesh, Portugal, Japan, and one multi-country study that included 22 countries. -See- Table 4.3

Table 4.1 Descriptive statistics of research included for this dissertation.

n papers	50	Mental Health	27	Assoc Behaviors	23
Study Focus Primary Focus G Number					
Mental Health		Associated Behaviors			
Social Avoidance/ Withdrawal, Anxiety, Depression, Loneliness.	Number and Percent		Number and Percent		
	27		23		50
	54%		46%		100%

Table 4.2 Study Characteristics/Numbers

Study Characteristics/Number		%
Longitudinal	11	22
Cross Sectional	39	78
	50	100

Table 4.3 Study Countries Total

Study Countries/Number	
Australia	2
Brazil	1
Bangladesh	1
Canada	1
Croatia	1
Czech Republic	1
China	5
Germany	3
Greece	2
India	3
Indonesia	1
Ireland	2
Israel	2
Italy	2
Italy, USA, Norway, Sweden	1
Japan	2
Korea	2
Portugal	1
Saudi Arabia	1
Spain	7
Spain and Latvia	1
UK	2
United States	3
USA and Canada	1
Wales and UK	1
21 countries	1
TOTAL	50

Six categories made up the population description of the study that was included in this study. The many research that was included in this dissertation were conducted in the general population; the remaining studies focus on subpopulations including adults, older individuals, children, adolescents/young adults, and families. -See- Table 4.4

Table 4.4 Population Descriptions

Population/Number Papers	
General Population	15
Sub Population	
Adults	12
Older Adults	8
Children	2
Adolescents/Young Adults	12
Family	1
TOTAL	50

The research papers reviewed in this dissertation covered four time period, pre-lockdown, pre-lockdown and during lockdown, during lockdown and post lockdown, and pre, during and post lockdown. -See Table 4.5

Table 4.5 Research's Time Frame

Pre-Lockdown	1
Pre-Lockdown & During Lockdown	28
During L & Post Lockdown	19
Pre, During & Post L	2
TOTAL	50

The general finding concerning Hypothesis 1 is that Covid led to an initial increase in the incidence and prevalence of mental health problems generally, and to increases in social anxiety, loneliness, and depression specifically, and consistently, on a global scale and across all demographic strata.

This increase in Covid related mental health issues manifested broadly across global populations in

many countries in the general population and demographic and functional subgroups of the population including adults (Kan et al., 2021), children and adolescents (Racine et al., 2021) older adults (Cuiffrine et al., 2021), school-going children (Ludwig-Waltz et al., 2023) university students (Liyanage et al., 2021), workers (Sheraton et al., 2020), caregivers (Dellafiore et al., 2022). This rise in social anxiety and mental health issues persisted across countries and populations post-lockdown and post-pandemic and is well documented in the literature (Kindred and Bates, 2023).

The emergence and rise of social anxiety and other mental health issues including loneliness and depression also led to a rise in social interaction disruption, social disengagement, and social avoidance that also persisted and is still evident today. This phenomenon is poorly understood, studied, and reported in the literature although scattered papers related to various aspects of the topic exist and are starting to emerge (Gonzalez-Sanguino et al., 2021, Fineberg et al., 2022, Cruze et al., 2023).

These emerging papers are limited and reported in various demographic groups and settings and require aggregation and intellectual coordination. This dissertation seeks to aggregate these disparate findings or research 'breadcrumbs' and to present proof of the hypothesis and merit for future research.

Importantly, several papers present novel applications of existing techniques to illuminate this social interaction disruption hypothesis, for example Prati et al., (2023). They are also aggregated and presented here as both findings proper evidence and as precedents for their future use as research approaches.

Much of the literature on social anxiety and social anxiety disruption during and post-Covid points to the cumulative effect of a wide array of variables including stress, lockdown, preexisting socioeconomic status, and individual personality traits. Repeated and or 'rolling lockdowns' had cumulative negative effects on social isolation, loneliness, social connectedness, and resilience.

Susceptible populations, such as young people and those with high levels of loneliness, females, and financial distress are highly correlated with the emergence of anxiety, anxiety-related fear of interaction and disengagement (of various types), and the degree of that response.

Social disengagement and withdrawal or downregulation of social interaction and relationships are correlated highly with anxiety. This is supported by the theoretical literature in the field most notably by Gazelle et al., 2019 and is also present in populations with social anxiety values below the diagnostic threshold for social anxiety and phobia disorders (Fehm et al., 2008) - a measurement value that was the more common finding of highly elevated levels of social anxiety, depression and

loneliness in the general populations across many countries during Covid and that did not reach the standard of mental disorder. These levels have persisted (Kindred and Bates, 2023, Cruze et al., 2023, Leavaradou et al., 2023)

This predisposition toward social disengagement is further exacerbated by the presence of accentuating factors including eating patterns, alcohol and substance abuse (Bloomenthal et al., 2016), physical and sedentary activity (Zika and Becker, 2021), and digital and social media overuse (Sun, 2023, Dhiman, 2020.)

Although this rise in mental health problems was correlated with a direct or indirect fear of social interaction, social interaction disruptions, avoidance, and withdrawal it manifested differentially depending on those demographics, country, and study context.

As stated, there is little direct study of the specific variable – fear and/or anxiety of social interaction post Covid – in the broad literature. Nevertheless, we found some scattered and early evidence that this fear of social interaction led to difficulties in reentry back into normal society and activities post-lockdown (Gonzalez-Sanguino et al., 2021) and to the stated avoidance of, and increased withdrawal from, society (Fineberg et al., 2022)

There was also evidence that this disruption to social interaction persisted past the acute phase of lockdown and even post-pandemic (Fineberg et al, 2022, Cruze et al, 2023)

One study in particular concerned the development of a diagnostic and predictive scale and self-report measure (PDSS) for the study of Pandemic Disengagement. Results demonstrated that the PDSS is a valid and reliable measure of a syndrome of disengagement from others following a pandemic (Prati et al. 2023). The study concluded that social anxiety was correlated with often unreported social disengagement when accurately measured. This finding bears directly on the lack of reporting on this specific dissertation topic.

However, not all social anxiety and (fear or) anxiety of social interaction during Covid led to withdrawal or avoidance. In several studies, social anxiety and other mental health issues and stressors were correlated with eventual positive outcomes such as PTG and enriched quality of life through more varied and increased life activities such as physical activity, the arts, and more selective social engagement (Bovero et al., 2023)

In many instances, this positive and developmental outcome, as with the development of anxiety and mental health issues generally, was mediated through individual and psychological variables including resilience (Xie and Kim, 2022) and the presence of and access to social capital (Gabarell-Pascuet et al., 2023)

Noriega et al., (2023) for example, studied the protective (resilience and life purpose) and vulnerability (anxiety and depression) factors that may impact PTG in 749 Spanish adults. Gender differences were found with women showing higher levels than men. Anxiety and depression through life purpose were found to negatively mediate PTG, and resilience – again through life purpose - was found to positively mediate PTG. Interventions based on these protective and vulnerability factors would be potentially useful.

4.2 Fear of socializing

The literature search for hypothesis 1 identified 27 studies examining fear or anxiety of social interaction and related issues. All 26 studies discussed and documented the presence and elevated levels of social anxiety in the general population or general population subgroups and also predominantly, although to varying degrees, other correlated mental health issues such as depression, and loneliness.

Even studies focused on positive aspects of growth and protective factors such as resilience made their case and presented their findings as a counterpoint to elevated levels of stress, anxiety, loneliness, or depression including Noriega et al., (2023) and Feng et al., (2024).

Social anxiety therefore was an almost ubiquitous variable even when discussed in the context of resilience or growth. These findings are further substantiated by several comprehensive, authoritative, and recent systematic reviews on the topic (Kindred and Bates, 2023., Dos Santos et al., 2021) Importantly, the papers cover a cross-section of ages and countries.

Social Anxiety, Social Interaction Disruption, Social Capital, and Connectedness in Adults

Diekhof et al., (2024) assessed whether medical-style protective face masks reduced deliberate and automatic social avoidance relative to unmasked faces in 311 German college students during and post-lockdown. Face masks impact various aspects of social cognition but it is unclear as to whether the wearing of face masks could also impact social avoidance behavior.

The authors therefore conducted two behavioral experiments that included both a self-report of behavioral intentions and an indirect measure of spontaneous approach and avoidance behavior initiation.

In this manner, the authors design took account of both the level of deliberate decision-making in line with the then-pandemic social norm and automatic behavioral tendencies that may rather reflect less deliberate, automatic mechanisms of social cognition and reaction. They tested two samples of healthy

students of various faculties of a North German University in two consecutive online studies during the first half of 2021 during various successive lockdowns and before the cessation of restrictions.

The research investigated deliberate and automatic social avoidance tendencies towards masked and unmasked faces in healthy young participants, who were tested following two major waves of the covid pandemic in 2021. The respondent received different interventions that either reduced or enhance the immediate disease threat posed by the presented stimuli.

The authors reported that deliberate approach-avoidance decisions were significantly related to participants' subjective pandemic-related threat perceptions for both masked faces and unmasked faces. The data suggest that the absence of protective face masks may have led to increased social avoidance at the level of deliberate decision-making during the pandemic and post-lockdown regardless of whether a rational contagion threat was present or high. People consciously chose to maintain avoidance behavior based on a perceived understanding of potentially higher contagion from unmasked individuals. Automatic social avoidance, however, was largely unaffected.

The relevance of the study to this dissertation is that individuals can and do perceive threat as signified by various indicators or proxies including basic direct stimuli such as face masks but may also include psychological and emotional variables such as social engagement generally or the obligation to interact in public places for example. These cues or patterns may prolong the persistence of avoidant behavior particularly where interaction is deemed incrementally complex or dangerous as in public physical activity at gyms or restaurants or bars where the perceived level of control and effort is not perceived to be commensurate with the (possible) risk.

When combined with other factors like increased sedentary behavior, alcohol consumption (at home), and excessive use of digital and social media, inertia toward reduced social interaction can eventually pose serious obstacles or rate-limiting steps to the return of pre-pandemic "normal" behavior, rituals, and interaction. These topics will be covered in more detail later in the dissertation.

Building on the importance of contextual variables as an important determinant of mental health and social anxiety, Liozidou et al., (2023) conducted a study in 650 adults from the general population examining whether social support could act as a bulwark against that social anxiety, the researchers collected the data in Greece during the second Covid wave, between February 3- June 1, 2021, and of 786 people surveyed, 650 were included after removing incomplete data. The majority (71.5%), with an average age of 33, were educated and female. More over half(65%) were single, whereas 32.8% or 47.7% were living with their parents or kids. Two thirds of those who were employed (89.8%) did so from home. Medical history, mental health (stress, anxiety, depression), trauma, and coping strategies

were among the information gathered.

Almost 20% reported pre-existing medical conditions, including 13.5% with psychiatric conditions. Interestingly, over half (57.5%) reported following moderate quarantine restrictions, 17.7% followed severe restrictions and 4% didn't follow any.

The pandemic significantly impacted mental health. A large portion of the study reported moderate to severe depression (33%), anxiety (21.3%) and stress (31.8%). Nearly 40% also experienced trauma-related distress. These mental health struggles were most associated with negative pandemic experiences like conflict at home, social isolation, and financial worries. Certain population characteristics increased the risk of mental health vulnerability including gender (being female), younger age, or unemployment were all associated with higher rates of depression, stress, and anxiety. Importantly, specific coping strategies emerged including acceptance, positive reframing, planning, active coping, and self-distraction through work or other activities. Gender differences also emerged, in that women reported using reframing, active coping, self-distraction, venting, behavioral disengagement, and social support more than men. Women relied more on social relationships and connectedness.

Common to many of these strategies is the factor of individual strength, resilience, and lessening of reliance on social networks and connectedness – a factor that has been documented across other studies in this dissertation. The lockdown increased both physical distancing and psychological distancing between people. Several coping strategies such as reframing and acceptance were positive coping strategies and have been recognized as protective factors for mental health (Bai et al. 2020). Other strategies, such as venting, behavioral disengagement, self-distraction, and use of instrumental support, have been associated with higher stress, anxiety, and depression levels, and can be less useful in stressful or conflict situations (Gurvich et al., 2021). Study respondents further displayed reduced social interaction and social support and a movement toward more individual strength and resilience-based coping strategies to address challenges.

Here again, concerning this dissertation's Hypothesis 1, we see that increasing stress and anxiety led by family and environmental variables can lead to various coping mechanisms that may be either positive or negative resulting in either increased social engagement and/or increased individual resilience and focus or negative outcomes such as social withdrawal and avoidance.

Coronado-Vázquez, (2024) examined the relationship between socioeconomic and educational factors and the level of anxiety and fear related to Covid. A sample of 150 patients who were at least 18 years old was taken. Of the participants, 35.6% reported an intermediate degree of anxiety, 8.9% reported a

low level, and 55.5% indicated a high level of fear regarding Covid. Additionally, 62.9% of those who thought they were at risk for COVID-19 and 64.3% of females showed significant levels of anxiousness.

The paper documents that during the second phase of the pandemic, more than half of the patients attending family medicine consultations exhibited a high level of fear and anxiety towards Covid, which was significantly associated with lower social class and unemployment. These findings were also supported by Yamamoto et al., (2022).

Prati et al., 2023, developed and validated a self-report measure of social disengagement (the PDSS) – in the USA, Italy, Norway, and Sweden - that investigates people’s general disengagement after the acute phases of the pandemic. In a final study component 3, the researchers conducted a non-randomized experiment comparing Norway and Sweden, to investigate whether scores on the PDSS were related to a markedly distinct approach to the pandemic in terms of mandatory lockdown. The result of this component 3, in addition to other components, demonstrated that the PDSS is a valid and reliable measure of a syndrome of disengagement from others following a pandemic specifically the Covid pandemic.

The researchers determined that a total of 400 participants would be an appropriate sample (i.e., estimated power was greater than 80% with $\alpha = .05$) Since they planned to randomly split half of the sample, this consequently required a total of 800 participants. They recruited participants through survey firms in the United States and Italy. All surveys were self-administered and confidential. In the US sample Five hundred and fifty-eight participants completed the surveys of which 143 were data cleaned. Thus, a sample of 415 complete surveys was used. Specifically, respondents were 50.7% female (U.S. census = 52.3%), 49.1% at least college-educated (U.S. census = 38.1%), 40% White (U.S. census = 42.7%), 23.3% Black (U.S. census = 24.3%), 19% Latino/Hispanic (U.S. census = 29.1%), 14.3% Asian (U.S. census = 14.1%), 2.9% multiracial (U.S. census = 3.6%), and reported a median income of \$75,000–99,000 (U.S. census = \$63,998). There were no differences in gender, age, non-White ethnicity, income, or education. In Italy, the survey was of 511 respondents of which 56 were removed. Therefore, a sample of 455 complete surveys was collected, and a mean age of ~46 was reported, ~51% female.

Data on a range of variables were collected including well-being, social well-being, general distress, post-traumatic stress, institutional trust, social media use, social interaction frequency, and others. As stated, Study 3 component examined whether disengagement syndrome was specifically linked with lockdowns and whether it had incremental validity over and above social anxiety.

The researchers conclude that these findings suggest that disengagement syndrome is likely to be present in a wide range of contexts, not just those subject to lockdown orders, and further supports the idea that disengagement syndrome is attributable to the pandemic's broader consequences for economic, political, social, and health functioning.

Prati et al.,(2021) point out that many reasons may be involved in continued disengagement or anxiety related to social interaction including fear of infection and continued mental health issues relating to depression and loneliness, and reluctance to socialize and socially engage due to loss of social skills and others. The extent and type of social disengagement may vary according to demographics, country, and cohort yet the phenomenon persists across many countries. Other researchers in the field including Fisher et al., 2021, Hood et al., 2021, and Kilgore et al., 2020, have noted the reluctance of various cohorts to reengage socially.

Gullo et al., 2021, carried out a 4-point longitudinal study of 3,931 adults in Italy, of which 71% were female, during and after lockdown in the general population. Responders were mostly female (77% at baseline), residents in northern Italy (48.8% baseline), and about a third of participants were students (27,3% baseline). The majority lived with one family member or were cohabitants (33,8% at baseline). Levels of depression were moderately severe in 6%, and severe in 2% of the responders. Levels of anxiety were moderate in 13% of the responders and severe in 3%. Significant differences were found between genders at baseline with higher levels of anxiety and depression in females, the unemployed, and students in comparison with other work categories.

There were no significant differences for different levels of education nor in the resident geographical area. Finally, age proved to be a factor negatively associated with both GAD-7 and the Patient Health Questionnaire (PHQ-9).

The authors found that levels of depression and anxiety were significantly higher and persistent in the study sample for each of the four time points and importantly through post-lockdown. Levels of coping were also significantly lower than normative data at all-time points. Levels of perceived social support and therefore social connectedness were significantly lower than normative data at the baseline and the first follow-up.

Yamamoto et al., 2022 conducted a study on 7,893 Japanese adults at two-time points – May and February 2020 and concluded that over repeated mild lockdowns, mental and physical symptoms decreased overall although loneliness increased and was correlated with a decrease in social interaction and social networks. Younger and middle-aged people, women, and individuals with socially disadvantaged status were all more susceptible to mental health issues, and depression was

commonly associated with loneliness and loss of social interaction and social networks.

The mean age of those who participated in both surveys (N=7893, response rate 69.6%) was 49.6 years, 65.6% were married, and 68.2% were employed. 3440 participated in the data collection. Respondents to the second data collection were older and had a larger proportion of men and married people. Respondents who participated in both time points and therefore at the later data point experienced greater loneliness and smaller social networks, while fewer people exceeded the cut-off points for depression (PHQ-9 and Kessler Psychological Distress Scale). Suicidal ideation decreased across the second time point data gathering in the first survey.

The 18-29 year old group displayed higher rates of depression from wave 1 to wave 2 of the pandemic and those respondents with preexisting mental health issues and lower financial status also continued to display high rates of suicidal ideation. Psychological distress reduced over both waves although was lowest in older people and somatic symptoms were less frequently reported, reduced across waves but remained higher in those with reduced socio-economic status. Loneliness increased most in women across both waves but was significantly higher amongst men in both waves.

Many of these social and interaction-related findings may relate to the fact that social networks and social interaction decreased for both men and women across both Covid waves but the decrease for women was higher for women than men but men had the lowest social network across both waves. Social network and social interaction attrition occurred even in mild waves of closure and the duration of the pandemic contributed to the accumulated loss of connectedness and social interaction driven by mandate, fatigue, fear of infection and general social disruption. This was felt most over time by older women.

Clusters of accumulated and combined effects and from a combination of mental health issues resulted from the duration of restrictions and accumulated impact. Individuals with higher loneliness and the lowest social network had the highest estimated rates of depression in both Covid waves.

Henwood et al., 2023, documented the association between compliance with government-prescribed social restrictions and willingness to socially interact or avoid as measured by the reaction to digital/pictorial stimuli of human states (sad/happy faces) using data from 174 UK adults in the general population across three-time points and indicated subjects becoming more avoiding of sad images on average in Covid wave 2 as compared to Covid waves 1 and 3.

People reported lower values for reduced-overall-interaction on average over time. In other words, and as relevant to this thesis, the researchers studied and evidenced increasing avoidance behavior despite easing of restrictions and controllable access to increased social interaction. This avoidance behavior

persisted. Social interaction disruption and disengagement persisted despite restriction easing and a relative return to normalcy.

Higher levels of stress were associated with less approach and reduced overall interaction. Higher social anxiety was reflected and evidenced by increased physical and digital avoidance.

In three other papers by Diekhof et al., (2024), Zoabi et al, (2023) and Prati et al.,(2023), the researchers focused on methodologies that sought to detect social interaction avoidance by measuring reactions to substitute or proxy stimuli for interaction. The findings of these papers are discussed elsewhere but noted here as an essential finding in this dissertation – high social anxiety (and often depression and loneliness) was dominant throughout the pandemic and is highly correlated with social avoidance and withdrawal in the theoretical literature, and when measured by novel means persistent social interaction disruption and avoidance was discovered and documented in empirical research.

Xu et al., (2022), building on the work of Rubin et al., (2009) reported that there are various subtypes of maladaptive socially avoidant and withdrawn personalities/subtypes in the general population separate from the default and predominant non-withdrawal types.

These subtypes had distinct mental health trajectories in response to the pandemic that predisposed their withdrawal and the extent, severity and functionality of that withdrawal. Xu et al.,(2022) reported that stress and anxiety can lead to disengagement generally, more or less, but in particular, in withdrawal-disposed subgroups can lead to higher and/or more extreme levels of withdrawal.

In January 2020, 266 Chinese adults participated in the initial study, and data was collected across 6 time points in 2020 – the last time point loosely corresponding to the Covid mitigation phase and some easing of restrictions. 222 respondents (83.46%) correctly filled all the questionnaires. The final sample included 222 adults (121 females, 54.50%) from 58 cities in 26 provinces in China. All participants were tracked monthly from February to June 2020. Participants ranged from 19 to 64 years.

Social withdrawal, including shyness and unsociability, was assessed using the Solitude Behavioral Scale at all time points. Other measures of shyness, unsociability, and well-being (including anxiety and depression and good health) were also utilized and data was collected at all time points. Statistical analysis was applied. Subtypes of social withdrawal were identified by two-step cluster analysis including on 3 maladaptive groups and one non-withdrawal subtype.

Results that concern this dissertation showed in particular that, the social avoidance group reported the lowest levels of well-being at both the initial and the mitigation phases.

In conclusion, Covid was found to be significantly correlated with elevated levels of anxiety,

depression and well-being.

Echoing Prati et al.,2021, Xu et al.,(2021) indicated that certain extreme social stressors including catastrophic situations such as pandemics can elevate social anxiety and other mental health reactions and thereby elevate predispositions to withdrawal and disengagement as coping mechanisms particularly when other factors such as resilience, family, and socioeconomic stress are present and operating.

Extreme stress and social anxiety can afflict all and increase dramatically in the general population and lead to widespread avoidant and withdrawal-like behavior but will be more pronounced and /or persistent in certain individuals and subtypes with confounding qualities.

Xu et al.,(2021) findings confirm the significant effect of social interaction disruption and avoidant behavior in the context of crises generally and Covid specifically and provide further evidence as to the existence of certain groups and types in the general population that are differentially and negatively impacted by elevated levels of social anxiety and associated mental health dysfunctions.

These groups when measured manifest persistent social disruption impacts. Further research is required.

Rishi et al., 2021 sought to examine the psychological impacts of covid and associated pandemic distress on the demographically diverse Indian population and their Covid coping mechanisms including physical activity and health, self-care, family connectedness, and self-development through new skill and learning acquisition, particularly in the early phase of lockdown. Passive acceptance of and 'submission' to the pandemic and restrictions were associated with fear, anxiety, and frustration. As the pandemic and lockdowns continued, however, fatigue set in and learning and self-development gave way to increased fear, anxiety, frustration, and irritability with social interaction. Extended social confinement and uncertainty led to greater anxiety and social discord.

This was particularly evident in younger age groups, less so in older people used to social and physical immobility now surrounded by family. Uncertainty, chronicity, and the length of stress all contributed to the emergence and cumulative effect of mental health issues such as anxiety and depression. The disruption of the daily ritual and the length of that disruption can amplify negative outcomes and social interaction disruption and lead to iterative and downward bidirectional feedback spirals between anxiety and depression (Feng et al., 2023).

A total of 261 socio-demographically diverse respondents, across all the participants were between 18 and 73 years of age. A second phase of the study was also planned in which 20% of the respondents were approached electronically with a follow-up survey to report their subsequent mental state based

on structured questions that were subjected to qualitative analysis.

Results indicated that as social support decreased over time females were spending 42.86% more time on household management than males. Even when house help was available females were still spending 61.04% more time on household work than males, which increased stress, especially for women working from home. In a combined analysis of household work and work from home, young females worked more than males and older males worked increasingly more than younger counterparts.

Almost all respondents made an active effort to cope with this scenario during the first weeks of lockdown. 31% of the respondents responded optimistically about the change with active functional coping in the form of spending time with family members and reconnecting with old friends.

A not insignificant 10% of the respondents coped with restrictions through negative emotions such as fear, anxiety, frustration, and irritability like fear of the unknown future and by behaviorally and psychologically isolating themselves. Social interaction disruption grew over the study period.

Kavanagh et al., 2022, evidenced the different coping strategies, distress, and post-traumatic growth among Australians with and without a history of a mental health diagnosis during Covid. The study was carried out in Australia, 381 Australians completed an online survey between 4 August 2020 and 25 October 2020. Coping strategies, distress, and post-traumatic growth were ascertained via the Brief COPE (Coping Orientation to Problems Experienced), a 28-item self-report questionnaire designed to measure effective and ineffective ways to cope with a stressful life event (DASS-21) Depression Anxiety and Stress Scale) PTGI and (Post-Traumatic Growth Inventory), respectively, and models were created separately for those with/without a history of a mental health diagnosis.

Inclusion criteria for this study were adults (≥ 18 years), who resided in Australia at the time of survey completion. Data was collected through an online Qualtrics survey between August and October 2020. Not surprisingly, higher distress was found among those with preexisting mental health issues.

After data cleaning and applying inclusion and exclusion criteria, 381 survey responses were included in the final analyses. Of the 381 participants (18-80 years) most participants were female ($n = 320$, 84.2%), held a tertiary level education ($n = 133$, 88.9%), and worked full-time ($n = 270$, 70.9%). A total of 149 (39.1%) participants reported a history of a mental health diagnosis. Severe levels of depression and stress were recorded and moderate levels of anxiety across the sample. Approximately 60% of participants in the study reported that their well-being and mental health had declined since the beginning of Covid. Participants with a history of a mental health diagnosis experienced higher levels of depression, anxiety, and stress.

Gizdic et al. (2023) also investigated the psychosocial predictors of psychosis risk, depression, anxiety, and stress across Croatia two years after the onset of the COVID-19 pandemic and post-lockdown and this study was composed of a total of 377 Croatian adults (78% females; mean age = 29.2) participated in the study. Two years after the pandemic, participants reported overall good general health (42%), but they were still concerned with the pandemic (54%). 57% of participants had received a virus vaccination, with a slight decrease in average general health before and after vaccination. Overall, participants reported a relatively high number of days when they felt love, happiness, or hope.

Questions assessing social connectedness, levels of loneliness and social isolation, and resilience were completed by approximately 83-86% of participants, of whom 28% were at high risk for psychosis.

A second set of analyses revealed that stress was negatively associated with levels of resilience, whereas general trauma and high interpersonal and social contact were positively associated with resilience. As reported in other studies for this dissertation, although stress decreased levels of resilience, those with previous exposure to general trauma and greater social connectedness - a high number of people in their social network- had increased resilience levels.

Increases in all mental health variables, including depression, anxiety, stress, and a doubled risk for psychosis outcome post Covid pandemic were evidenced. Stress was found to decrease levels of resilience. Interestingly those exposed to previous traumatic experiences with greater social connectedness exhibited higher resilience levels thereby pointing to the function of experience, learning, and a potential avenue for future mental health interventions through community shepherding and mentoring programs.

Importantly for this dissertation, the study concluded that although 2 years after the emergence of Covid, post-lockdown, and vaccination, anxiety persisted concerning the virus and contagion. Continued anxiety and social interaction disruption was evident. Resilience, social connectedness, and social network were and continue to be protective against anxiety and mental health dysfunctions.

A much larger study by Matos et al., (2021) examined how social connection can be used as a coping mechanism for threatening events and crises, specifically Covid mandated lockdown and social isolation when deprived of social support and social interaction and when daily rituals are disrupted. The study included 4,057 adults from the general population from 21 different countries.

The research sample comprised of 4057 participants from 21 countries: Argentina (ARG) N = 257, Australia (AUS) N = 109, Brazil (BRA) N = 299, Canada (CAN) N = 115, Chile (CHL) N = 282,

China (CHN) N = 77, Columbia (COL) N = 50, Cyprus (CYP) N = 38, Denmark (DNK) N = 141, France (FRA) N = 115, Great Britain (GBR) N = 268, Greece (GRE) N = 145, Italy (ITA) N = 160, Japan (JPN) N = 522, Mexico (MEX) N = 181, Poland (POL) N = 82, Portugal (PRT) N = 394, Saudi Arabia (SAU) N = 256, Slovakia (SVK) N = 46, Spain (ESP) N = 392, and The United States of America (USA) N = 128.

The sample consisted of 18.2% of males and 80.8% of females, 0.4% of participants reported other gender and 0.6% preferred not to report their gender. The mean age of the sample was 41.45 years old. The online survey collected sociodemographic information (nationality, country of residence, age, gender), Covid related information (e.g., experience of Covid infection) and administered self-report instruments assessing dimensions of social connection (i.e., compassion for self, from others, for others, and social safeness), dimensions of social disconnection (i.e., fears of self-compassion, from others, for others, and loneliness), the perceived threat of Covid, post-traumatic growth and post-traumatic stress symptoms.

A major stressor during the pandemic has been a sense of social disconnection and loneliness and anxiety toward social interaction and connectedness due to fear of contagion. The researchers explored how people's experience of compassion and feeling socially safe and connected, in contrast to feeling socially disconnected, lonely, and fearful of compassion, mediated the perceived and experienced development of post-traumatic growth and post-traumatic stress.

Extreme conditions can cause extreme unique reactions, both negative and positive depending on other present and correlated individual and environmental factors such as resilience, social support and connectedness, social interaction disruption, and others.

Social disconnection predicted higher levels of post-traumatic stress, revealing that being fearful of compassion and feeling lonely and disconnected from others increased traumatic stress symptoms.

The study concluded that social connection is a key coping mechanism against crises and that the presence of this variable may promote PTG whereas social disconnection and disengagement correlate positively with vulnerability and isolation.

4.3 Social Anxiety, Social Connectedness, Social Support, and Social Capital in Older Adults

The plight and heightened vulnerability of older people during Covid have been well documented although studies have reported either low, or insignificant levels of mental health impact (Nam et al., 2021, Parlapani et al., 2021).

Four (4) of the found papers relating to fear or anxiety of social interaction and related issues studied these phenomena in older adults.

Benam et al., (2022) explored the post-lockdown and pandemic persistence of factors -including age, sex, disability status, anxiety, depression, social support, and mobility - associated with loneliness among older Canadian adults and people with disabilities. Most respondents reported living with others and therefore ostensibly had systems of social support or social capital in place.

Social connectedness and social relationships were instrumental in combating anxiety and where not present gave rise to increased anxiety and lack of connectedness. These findings are supported by a Wickramaratne et al., 2022 review that concluded social connectedness protects adults in the general population from depressive symptoms and disorders. The results, which were largely consistent across settings, exposure measures, and populations, may support efforts to improve clinical detection of high-risk patients, including adults with low social support and elevated loneliness.

Zhang et al., 2023 also document the importance of social capital and health-related quality of life (HRQoL) in Chinese older adults. 1201 Chinese older adults aged ≥ 60 years were included in the study, with a mean age of 70.12 ± 6.29 years (range: 60–97 years). Most of them were rural residents (73.36%), women (53.37%), married (74.02%), had no higher education (59.30%) and were in the middle-income group (61.20%) and the researchers reported in the finding that social capital and quality of life had a significant positive correlation.

Social engagement and social capital have a strong correlation, supporting the first hypothesis of the dissertation. If social anxiety or depression interferes with such contact, the result is retreat, even less social capital, and a worse quality of life. These findings confirm the findings in other discussed papers of this dissertation papers concerning the importance of social capital and social support.

Finally, Celdran et al., 2021 in post-lockdown Spain, in a sample of 1,009 older adults (>55 years) and students at the University of Barcelona through a questionnaire, explored PTG and Inventory scores-PTG-SF and attempted to identify predictive variables including sociodemographic variables, and social resources.

Results showed that a quarter of the participants experienced higher PTG after the forced lockdown, with age and social resources being specifically correlated with scores on the PTGI-SF. Older adults exhibited resilience and recovery concluding therefore that older adults show remarkable resilience and at most average but often much less than average susceptibility to social anxiety and social interaction anxiety.

4.4 Social Interaction Disruption in Adolescents and Young Adults

We turn now to the findings of six (6) studies relating to older adolescents and young adults, most of whom were students in school or university settings: Cruz et al., (2023), Zoabi et al., (2022), Dopico-Casal et al.,(2021), Luo et al.,(2021), Meltzer et al., (2023), Gibbons et al.,(2022).

Cruz et al, 2023 in an important Portuguese study of school-going adolescents of approximately equal gender representation compared the trajectories of social withdrawal and social anxiety before during, and after the closure of schools imposed by the Covid lockdowns, and investigated the association of self-esteem with these trajectories. Importantly Cruz et al. also studied the incidence of social withdrawal and social anxiety – the two primary variables in our main hypothesis.

Participants were 844 upper middle school students from 40 classes at 14 public schools of Continental Portugal and Madeira. The sample was gender-balanced, with 427 boys (50.6%) and 417 girls (49.4%), mean age was 12.70, and socioeconomic status was varied as was ethnicity (<18%). Social withdrawal, social anxiety, self-esteem, and school and classroom characteristics were studied variables across 4 time points and by gender. Girls reported higher social withdrawal and social anxiety, and lower self-esteem than boys at baseline.

Importantly also, adolescent students reported higher social withdrawal after the lockdowns than before the pandemic as a result of school closure (during Covid) and after a return to normal school attendance. The social withdrawal was high and highly correlated with social anxiety and persisted up to a year after the lockdown and cessation of the pandemic. Self-esteem was found to be protective against anxiety and withdrawal and correlates with the finding noted elsewhere by Prati et al., (2021) that various individual (e.g. resilience – Jefferies et al., 2021) and environmental components (family, community- Mak et al., 2018) may lead to differential disengagement across populations and same cohorts.

Social disengagement and withdrawal or downregulation of social engagement and relationships therefore are correlated highly with anxiety. This is also supported by the theoretical literature in the field most notably by Gazelle et al., (2019) and is also present in populations with social anxiety below the diagnostic threshold for social anxiety and phobia disorders (Fehm et al., 2008) - a measurement value that would have been common to many populations and finding of highly elevated levels of social anxiety, depression and loneliness in the general population during Covid and that has persisted (Kindred and Bates, 2023).

This predisposition toward social disengagement is further exacerbated by the presence of accentuating factors including alcohol and substance abuse (Bloomenthal et al., 2016), physical

activity (Zika and Becker, 2021), and digital and social media overuse (Sun, 2023, Dhiman, 2020.). Gibbons., (2022) study reported on young adult psychology students in Ireland and evidenced that overall, adverse mental health was high in this population during the pandemic and the lack of learning motivation was significant. As expected, and found in other research presented in this dissertation, positive outlook - the importance of resilience and individual traits - was associated with good mental health.

A sample of 162 university students (81% of the second-year cohort) was recruited from the second year of a psychology BSc program. 86.4% were female (n=140) and 13% male (n=21). Participants' average age was 22 years (range 18–59 years). A survey-based, correlational design was employed. The predictor variables of the study design were course-related demands (rated as hassles and as uplifts), pandemic-related stressors, including social media use and changes in diet and exercise; and aspects and influences on coping, namely support, context control, and personality. The survey took approximately 12 min to complete. A score on the General Health Questionnaire (GHQ) was used to determine those broadly 'at risk' or 'not at risk' of developing a stress-related illness.

A striking finding was that 68.5% of respondents were at risk of a stress-related illness value that exceeded that reported in pre-pandemic populations of students and non-students of similar age. The average GHQ score was higher compared with pre-pandemic normative student populations. Those 'at risk' spent more time on their devices and they were more likely to struggle to find the motivation to be productive and they more often reported changes in sleeping habits i.e., they engaged in behaviors that impacted their coping or reflected poor coping.

While positive ratings of teaching and optimistic thinking were associated with good mental health, context control was key adverse ratings of teaching quality lowered learning motivation.

Several observations as to the relevance of this paper to this dissertation are noted; respondents suffered from high levels of anxiety, stress, and poor motivation. Respondents with a predisposition toward stress-related unwellness overused their smartphones, had low motivation, poor coping, and sleep disruption and many of the individuals with these traits may also have suffer lower social interaction levels and disengagement. This is an area for future research.

Zoabi et al., (2023) document the changed perception and experience of social touch as an enabler of social connectedness. Forty-three participants (25 female) were recruited from the University of Haifa, Israel. The participants' ages ranged from 18 to 42 although predominantly clustered in young adults. Pre- and post-Covid measurements of touch and object were measured.

The authors proposed that social restriction imposed by Covid changed stimuli and cues related to

touch and that consequently people's perception and reaction to social touch – a crucial component of social interaction and social connectedness - and therefore some element of social connectedness and social interaction, also changed, perhaps permanently. Researchers examined how perceptions of interpersonal touch in social interactions were affected by the pandemic and hypothesized that after Covid social touch might induce hyper-alertness to touch and therefore social interaction due to the risk of infection.

Analysis revealed a significant three-way interaction between touch, object, and Covid, and therefore further separate analysis of pre-and post-Covid findings was carried out. Participants in the post-Covid group rated photos depicting touch as less pleasant than did participants in the pre-Covid group.

The results of the study suggest that not only did the pandemic have an impact on behavioral responses, but it also affected the neural processing of touch stimuli. The authors noted that Covid may have caused lasting changes to perceptual and evaluative processes of social interaction. This is an area for future study.

Concerning this dissertation the Zaobi et al., (2023) study confirmed a high incidence of social interaction anxiety and avoidant behavior as proxied by the non-social touch preferences.

Luo et al., (2022) explore the effective functioning of social groups through networks of relationships before and during Covid in over 10,540, Chinese youths at different levels of education. including high school, graduate, and postgraduate, and measured along 4 dimensions of social capital – defined as ‘the access to and use of resources embedded in one’s social networks’, Lin (2002), Flora (1998) - family, social, individual, and societal.

Participants aged 15 to 33 years old were included in the study of whom 2855 (27.1%) were high/vocational school students, 7419 (70.4%) were undergraduate students, and 266 (2.5%) were graduate school students. About 71% of the participants were female and 61.8% were from non-urban regions.

In summary, the changes in mean social capital scores decreased slightly from 15.14 to 14.01 in the individual dimension and from 13.36 to 12.92 in the community dimension and increased slightly from 12.70 to 13.11 in the family dimension and from 7.11 to 7.20 in society dimension. The mean total social capital score decreased from 48.31 to 47.24. The trend of change was consistent across three educational levels after adjusting for age, sex, ethnicity, locality, and province of residence.

Individual and Community levels of social capital decreased during the lockdown while family and societal social capital increased.

Many of the changes may be explained by lockdown, restricted social activities, and fear of contagion.

The important point is that restriction reduces individual social capital and connectedness. Such social capital reductions as we have noted elsewhere may under certain circumstances and in certain groups persist and manifest in social avoidant behavior and disengagement.

A survey was administered in the United States and Canada by Meltzer et al.,(2023) in summer 2022. Not surprisingly philanthropic activity toward family and community and self-help development activities including learning all contributed toward connectedness and feelings of well-being. The authors explored the coping mechanisms, activities, challenges, places visited, and sources of support that predicted teenagers feeling connected to others during Covid.

Data for this analysis come from a larger mixed-methods, multi-year study that aims to understand the lived experiences of children, teens, and older adults in the United States and Canada during the Covid pandemic through the lenses of vulnerability, mobilities, and capacities. In July 2022, the research team conducted three, nationally representative online surveys in the United States and Canada of parents or guardians of children ages 5- 11, teenagers ages 12-18, and older adults ages 65 and over. Respondents were asked about their challenges, coping strategies, activities, and relationships during the pandemic, as well as their history with Covid and their sociodemographic.

There were 1,002 good-quality responses by the close of the survey period for an incidence rate of 23%. Surveys took an average of five minutes to complete. Five multivariate models were created each focusing on a different aspect of teenagers' Covid experiences: extracurricular activities; sources of support; coping mechanisms; pandemic-related activities; and challenges faced.

92% of the adolescent respondents said they didn't feel socially connected throughout the pandemic. 52% of individuals identified as female, 46% as male, and 2% as non-binary or other in terms of gender identity. The distribution of respondents' ages was more equally split between 12 and 17, with 25% of them being 18 years old. Of them, exactly half were residents of the United States and Canada, respectively, and the majority of Canadians spoke English as their first language (71%).

Based on bivariate analyses, those who participated in multiple activities were more likely to report feeling connected to others, including music, religious activities, and volunteer or community service projects. Those who did not report participating in any activities were less likely to feel connected to others.

The survey results challenge the narrative that depicts teenagers as a homogenous group that relies solely on adults for their resilience. Rather, it points to teens' capacity for agency, as demonstrated through how they actively constructed elements of their Covid disaster experiences.

Dopico-Casal et al., (2023) examined the role of perceived social support (PSS) as a protective factor

against the psychological impact of Covid restrictions on Spanish university students. The study sought to establish whether PSS was protective against or buffered the relationship between stress associated with the pandemic and four indicators of mental health - anxiety, depression, irritability, and self-perceived change in mental health. 826 students participated, 88% were undergraduate, and 75.3% were female, 45.8% were aged 21–23. Many lived at home with their parents, some with partners, and a small percentage (5.4%) alone.

Data was gathered from each participant on Covid stressors (a 26-item composite scale), the PSS scale after Padron et al., (2021), and various psychological attributes including irritability, anxiety (GAD-7), depression, and self-perceived change in mental health (5-point Likert scale again after Padron et al., 2021).

The study indicated stressors like quarantine, made teens feel more stressed, anxious and depressed however, having good perceived social support (feeling cared for by others) helped lessen the negative impact of stress, except for stress directly related to the pandemic itself.

Buffering theory (Cohen & Wills, 1985) generally asserts that social support promotes mental health and mitigates the negative impact of stressful events. SS (Social Support) in this sense can be defined as “support accessible to an individual through social ties to other people, groups, and the larger community” (Lin et al., 1979; p. 109). SS therefore by its very definition and functionality implies and denotes increased connectedness and social interaction.

On balance therefore the results of Dopio-Casal et al.,(2023) study are supportive that perceived social support reduced uncertainty, created connectedness, and reduced social interaction disruption. Contrary outcomes involving reduced social interaction (either enforced or voluntarily selected due to anxiety or depression) can similarly reduce resilience and protection against anxiety, depression, and loneliness and lead to further dysfunctional associated behaviors such as alcohol and tobacco consumption as we will examine at a later point in the dissertation.

4.5 Social Connectedness, Social Capital, Resilience and Stressors in the Context of Family

Feng et al., 2024 studied the impact of individual social capital and psychological resilience in the family setting and the context of mental health of 331 family caregivers of kindergarten children in mainland China. Importantly the study was carried out in 2023 very late in the pandemic, post-lockdown, and almost post-cessation of pandemic.

In total, 331 participants participated, of whom 38.3% were fathers, and 61.3% mothers. 96.1% married, and mean age was 37.68 years. 95.8%) of respondents were employed. More than half

reported a high monthly income. A significant association was found between social capital and resilience. Psychological resilience was found to partially mediate the relationship between social capital and mental health outcomes. Resilience is a significant protective variable and resilience combined with social capital offers the most protection against mental health issues while also generating connectedness and a predisposition toward social interaction.

Feng et al., demonstrate that psychological resilience is a mediator between social capital and mental health and that a positive relationship exists between bridging social capital and mental health. Psychological resilience is also negatively associated with depression, anxiety, and stress. Also of note is the potential negative aspects of social capital, particularly within family caregiving groups. The work-caring balance creates a significant burden and although important in the family setting, especially for children and adolescents, caregiver care may impose significant mental and physical health stress on the caregivers and in particular in those older caregivers with less resilience.

Kacane and Hernandez-Serrano, (2022) studied the use of video calling by families as a means to facilitate social and emotional connectedness in two countries – Latvia and Spain. A small study of eight multi-family member interviews in each country was conducted from October to December 2021 mainly via Zoom and WhatsApp (due to lockdown restrictions). Semi-structured interviews focused on three thematic blocks- (family lifestyle during the pandemic, celebrating family festivities under covid restrictions, and the role of digital technologies and social media platforms for family celebrations and their impact on festive culture and family relationships. The opinions of minors were collected through their parents without directly involving them in the interviews.

Results from the older generations evidenced that short-term digital opportunities are not changing traditions or rituals for family celebrations, in which social connections need to be lived physically in presence. Younger people reported video call fatigue while older people expressed a preference for the traditional in-person gatherings but temporary gratitude for video calling facilities.

Limitations and inequivalent digital communication were viewed as sources of stress, misunderstandings, and sometimes even withdrawal among family members. This combined technology and pandemic fatigue require further future research. Nevertheless, video calls in a family setting and amongst intergenerational actors ensured a sense of social and emotional connectedness inspired the appearance of virtual celebration ideas and had a positive effect on reducing social isolation and loneliness and increasing social interaction.

4.6 Associated behaviors

We turn now to the examination of Objective 2 and a determination as to whether social interaction

disruption caused by social anxiety and other mental health disturbances also manifested in associated health behavior disruption or dysfunction. As stated, we are focused on four specific behaviors – physical activity and sedentary behavior, eating patterns, tobacco and alcohol use, and digital and social media use.

Eating Disruption

A study on the psychosocial risk factors associated with social anxiety, depression, and disordered eating symptoms during the covid pandemic was conducted in the United States with a total of 239 young adults, 79% of whom were female. The study's findings indicated that a significant increase in the use of video chat during the pandemic heightened exposure to self-image, particularly in females. Negative concerns about body image, loneliness, and social media use were significantly linked to disorder eating and mental health issues including depressive symptoms. This finding is corroborated in the general literature across many countries (Carlee Bellapigna, 2022).

In a much larger study done in Bangladesh by Samanta et al., (2022) consisting of 1059 participants, the majority were students in the young adult age group, with a maximum age of 24 years old and consisting of 757 female participants. The study indicated that more than half of the female participants - 331 (43.73%) - believed that they were getting overweight and becoming obese during the lockdown.

Additionally, another survey conducted in West Bengal, India by Dey et al., (2020) found significant changes in food consumption habits among young and middle-aged participants that strongly correlate with the hypothesis of this dissertation, In the lockdown era, eating disruptions and alteration of dietary habits and lifestyle patterns were associated behaviors that potentially persisted after the lockdown.

The lockdown's impact on eating disruption is not a novel issue that only affects adults or that is only limited to certain regions of the planet. This finding has also been noted in Europe in children. According to cross-sectional research on 3,517 Czech children, it was observed that the covid related limitations have exacerbated the already existing issue of childhood obesity and excess weight (Vazna et al., 2022)

These findings confirm that Covid lockdowns severely disrupted eating patterns and behaviors in a variety of populations and across genders but specifically in female populations possibly increasing concerns about negative body image, eating disorders, and weight gain. The eating issue is not necessarily dramatic or definitive as a single variable but is compelling when combined with other

findings in reduced physical activity, increased sedentary behavior, and the reoccurring issues of depressive symptoms and social anxiety.

Future research should focus on a potential connection between reduced physical activity leading to reduced social interaction, sedentary behavior, and possible overeating or poor eating and the bi-directionality and inter-mediation of these factors. Indications of these connections have been reported but not systematically articulated or systematically studied in a well-designed longitudinal study.

Problematic digital and smartphone use

This dissertation's central claim is that there were behavioral issues with smartphone use that got worse during the lockdown and were linked to avoidance, decreased connectivity, and disturbances in social interactions. These issues may have continued after the lockdown ended.

According to a recent global survey, approximately 70% of Internet users around the world, especially the younger generation, were using smartphones or mobile phones more frequently as a result of the Covid outbreak (Gregorio et al.,2021). A cross-sectional study reported a Problematic Smartphone Use (PSU) prevalence of 43.3% among an adult sample from Macao, China (K Ng, 2022)

This issue was again investigated in another study conducted in China that used a different group of young adult university students as its target group consisting of 1,629 participants. The study demonstrated a 58.5% prevalence of problematic smartphone use that was linked to symptoms of depression, anxiety, and insomnia compared with students who had not developed the excessive use of smartphone behavior. Moreover, the study also concluded that not having face-to-face classes and merely attending online learning exacerbated problematic smartphone use and mental health issues (Chi Zhang et al., 2022).

Excessive smartphones use leads to issues of connectedness and much like the eating-sedentary behavior axis mentioned earlier, a similar issue would seem to exist between smartphone use and other online promoting activities such as online learning. Again, the research points to this theme of combined unintended consequences whereby trigger events such as the pandemic, for example, lead to a waterfall or cascade effect of negative and dysfunctional combinations of excessive behaviors and uses of technology, food, and stimulants. Eventually, these excesses give rise to or become highly correlated with mental disturbances, social interaction disruption, and social disengagement issues.

These general findings were also confirmed by Fung et al., (2021) who investigated the long-term impact of internet-related behaviors on mental health following lockdown. 489 participants in this

research were recruited from 3 primary schools in Sichuan, China, and yielded similar results regarding the negative association between smartphone use perceived weight stigma, and psychological distress. However, Feng et al.'s 3-time-point longitudinal study is important in that it found that persistent problematic social media use developed during Covid was associated with a similarly concerning rise in depression and anxiety symptoms post-lockdown. The social anxiety and mental disturbance persisted.

The concerning trend of persistent problematic digital use post-lockdown, characterized by excessive screen time and potentially harmful online interactions, appears to have transcended the temporary restrictions of lockdowns and continues to impact mental health. Notably, this research by Fung et al. (2021), and other studies cited above, demonstrated the direct association between persistent problematic social media use and increased symptoms of depression and anxiety.

Generally, the studies reviewed in this dissertation on the smart phone use topic highlight and confirm the objective of our research relating to associated coping behaviors. People developed associated behavior disruption, these disruptions especially in the case of smartphone overuse were highly correlated with social anxiety, loneliness, and social interaction disruption. These disruptions and mental disturbances persisted post-lockdown.

Although social media can help people to feel connected, relying too much on it can lead to superficial and unfulfilling social interactions. In addition, the contrived and orchestrated online world can distort self-perception and fuel feelings of inadequacy, leading to social withdrawal and isolation. Studies have documented a negative correlation between face-to-face social interaction and social media use, suggesting that problematic digital habits may displace opportunities for deeper, more meaningful connections. This social isolation can then exacerbate feelings of depression and anxiety, creating a detrimental cycle (Fung et al.,2021)

Pandemic lockdowns and other emergencies and crises have long-term effects that go beyond the initial time of restriction. To completely comprehend the complicated associations between digital behaviors, social connectivity, and mental health, further study is required. The results of the current dissertation, however, clearly point to the necessity of interventions that support positive digital habits and foster in-person social connection.

Physical Activity and Sedentary Behavior

Lockdowns caused by covid had a major effect on physical activity levels and increased sedentary behavior. During the lockdown prohibitions on outdoor activities, and the tendency of many

individuals to switch to remote work have led to the prevalence of sedentary behavior in the general population. A cross-sectional study conducted in Japan sampling 14,494 participants who were 65 and older indicated a 30% decrease in physical activity since the pandemic (Koji Tami et al., 2022).

Following the lockdown there has been a general decline in physical activity and a higher prevalence of sedentary behavior. These findings have been documented and reported in numerous countries across the globe, among a wide range of demographic groups, and they all appear to support the same general trends: a persistent decline in physical activity and an increase in sedentary behavior across all age groups and in the majority of different geographic locations (Amaryllis H et al.,2022)

According to a study conducted by Mohammed et al., (2021) among 5,896 participants from 17 countries in the Middle East and North Africa region over one-third of the participants stopped practicing any form of physical activity, and well over half of the studied population spent significantly more time on social media. Furthermore, the researchers have noted in their results, the rise in the sedentary lifestyle and reduction in physical activities, and the majority of respondents' time spent watching television or scrolling through social media (Abouzid el., 2021) Furthermore, a cross-sectional study that was carried out over three consecutive years in Ireland from 5 different schools with 7,530 school children (of which 33% male, 65% female, and 2% others) indicated an inactivity level over 3 years of 25% in 2019, 22% in 2020 and 23% in 2021. Although the Covid restrictions may have affected activity levels, the reduction in physical inactivity was not significant but continued to indicate sedentary behavior and persistent inactivity even after the restrictions were significantly reduced (Kwak el.,2023).

Pinyi et al., (2023) further investigated the persistence of sedentary behavior by examining the continued use of O2OFD (online-to-offline food delivery) service in China. This food delivery service was a highly popular service during lockdown. The study aimed to see if post-lockdown customers remained interested in using the service and examined whether those who used O2OFD during lockdowns were more inclined to continue using them rather than dining out - which generally entails social contact and social interaction.

Interestingly, the data indicates that a sedentary lifestyle influences this decision. In other words, a person's overall predisposition toward physical inactivity may impact their continuing usage of O2OFD, independent of variables such as convenience or the avoidance of cooking. This sedentary behavior may have been exacerbated during the lockdown and persisted post the lockdown.

Despite efforts by different health organizations worldwide to prevent and address the rise in sedentary behavior that was triggered by the pandemic, many studies indicated that insufficient

adherence and compliance to recommended physical activity guidelines for optimal health benefits was a greater issue in all age groups than expected. This was highlighted by an Australian study by Arundel et al., (2021) encompassing 2,803 participants aged from 5- to 75, including 147 children, 1,296 Adolescents, and 1,360 adults (including older adults).

In their study, Arundel et al., (2021) unequivocally stated that children and adolescents should engage three times a week in muscle-strengthening exercise in addition to 60 minutes of moderate to vigorous intensity physical activity each day, as recommended by the Australian physical activity guidelines. However, clearly showed that only 26% of children and 8% of adolescents met these recommendations during typical conditions, and in the adult age group the results showed that only 48% of Australian adults and 25% of older adults followed these recommendations. The researchers suggested that restrictions and lockdowns related to managing the covid pandemic may have contributed to a further decline in compliance.

The findings from varied studies repeatedly show that sedentary behavior and a lack of physical exercise are associated with and have a negative impact on both physical and mental health. Furthermore, this dissertation's reviewed studies results conclusively show that these behaviors increased during the Covid pandemic. Given this information, the continuance of these habits and their likely impact on mental health issues following the lockdown is both plausible and logical.

However, this possible long-term effect, as well as its impact on mental health and the direct connection to socializing and social connectedness, should be more systematically investigated in future longitudinal research.

A study by Seung-Man Lee et al., (2023) on perceived health status and physical activity in 2,102 adolescents in South Korea pre, during, and post-Covid documented a small decrease in physical activity with concomitant negative effects on sleep and eating disruption.

The general maintenance of physical activity was reported as being a self-help directed maintenance of mental health, physical health, and medical cost management and reduction. Respondents were therefore aware of the dysfunctional effect that could have occurred from not exercising regularly. By inference we can suggest that individual with social anxiety disrupted social interaction generally across many studies, had they been monitored, may have also evidenced lower physical activity and increased sedentary behavior and eating disruption. This potential correlation may be answered by future research.

Another study by Perez et al., (2020) sought to assess the effect of the lockdown on the physical activity levels of 98 older frail adults in Spain during the Covid lockdown and to identify predictors of

both sufficient and insufficient physical activity levels.

Measurements of pre and during-lockdown values of physical activity were taken. Importantly over a third (~33%) were below required or recommended activity levels and were correlated with several variables including depression and fatigue. On the other hand, maintenance of social networks and resilience and distraction as measured by reading and other activities were correlated with required and recommended levels of physical activity and well-being in comparison to non-complying respondents and pre-lockdown values. Social networks, distraction, and resilience were protective against diminished activity levels and perceived health status.

Similarly, a paper published by Alansare (2023), investigated the increase in and prevalence of sedentary behavior - a correlated inverse concomitant of reduced physical activity - in 1,255 Saudi Arabian young adults during and post-Covid.

54.7% of respondents spent excessive time - greater than 8 hours a day - in general, sedentary behavior and more in select other sedentary behavior-specific modalities including work or weekend leisure time. Sedentary behavior logically involves lower or reduced physical activity and exercise, much of which would have otherwise taken place outdoors and in public or semi-public places before Covid. This rise in sedentary behavior supports other noted findings by Mohammed et al., (2021) above and others.

Tobacco and Alcohol abuse

Susanne et al., (2021) carried out a study on the general population using an online survey consisting of 80 individuals on the impact of the Covid pandemic on smoking cessation efforts in a group of non-daily smokers. This study indicated that participants experienced changes due to the pandemic related to their smoking behavior. Unlike the other associated behaviors that were discussed in this dissertation, the findings with regard to smoking and drinking are more positive.

Based on this dissertation's findings concerning smoking we find that the motivation to stop smoking increased slightly during the Covid pandemic. This increase was even more pronounced among those who were on a 30-day abstinence program. The study showed that there was a positive correlation between increased motivation to quit and changes promoting social well-being. Susanne et al., (2021) also demonstrated that excessive drinking dropped during the pandemic, however, there was a rise in attempting e-cigarettes.

Similarly, Belen et al., 2021 investigated how alcohol intake and mental health altered among young individuals in Spain during the Covid pandemic. A longitudinal study of 305 young persons (ages 18-

26), predominantly female and college students was conducted before (November 2019 - February 2020) and after (March 2021) the Covid pandemic. Participants reported their alcohol usage (amount and frequency), as well as their sadness and anxiety symptoms.

Similar to Suzan et al., (2021) findings Belen et al., (2021) noted that the overall, alcohol intake (both amount and frequency) declined from pre- to post-pandemic levels. College students had a greater reduction in drinking frequency than non-college students. Changes in alcohol consumption were unaffected by pre-existing anxiety symptoms. However, young individuals who had greater depressed symptoms prior to the pandemic were less likely to limit their drinking amount and frequency during the epidemic.

From these findings we can conclude that the lockdown most certainly contributed to some people consuming less alcohol overall. Restricted access to pubs and restaurants, which are popular drinking destinations, may have resulted in fewer opportunities and social cues to consume alcohol. Furthermore, the report cites a drop in excessive drinking, maybe due to a greater emphasis on health and well-being during a worldwide health crisis.

However, it must be noted that the pandemic's impact on associate behaviors was not uniform. The studies show an increase in e-cigarette use, for example suggesting that some people may have turned to alternate drugs or delivery devices as coping techniques. More study is needed to determine how pre-existing drinking habits, social isolation, and mental health changes during lockdowns affected individual alcohol consumption patterns.

A study by Carmona-Marquez et al., (2021) in 305 young adults in Spain pre-Covid and during Covid, although not directly on topic, also substantiates the general finding that in general, this study and others cited in this dissertation underlines the general sense that alcohol and tobacco use either did not increase significantly as a result of Covid or increased transiently and then normalized to pre-Covid levels. However, individuals with a greater predisposition toward more negative coping mechanisms including depression were more resistant to decreasing alcohol use or increased alcohol consumption thereby creating a potential self-reinforcing loop.

In a related study, Grigoropoulos and Konstantinos (2022), reported on the association of loneliness and alcohol use in 279 young adults in Greece in 2020 during Covid. Loneliness was found to be a mediating and exacerbating factor in the association between fear of Covid and alcohol use and abuse as a coping mechanism. Again, in this study, we note that while the significant rise in alcohol use in many countries during the early stages of Covid and Covid lockdown specifically may have been temporary it is nevertheless the case that alcohol use was associated with mental disturbance including

social anxiety, depression, and loneliness, and that increased use may persist in segments of the population experiencing persistent social interaction disruption post Covid. Future research may elucidate this point.

We conclude, therefore, that sedentary behavior increased alone but also incrementally when correlated with other dysfunctional associated behaviors and mental health disruption would support the general premise of this dissertation that social interaction disruption is associated, potentially bi-directionally, with negative associated behavior impacts. This potential correlation requires further systematic research.

CHAPTER FIVE

CONCLUSION

The emergence and rise of social anxiety and other mental health issues including loneliness and depression led to a rise in social interaction disruption, social disengagement, and avoidance that also persisted and is still evident today. This phenomenon is poorly understood, studied, and reported in the literature although scattered papers related to various aspects of the topic exist and are starting to emerge (Gonzalez-Sanguino et al., 2021, Fineberg et al., 2022, Cruze et al., 2023)

We carried out a comprehensive search across 4 of the leading databases – PubMed, Scopus, Web of Science, and Google Scholar. The research review sampled some 4300 papers resulting in a final selected 50 papers for narrative systematic review and synthesis. 27 of which are related to Mental Health and 23 to Associated Behaviors.

We reported and confirmed the extraordinary upheaval created by Covid. The impact on mental health and associated behaviors was and remains significant.

This rise in social anxiety and mental health issues, and their impact on social interaction to a lesser extent, is documented in the literature. The persistence of these disruptions was less researched and documented and it is to this aspect that this dissertation has contributed. Moreover, we confirmed a continued demographic, gender, and socio-economic skew in the findings. Women, young children, adolescents, young adults, and persons of lower financial means all exhibited greater vulnerability.

Importantly we further confirmed that those individuals and groups with greater resilience and higher social interaction, networks, and connectedness were more protected against mental disturbance and that in some portion of the population, this protection and predisposition led to positive development and post-traumatic growth.

Recommendation

This lack of specific research on the dissertation topic of focus when set against the backdrop of the

existing wealth of research on the alarming rise and persistence of social anxiety and other related mental health issues during and post-lockdown and post-pandemic, points to the urgent need for future research in this area.

The findings of this study indicate that social capital, social support, and social network formation positively impact the quality of life during crisis and sustained emergency settings and draw attention to the importance of individual and community factors in the social sphere.

People of all ages and economic statuses should be facilitated and encouraged to participate in civic activities, thereby providing positive distraction and meaningful social and community connectedness. These findings may be useful for targeted clinical intervention, policy development, public health communications, and government resource allocation.

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APPENDIX 1: KEYWORDS

keywords approach	List of keywords related to fear	key words approach	keywords related to fear and socializing
broad:	anxiety,panic,avoidance,adjudation,nervousness, shyness, aprehension, dread, fright, afraid, phobia, aversion	Narrow	social anxiety, social interaction anxiety, social panic, social adjutation, social phobia, social interaction phobia, social isolation, social avoidance, social shyness, physical avoidance, community avoidance, physical isolation, social distancing, social withdrawl, physical withdrawl, social connectdness, social disinclination, social relationship, group contact,in-person contact.
	list of keywords related to socializing		list of keywords related to associated behaviours
broad:	distancing, withdrawal, connectdeness, contact,interaction, inperson,shyness,disinclination, relationships, social behaviour, social capital, social network	Narrow	tobacco consumption,tobacco abuse, alcohol consumption, eating disorder,eating pattern disruption, alcohol abuse, work at home, movement disruption, less movement, virtual socializing, cyber socializing, cyber interaction, digital socializing, digital interaction, physical activity, physical exercise, physical fitness, physical exercise pattern, physical exercise pattern disruption, physical exercise disruption, digital contact, coping mechanism, coping behaviours, behavioural adaptation, remot work, online education,
	list of keywords related with associated behaviours		
broad:	tobacco, alcohol, eating, exercise, sedentary, work,movement,fitness,eating pattern, coping, exercise,immobile, movement, lifestyle changes		
Boolean operators	List of keywords terminology		
AND	post covid-19,after covid-19, post covid-19 period, post covid-19 era,post pandemic, INCLUDING (during, during covid-19, general population, AND (variation of all listed synonyms and related topics) +MeSH Terms		
OR	List of keywords terminology variation of all listed synonyms and related topics		
NOT	List of keywords terminology during, during covid-19, anxiety disorder, social anxiety disorder,existing mental health disorder, disorder,mental disorder, long covid		

APPENDIX 2: SEARCH STRINGS

<u>Databases</u> <u>Google Scholar</u>	<u>SEARCH STRINGS</u>	<u>#of papers</u>	<u>imported to Covidence</u>
1	intitle:"fear of socializing" OR "fear of social interaction" OR "social anxiety" OR "social avoidance" OR "social isolation" OR "physical isolation" OR "social withdrawal" OR "social interaction" OR "social distancing" OR "physical withdrawal" OR "social interaction anxiety" AND "post covid-19 era" AND ("social relationship" OR "social network" OR "social connectedness" OR "connectedness" OR "social capital" OR "in-person contact" OR "group contact" OR "social behavior" OR "social shyness" OR "social disinclination") AND ("post covid-19" OR "after covid-19" OR "post pandemic" OR "after pandemic" OR "post covid-19 era") AND ("social avoidance" OR "community avoidance" OR "Physical avoidance") AND (tobacco OR "alcohol consumption" OR "tobacco consumption" OR "alcohol abuse" OR "tobacco abuse" OR "eating pattern" OR "eating disruption") OR "work at home" OR "remote working" OR "virtual socializing" OR "cyber interaction" OR "cyber socializing" OR "digital socializing" OR "digital interaction" OR "digital communication" OR "physical avoidance" OR "physical activity" OR exercise OR "exercise disruption" OR sedentary OR "digital contact" OR "coping mechanism" OR "behavioral adaptation" OR "online education" OR "lifestyle change") AND ("general population" OR populace OR society OR "general populace" OR community OR "general public") -during covid-19 - social anxiety disorder	76	76

<u>2</u>	<p>"fear of socializing" OR "fear of social interaction" OR "social anxiety" OR "social avoidance" OR "social isolation" OR "physical isolation" OR "social withdrawal" OR "social interaction" OR "social distancing" OR "physical withdrawal" OR "social interaction anxiety" AND "post covid-19 era" AND ("social relationship" OR "social network" OR "social connectedness" OR "connectedness" OR "social capital" OR "in-person contact" OR "group contact" OR "social behavior" OR "social shyness" OR "social disinclination") AND ("post covid-19" OR "after covid-19" OR "post pandemic" OR "after pandemic" OR "post covid-19 era") AND ("social avoidance" OR "community avoidance" OR "Physical avoidance") AND (tobacco OR "alcohol consumption" OR "tobacco consumption" OR "alcohol abuse" OR "tobacco abuse" OR "eating pattern" OR "eating disruption") OR "work at home" OR "remote working" OR "virtual socializing" OR "cyber interaction" OR "cyber socializing" OR "digital socializing" OR "digital interaction" OR "digital communication" OR "physical avoidance" OR "physical activity" OR exercise OR "exercise disruption" OR sedentary OR "digital contact" OR "coping mechanism" OR "behavioral adaptation" OR "online education" OR "lifestyle change") AND ("general population" OR populace OR society OR "general populace" OR community OR "general public") -during covid-19 -social anxiety disorder</p>	<u>76</u>	<u>76</u>
<u>3</u>	<p>intitle:"fear of social interaction" OR "physical isolation" OR "physical avoidance" OR "social anxiety" OR "interaction phobia" OR "fear of socializing" OR "social interaction anxiety" OR "social avoidance" OR "social agitation" OR "social nervousness" OR "social apprehension" OR "aversion" AND "post covid-19 era" -during covid-19 pandemic -social anxiety disorder -mental disorder -long covid</p>	<u>55</u>	<u>55</u>
<u>4</u>	<p>"fear of social interaction" OR "physical isolation" OR "physical avoidance" OR "social anxiety" OR "interaction phobia" OR "fear of socializing" OR "social interaction anxiety" OR "social avoidance" OR "social agitation" OR "social nervousness" OR "social apprehension" OR "aversion" AND "post covid-19 era" -during covid-19 pandemic -social anxiety disorder -mental disorder -long covid</p>	<u>52</u>	<u>52</u>

<u>5</u>	intitle:"fear of social interaction" OR "social interaction anxiety" OR "fear of socializing" OR "social phobia" OR "social interaction anxiety" OR "social avoidance" OR "social interaction avoidance" OR "social adjutation" OR "social nervousness" OR "social apprehension" AND "post covid-19" -anxiety disorder	<u>37</u>	<u>37</u>
<u>6</u>	"fear of social interaction" OR "social interaction anxiety" OR "fear of socializing" OR "social phobia" OR "social interaction anxiety" OR "social avoidance" OR "social interaction avoidance" OR "social adjutation" OR "social nervousness" OR "social apprehension" AND "post covid-19" -anxiety disorder	<u>39</u>	<u>39</u>
<u>7</u>	intitle:"social isolation" OR "social withdrawal" OR "physical withdrawal" OR "social distancing" OR "social shyness" OR "social disclination" OR "social avoidance" OR "community avoidance" AND "post covid-19 era" -during COVID-19	<u>137</u>	<u>137</u>
<u>8</u>	"social isolation" OR "social withdrawal" OR "physical withdrawal" OR "social distancing" OR "social shyness" OR "social disclination" OR "social avoidance" OR "community avoidance" AND "post covid-19 era" -during COVID-19	<u>155</u>	<u>155</u>
<u>9</u>	intitle:"social isolation" OR "physical isolation" OR "social withdrawal" OR "physical withdrawal" OR "social disinclination" OR "social avoidance" OR "community avoidance" OR "physical avoidance" AND "post covid-19" -during COVID-19 -long COVID-19 -economics -prevention -during covid-19 period	<u>4</u>	<u>4</u>
<u>10</u>	"social isolation" OR "physical isolation" OR "social withdrawal" OR "physical withdrawal" OR "social disinclination" OR "social avoidance" OR "community avoidance" OR "physical avoidance" AND "post covid-19" -during COVID-19 -long COVID-19 -economics -prevention -during covid-19 period	<u>45</u>	<u>45</u>
<u>11</u>	intitle:"social interaction" OR "social relationship" OR "social network" OR "social connectedness" OR "social capital" AND "post covid-19" -during covid-19 -during covid-19 period -during the pandemic -economy –economics	<u>81</u>	<u>81</u>

<u>12</u>	"social interaction" OR "social relationship" OR "social network" OR "social connectedness" OR "social capital" AND "post covid-19" -during covid-19 -during covid-19 period -during the pandemic -economy -economics	<u>130</u>	<u>130</u>
<u>13</u>	intitle:"tobacco consumption" OR "tobacco abuse" OR "alcohol consumption" OR "alcohol abuse" AND "post COVID-19" -during covid-19 -during covid-19 period	<u>95</u>	<u>95</u>
<u>14</u>	"tobacco consumption" OR "tobacco abuse" OR "alcohol consumption" OR "alcohol abuse" AND "post COVID-19" -during covid-19 -during covid-19 period	<u>106</u>	<u>106</u>
<u>15</u>	intitle:"eating disorder" OR "eating pattern disruption" OR "eating pattern" AND "post covid-19" -during	<u>2</u>	<u>2</u>
<u>16</u>	"eating disorder" OR "eating pattern disruption" OR "eating pattern" AND "post covid-19" -during	<u>23</u>	<u>23</u>
<u>17</u>	intitle:"work at home" OR "remote work" OR "virtual socializing" OR "online education" OR "cyber interaction" OR "cyber socializing" OR "digital contact" OR "digital socializing" OR "digital interaction" AND "post covid-19" -during covid-19 period -during the pandemic -during covid-19	<u>356</u>	<u>356</u>
<u>18</u>	"work at home" OR "remote work" OR "virtual socializing" OR "online education" OR "cyber interaction" OR "cyber socializing" OR "digital contact" OR "digital socializing" OR "digital interaction" AND "post covid-19" -during covid-19 period -during the pandemic -during covid-19	<u>372</u>	<u>372</u>
<u>19</u>	intitle:"physical activity" OR "physical fitness" OR "physical exercise" OR "physical exercise pattern" OR "physical exercise pattern disruption" AND "post covid-19" -during covid-19 -patients	<u>48</u>	<u>48</u>
<u>20</u>	"physical activity" OR "physical fitness" OR "physical exercise" OR "physical exercise pattern" OR "physical exercise pattern disruption" AND "post covid-19" -during covid-19 -patients	<u>199</u>	<u>199</u>
<u>21</u>	intitle:"immobility" OR "less movement" OR "movement disruption" OR "sedentary" AND "post covid-19" -during covid-19 -patients	<u>41</u>	<u>41</u>
<u>22</u>	"immobility" OR "less movement" OR "movement disruption" OR "sedentary" AND "post covid-19" -	<u>78</u>	<u>78</u>

	during covid-19 -patients		
<u>23</u>	intitle:"coping behaviors" OR "behavioral adaptation" OR "life style change" AND "post COVID-19" - economy -during covid-19	<u>4</u>	<u>4</u>
<u>24</u>	"coping behaviors" OR "behavioral adaptation" OR "life style change" AND "post COVID-19" -economy - during covid-19	<u>14</u>	<u>14</u>

Database PubMed	Search Strings	#Papers	Imported to Covidence
1	Socialization Challenges AND post COVID-19	15	15
2	(fear of socializing) AND (post covid 19) "fear"[MeSH Terms] OR "social behavior"[MeSH Terms] OR "socialization"[MeSH Terms] "COVID-19" OR "COVID-19"[MeSH Terms]	13	13
3	"socialization challenges in the post pandemic world"("social behavior"[MeSH Terms] OR ("social"[All Fields] AND "behavior"[All Fields]) OR "social behavior"[All Fields]	2	2
4	(covid-19) AND (social interaction) "social interaction"[MeSH Terms]("COVID-19"[MeSH Terms]	39	39
5	(((((fright) OR (panic)) OR (social avoidance)) OR (social isolation)) OR (social withdrawal)) AND(postCOVID-19)"fear"[MeSH Terms],"panic"[MeSH Terms],"social behavior"[MeSH Terms], "COVID-19"[MeSH Terms]"social isolation"[MeSH Terms], "social behavior"[MeSH Terms], "COVID-19"[MeSH Terms]	47	47
6	((((impact) OR (fear)) OR (socialization)) AND (post covid-19)"impact"[All Fields]"fear"[MeSH Terms] ,"social behavior"[MeSH Terms]	337	337
8	((current) AND (social isolation)) AND (post Covid-19)"current"[All Fields],"social isolation"[MeSHTerms],"COVID-19"[MeSH Terms]	110	110

9	((social phobia) AND (COVID-19)) AND (Pandemics)) OR (post-COVID-19 conditions) "phobia, social"[MeSH Terms] covid 19"[MeSH Terms] ,pandemics"[MeSH Terms], condition"[All Fields]	66	66
10	((fear) OR (anxiety)) AND (social interaction)) AND (COVID-19) "fear"[MeSH Terms] "anxiety"[MeSH Terms] social interaction"[MeSH Terms]"COVID-19"[MeSH Terms]	10	10
11	((social fear) OR (social phobia)) OR (dread)) OR (aversion)) OR (fear interaction)) AND (post COVID-19)	149	149
13	((remote work) OR (online education)) OR (lifestyle change)) OR (work at home)) OR (virtual socializing)) OR (digital socializing)) AND (post COVID-19)	47	47
14	((social phobia) OR (social isolation)) OR (community avoidance)) OR (nervousness)) AND (post COVID-19)	156	156
15	((social withdrawal) OR (social disinclination)) OR (social isolation)) OR (social distancing)) OR (nervousness)) OR (shyness)) OR (dread)) OR (social phobia)) AND (post COVID-19)	168	168
16	((Public anxiety) OR (social anxiety)) AND (post COVID-19)	71	71

17	(((((dread) OR (fright)) OR (afraid)) OR (IN person contact)) AND (COVID-19) AND (POST COVID-19) "dread"[All Fields], "fear"[MeSH Terms], "contact"[All Fields], "COVID-19" OR "COVID-19"[MeSH Terms]	41	41
18	(((((virtual socializing) OR (digital socializing)) OR (cyber interaction)) OR (cyber socializing)) AND (post COVID-19)	14	14
19	(((((social connectedness) OR (social capital)) OR (social network)) OR (social relationship)) OR (social behavior change)) AND (post COVID-19)"social capital"[MeSH Terms], "social networking"[MeSH Terms], "COVID-19"[MeSH Terms]	26	26
20	(((((((((eating) OR (eating pattern)) OR (eating disorder)) OR (eating disruption)) OR (tobacco)) OR (tobacco consumption)) OR (alcohol)) OR (alcohol consumption)) AND (post COVID-19)	16	16
21	(negative adaptive health behaviours) AND (covid-19)("acclimatization"[MeSH Terms] "health behaviours"[All Fields] OR "health behavior"[MeSH Terms] ("COVID-19" OR "COVID-19"[MeSH Terms] "adaptations"[All Fields] OR "adapt"[All Fields] OR "adaptabilities"[All Fields] OR "adaptability"[All Fields]	3	3
22	(((((exercise) OR (exercise disruption)) OR (sedentary)) OR (ongoing disruption)) AND (Post-COVID-19)	25	25

Database WEB OF SCIENCE	Search String	#Papers	Imported to covidence
1	fear of socializing AND COVID-19	28	28
2	ALL=("nervousness" AND post COVID-19)	18	18
3	ALL=(("panic" OR "nervousness" OR "dread" OR "fright" OR "aversion" OR "fear of social*" OR "shyness") AND "POST COVID-19")	43	43
4	ALL=("social avoidance" AND post COVID-19)	1	1
5	ALL=(("social anxiety" OR "social phobia" OR "social isolation" OR "social withdrawal" OR "social disinclination" OR "physical avoidance" OR "community avoidance") AND "POST COVID-19")	67	67
6	ALL=(("social distancing" OR "social avoidance" OR "physical isolation" OR "interaction phobia" OR "distancing" OR "physical avoidance" OR "community avoidance" OR "withdrawal" OR "disinclination" OR "social disinclination") AND "POST COVID-19")	241	241

7	ALL=(("social interaction" OR "social relationship" OR "social network" OR "social connectedness" OR "social capital" OR "social behavior" OR "IN person" OR "IN person contact" OR "group contact") AND "POST COVID-19")	217	217
8	ALL=("social anxiety" caused by COVID-19)	24	24
9	ALL=(("tobacco" OR "alcohol" OR "alcohol consumption" OR "tobacco consumption" OR "alcohol abuse" OR "tobacco abuse" OR "eating" OR "eating pattern disruption" OR "eating pattern") AND "POST COVID-19")	115	115
10	ALL=(("work at home" OR "remote work" OR "virtual sociali*" OR "cyber interaction" OR "cyber sociali*" OR "digital contact" OR "digital sociali*" OR "digital interaction" OR "physical activity" OR "physical exercise" OR "exercise pattern" OR "exercise pattern disruption" OR "sedentary") AND "POST COVID-19")	270	270
11	ALL=(("coping mechanism" OR "behavioral adaptation" OR "life style change") AND "POST COVID-19")	5	5

Database Scopus	Search String	#Papers/Document	Imported covidence
1	ALL= ({post COVID-19} AND {social isolation})	21	21
2	TITLE-ABS-KEY ({social phobia} OR {social isolation} OR {social withdrawal} OR {social distancing} AND {post COVID-19})	106	106
3	TITLE-ABS-KEY ({social phobia} OR {social isolation} OR {social withdrawal} OR {interaction phobia} OR {social avoidance} OR {physical avoidance} OR {community avoidance} OR {physical isolation} AND {post COVID-19})	22	22
4	TITLE-ABS-KEY ({post COVID} OR {post COVID-19} OR {social phobia} OR {social isolation} OR {social anxiety} OR {social withdrawal} OR {withdrawal} OR {interaction phobia} OR {social avoidance} OR {physical avoidance} OR {community avoidance} OR {physical isolation} {distancing} OR {social disclination} OR {disinclination} AND {post COVID-19})	105	105
5	TITLE-ABS-KEY ({social phobia} OR {social isolation} OR {social anxiety} OR {social withdrawal} OR {withdrawal} OR {interaction phobia} OR {social avoidance} OR {social behavior} OR {social capital} OR {social connectedness} {social network} OR {social relationship} OR {social interaction} AND {post COVID-19} OR {post COVID})	1	1
6	TITLE-ABS-KEY({social distancing} W/15 {post COVID-19})	5	5
7	TITLE-ABS-KEY ({FEAR} W/20 {post COVID-19})	2	

9	TITLE-ABS-KEY ({anxiety} W/30 {post COVID-19})	32	32
10	TITLE-ABS-KEY ({avoidance} W/30 {post COVID-19})	2	2
11	TITLE-ABS-KEY ({nervousness} W/30 {post COVID-19})	1	1
15	TITLE-ABS-KEY ({aversion} W/40 {post COVID-19})	1	1
16	"post covid-19" AND "coping behaviors"	30	30
17	TITLE-ABS-KEY ("post covid-19") AND TITLE-ABS-KEY ("coping behaviors") OR TITLE-ABS-KEY ("life style change")	30	30
18	tobacco consumption AND "post COVID-19"	1	1
19	(TITLE-ABS-KEY ("eating disorder") AND TITLE-ABS-KEY ("post covid-19"))	18	18

APPENDIX 3: QUALITY ASSESSMENT PROCESS

Intervention / Exposure ?

Include

- fear of socializing post covid
- social anxiety
- social anxiety and associated behaviors
- alcohol consumption
- tobacco consumption
- sedentary or fitness

Exclude

Comparator / Context ?

Include

- socializing before covid-19
- socializing during covid-19
- fear of socializing and other associated behaviors before, during and post covid-19

Exclude

Outcome ?

Include

- fear of socialization
- social and physical isolation
- exercise and eating pattern disrupted
- consumption of alcohol and tobacco detected

Exclude

Study Characteristics ?

Include

- systematic review
- qualitative studies
- quantitative studies

Exclude

Other ?

Include

all types of sampling methodology
published between march 2020 and October 2023

Exclude

Save

covidence fear of socializing in the post COVID period: a systematic re... Search studies

Title and abstract screening

Screen references 1 Resolve conflicts 0 Awaiting other reviewer 0 Irrelevant references 2313

All Filter Tags Criteria Hide highlights Hide abstracts Display: 25 Most recent

#4277 - Goh 2022

Why did COVID-19 not further harm the mental health of poor mothers? A mixed-method study on low-income families in Singapore

Goh, E.C.L.; Wen, D.J.R.; Ang, R.C.Y.
BMJ Open 2022;12(1):
2022
DOI: 10.1136/bmjopen-2021-052103

Abstract

Objectives This paper examines the impact of COVID-19 pandemic on a disadvantaged group of financially poor mothers' mental health conditions in Singapore during the phase of acute COVID-19 infection. Design A mixed method design is used. We conducted five focus group discussions with

No **Maybe** **Yes**

Gibbons 2022 Save Complete

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Page 1 of 13

Gibbons BMC Psychology (2022) 10:261
https://doi.org/10.1186/s40359-022-00971-w

BMC Psychology

RESEARCH Open Access

Understanding the role of stress, personality and coping on learning motivation and mental health in university students during a pandemic

Chris Gibbons

Abstract
The aims explored the associations between stress, personality and coping on student mental health and compared defensive pessimism and optimism as influences on learning motivation. Most research construes 'stress' as distress with little attempt to measure the stress that enhances motivation and well-being. Undergraduate psychology students (N = 162) were surveyed on student and pandemic-related stressors, personality, support, control, mental health and learning motivation. Overall, adverse mental health was high and the lack of motivation acute. While positive ratings of teaching and optimistic thinking were associated with good mental health, control control was key.

DATA EXTRACTION **QUALITY ASSESSMENT**

study title
Title of paper / abstract / report that data are extracted from
Understanding the role of stress, personality

authors
Chris Gibbons

Country in which the study conducted

- United States
- UK
- Canada
- Australia
- Other

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Page 1 of 13

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BMC Psychology

RESEARCH Open Access

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- Phone
- Mail
- Clinic patients
- Voluntary
- Other

Clear above selection

Intervention/exposures
The specific factor that is studied

Results and Conclusion
primary and secondary results

Dingle 2022 Save Complete ?

Select Full Text ▾

Page 1 of 11

Behavior Change (2022), 9(1), 141–150
doi:10.1017/bch.2022.4

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SHORTER COMMUNICATION

Loneliness, Belonging, and Mental Health in Australian University Students Pre- and Post-COVID-19

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(Received 27 January 2022; accepted 9 May 2022; first published online 27 May 2022)

Abstract
The move to online learning during COVID-19 deprived first-year students of friendships and other sources of social support that could buffer against stress during their transition to university. These effects may have been more for international students than domestic students as many were subjected to travel restrictions or quarantine in addition to the usual stresses. This study examined the impact of COVID-19 on social connections and mental health of first-year students enrolled in a metropolitan university in Australia. The study involved 1,179 students (50.6% international) and used a 2 (colours: 2019, 2020, 2021) × 2 (students: domestic and international) between-group design. Results showed that both loneliness and university belonging were significantly more during the first year of COVID-19 compared to the year before or after. Country in expectation, domestic students were lonelier than international students across all cohorts. Multiple-group memberships did not change. As predicted, loneliness was moderately to highly correlated with the number of screens, non-behavioral interests, and

Main Limitation of research

Indicate the degree of limitations and justify briefly

High
Low
Unsure

Supporting text

Enter supporting text about your judgement

Other sources of bias

State any important concerns about bias not addressed in the other domains in the tool. If particular questions/entries were pre-specified in the review's

