Research Repository UCD

Title	The promotion of positive psychological functioning through cognitive and behavioural processes
Authors(s)	O'Connor, Martin
Publication date	2022
Publication information	O'Connor, Martin. "The Promotion of Positive Psychological Functioning through Cognitive and Behavioural Processes." University College Dublin. School of Psychology, 2022.
Publisher	University College Dublin. School of Psychology
Item record/more information	http://hdl.handle.net/10197/13238

Downloaded 2026-05-22 16:46:27

The UCD community has made this article openly available. Please share how this access benefits you. Your story matters! (@ucd_oa)

© Some rights reserved. For more information

The promotion of positive psychological functioning through cognitive and behavioural processes

Martin O'Connor, BA (Hons), M.Sc., Ph.D.

14210603

Thesis submitted to the National University of Ireland in fulfilment of the requirements for the degree of D Psych Sc (Clinical Psychology)

School of Psychology, College of Social Sciences and Law, University College Dublin, Belfield, Dublin 4.

Head of School: Prof. Suzanne Guerin, BA, Ph.D.

Course Directors: Prof. Alan Carr, AFBPsS, AFPsSI, BA, MA, Ph.D. and Prof. Gary O'Reilly, BA, MA, MPsychSc, Ph.D.

Supervisor: Prof. Louise McHugh, B.Sc, MA, Ph.D.

April 2022

Acknowledgments

I am eternally grateful to Prof. Louise McHugh for the fantastic supervision you have provided. It is truly appreciated.

To my parents, Rinty and Patricia, and my brothers, John and Paul, thank you for all the support, inspiration and advice that you have given me.

Thank you to Prof. Gary O'Reilly for your expert help and guidance.

Thanks to Dr. Eddie Murphy for your support and input.

Last but not least, many thanks to Ms Alison Stapleton, Ms Emma Hoctor and Ms Leda Connaughton for your help with this research.

Abstract

The promotion of positive psychological functioning is a major public health need and a key objective of clinical psychology. Cognitive and behavioural processes hold promise as means to this end, and process-based CBT provides a coherent system for their integration. The research programme described in this thesis investigated the promotion of positive functioning through such processes. Accordingly, three studies are reported and each explored the promotion of positive functioning through cognitive and behavioural processes.

Study 1 focused on facilitating the application of processes to conceptualise cases in process-based CBT by evaluating a conceptual model. This model proposed resilience as a pathway through which transtherapeutic mindfulness processes promote positive mental health. Findings from this study provided empirical support for the model in a sample of 129 early adolescents. This publication helped lay a conceptual foundation for the subsequent studies in this research programme.

Study 2 aimed to advance the process-based CBT agenda of distilling the literature on processes that promote positive psychological functioning. In accordance, a systematic review and meta-analysis was conducted to elucidate the efficacy of mindfulness processes in promoting resilience. The findings of 57 randomised controlled trials were synthesised and revealed that mindfulness processes are efficacious in promoting resilience, but not more so than comparison interventions. This set of findings provided an empirical basis for Study 3.

Study 3 sought to extend the nascent empirical research on process-based CBT interventions. A cluster randomised controlled trial was conducted to evaluate the efficacy of an intervention which integrated the processes explored in the two preceding studies. Findings did not support the efficacy of this intervention in

enhancing positive psychological functioning outcomes in a sample of 604 early adolescents. Collectively, the three studies contribute to the scientific literature and present a number of implications for the practice of clinical psychology.

Table of Contents

ACKNOWLEDGMENTS ii

ABSTRACT iii

LIST OF TABLES vii

LIST OF FIGURES viii

CHAPTER 1: INTRODUCTION 1
- OVERVIEW OF CHAPTER 1
- BEHAVIOURAL AND COGNITIVE THERAPIES 1
- EMPIRICAL SUPPORT AND CONTROVERSY 3
- PROCESS-BASED COGNITIVE BEHAVIOUR THERAPY 4
- EXTENDED EVOLUTIONARY META MODEL 9
- THE CURRENT PROGRAMME OF RESEARCH 12
- STUDY 1 13
- STUDY 2 14
- STUDY 3 16
- CONCLUSION 17
- REFERENCES 18

CHAPTER 2: STUDY 1 30
- ABSTRACT 30
- INTRODUCTION 31
- METHOD 34
- RESULTS 37
- DISCUSSION 39
- REFERENCES 43

CHAPTER 3: STUDY 2 53
- ABSTRACT 53
- INTRODUCTION 54
- METHOD 57
- RESULTS 62
- DISCUSSION 72
- REFERENCES 77

CHAPTER 4: STUDY 3 101
- ABSTRACT 101
- INTRODUCTION 102
- METHOD 106
- RESULTS 113
- DISCUSSION 117
- REFERENCES 122

CHAPTER 5: GENERAL DISCUSSION 131
- OVERVIEW OF CHAPTER 131
- MAIN FINDINGS 131
- STUDY 1 132

STUDY 2 133
STUDY 3 134
CONTRIBUTION TO THE SCIENTIFIC LITERATURE 135
IMPLICATIONS FOR CLINICAL PRACTICE 138
OVERARCHING LIMITATIONS 140
DIRECTIONS FOR FUTURE RESEARCH 142
CONCLUSION 144
REFERENCES 146

APPENDIX A 154

APPENDIX B 155

List of Tables

2.1	Descriptive statistics for the study variables	38
3.1.	Characteristics of included studies	65
3.2	Risk of bias in studies	68
4.1	Process-based CBT intervention sessions	110
4.2	Characteristics of participants randomized to each group	114
4.3	Estimates of between- and within group differences on study variables	115
5.1	Alternative metrics for the publication of Study 1	136

List of Figures

1.1	The extended evolutionary meta model of processes of change	11
2.1.	Model of mindfulness as a predictor of positive mental health, mediated by resilience	39
3.1	Study selection flow diagram	63
3.2	Forest plot depicting the individual and summary effect estimates of MBIs relative to inactive control conditions on resilience	70
3.3	Funnel plot depicting MBI effect estimates from individual studies against their standard errors	72
4.1	Participant flow through the randomized trial	108

Chapter 1: Introduction

Overview of Chapter

This chapter begins by discussing the historical background to this programme of research. Empirical support and controversies that inform the research are then outlined. Following this, the philosophical and theoretical basis for the research is presented. An overview of the three studies that form the programme of research concludes the chapter.

Behavioural and Cognitive Therapies

This programme of research is rooted in the behavioural and cognitive therapies, a field with a long and eventful history. Behaviour therapy emerged from the work of Pavlov (1927), Watson (1913), and Cover Jones (1960). Indeed, Wolpe (1954) developed systematic desensitisation on the basis of the classical conditioning principles that emerged from this body of work. Although efficacious for a number of circumscribed difficulties, such as post-traumatic stress disorder (PTSD), many psychological problems were not responsive to this approach (Hooper & Larsson, 2015). In response, the operant conditioning principles of Skinner (1938) were added to these psychological interventions (e.g., Agras et al., 1968) and emerged as a milestone of success in the field of clinical psychology (Barlow, 2004). This behavioural approach reigned as the dominant paradigm in psychology throughout the 1950s, but a paradigm shift was occasioned by the emergence of cognitive science. The *cognitive revolution* was stimulated by concerns over the inability of behaviourism to adequately account for cognition and language (e.g., Chomsky, 1959) and represented a confluence in the fields of linguistics, neuroscience, psychology, anthropology, and computer science (Hooper & Larsson, 2015; Matlin, 2003).

Cognitive therapy emerged as a dominant psychotherapeutic approach in the 1970s as a result of the increasing popularity of rational-emotive therapy (RET; Ellis, 1971), stress inoculation training (SIT; Meichenbaum, 1977) and Beck's cognitive therapy (Beck, 1976). These approaches use a host of processes, such as cognitive reappraisal, to reduce the intensity and frequency of irrational, stress-inducing or negative cognitions and restructure them into more helpful forms, thereby ameliorating uncomfortable feelings and dysfunctional behaviours (Masuda et al., 2004). Over time, cognitive therapy processes were integrated with behaviour therapy processes and acquired the moniker cognitive behaviour therapy (Westbrook et al., 2011). Cognitive therapy now had a complementary interventional component that specialised in effecting behaviour change (Hooper & Larsson, 2015). Similar to behaviour therapy, cognitive behaviour therapy emphasises the role of core processes in psychopathology and therapeutic change. A diathesis-stress model is adopted in which predisposing and maintaining factors are distinguished (Hofmann & Hayes, 2018b). Moreover, the processes that maintain the presenting problem are prioritised, as it is they that need to change to improve mental health (Hofmann & Hayes, 2018b). In recent decades, however, the rise of constructivist and similar postmodernist philosophies moved the field in a new direction (Hayes, 2004). A number of cognitive and behavioural therapies emerged which are underpinned by contextualistic philosophies and emphasise processes such as mindfulness, emotional acceptance, cognitive defusion, and personal values.

Contextual cognitive behaviour therapies include mindfulness-based cognitive therapy (MBCT; Segal et al., 2002), acceptance and commitment therapy (ACT; Hayes et al., 1999), functional analytic psychotherapy (FAP; Kohlenberg & Tsai, 1991), compassion focused therapy (CFT; Gilbert, 2010), schema therapy (Young,

1990), integrative behavioural couple therapy (IBCT; Jacobson & Christensen, 1996), metacognitive therapy (MCT; Wells, 2009), dialectical behaviour therapy (DBT; Linehan, 1993), and the cognitive behavioural analysis system of psychotherapy (CBASP; McCullough, 2000). The cognitive and behavioural therapies in this category exhibit five common features (Hayes, 2004). Firstly, they emphasise change in the function and context of private experiences (e.g., emotions, feelings, and cognition), as opposed to altering their intensity, content or frequency. Secondly, they aim to cultivate flexible and broad behavioural repertoires, rather than eradicate narrowly-defined problems. Thirdly, the processes emphasised by the therapies are relevant to the clinician as well as the client. Fourthly, contextual cognitive behaviour therapies build upon the aforementioned models that preceded them. Finally, the therapies target issues that were previously the purview of less-empirical traditions (e.g., spirituality, self, and meaning).

Empirical Support and Controversy

The existing evidence base supports the efficacy of cognitive and behavioural therapies for a plethora of disorders. Indeed, meta-reviews that analysed 126 meta-analyses of cognitive behaviour therapy (Fordham et al., 2021) and 20 meta-analyses of ACT (Gloster et al., 2020) evidenced positive effects for a wide range of target conditions. This expansive evidence base for cognitive and behavioural therapies has substantively informed the National Institute for Health and Care Excellence (2022) and American Psychological Association Division of Clinical Psychology (2022) treatment recommendations for specific disorders.

The focus of cognitive and behavioural therapies on disorders defined by the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013) and International Classification of Diseases (ICD-10; World

Health Organization, 2016) has led to an abundance of syndrome-specific treatment protocols (Hofmann & Hayes, 2018b). This alignment with classification systems, however, has presented a number of problems. As syndromal thinking prevails, interest in health promotion wanes (Hofmann & Hayes, 2018b). The emphasis on techniques for specific symptoms can detract from theory and case formulation and overwhelm practitioners with an array of allegedly distinct but frequently overlapping procedures. This often manifests as rigidity on the part of the practitioner or low fidelity to evidence based practice (McHugh et al., 2009). Disorder-specific protocols have also been criticised for neglecting the role of the common factors in therapy (Laska et al., 2014). In light of these problems, Hofmann and Hayes (2018b) have argued that clinical psychology needs to focus instead on isolating and understanding the effective processes of change that traverse the gamut of cognitive and behavioural therapies.

Process-based Cognitive Behaviour Therapy

Process-based cognitive behaviour therapy (CBT) presents an alternative approach to understanding and ameliorating psychological problems, while emphasising the promotion of human prosperity (Hayes, Hofmann, & Ciarrochi, 2020). This approach avoids the constraints of disorder-specific protocols that are based on arbitrary and rigid classification systems and strengthens the link between treatment and theory (Hofmann & Hayes, 2018b). Process-based CBT has been defined as the contextually specific use of empirically supported processes with evidence based procedures to promote the prosperity of people and help solve their problems (Hofmann & Hayes, 2019). This definition entails that procedures and mechanisms which are evaluated with poor methodology, focus exclusively on symptom reduction, or are not modifiable do not belong in the process-based CBT

model (Ong et al., 2020). Moreover, three key components are featured in the definition. Firstly, procedures and processes targeted by interventions must be selected with sensitivity to context (Ong et al., 2020). Such contextual factors include cultural fit, situational stressors, social support, natural contingencies, and stimulus control (Hayes, Hofmann, & Ciarrochi, 2020). Furthermore, contextual changes may necessitate deviations from the intended intervention to help the individual or group to reach their treatment goal. Secondly, the empirically supported processes in this approach must be connected to evidence based procedures and vice versa. Without this connection, the processes cannot be enacted and the procedures are ineffective (Ong et al., 2020). Thirdly, process-based CBT has an explicit goal: to promote the prosperity of people and help solve their problems. Consequently, this approach aims to facilitate the thriving of whole persons rather than merely reduce suffering, as process-based CBT focuses on the cultivation of mental health, not solely an absence of disorder (Hayes & Hofmann, 2017). Process-based CBT is, therefore, an ideal fit with the current programme of research given the overlapping focus on promoting positive psychological functioning.

Process-based CBT is not a radically new model (Ong et al., 2020). This lack of uniqueness in its assessment and intervention components, however, is by design, as the existing theoretical and empirical literature is intentionally drawn from in line with the principle of parsimony (Laird, 1919). Furthermore, this approach seeks to distil and synthesise this literature, organise it in a coherent model, and highlight the topics on which to focus, while orienting the field of clinical psychology to the promotion of positive functioning (Ong et al., 2020). Thus, process-based CBT contributes a meta-theoretical model that conceptualises the existing literature in an integrative framework which bridges the gaps between disparate therapies in an effort

to advance the whole field, rather than differentiate its constituent components. In accordance, this approach has the potential to diminish the dominance of walled-off schools of thought and trademarked treatment protocols and to strengthen the collaboration between different wings in the field (Hayes & Hofmann, 2017).

With respect to philosophy of science, process-based CBT adopts a universal stance (Ong et al., 2020). It welcomes the coexistence of different philosophical worldviews (e.g., *mechanism* in Beck's cognitive therapy and *contextualism* in ACT) so long as they serve the ultimate goal of promoting the prosperity of people (Hofmann & Hayes, 2018a; Hughes, 2018). The core epistemology underpinning this approach is empiricism (Ong et al., 2020). Process-based CBT therefore relies on falsifiable hypotheses and methodologically rigorous research designs to further its scientific agenda. Such investigations can be conducted at various levels in applied or basic settings with idiographic (e.g., Coniglio & Farris, 2021; Pavlacic & Young, 2020) or nomothetic methods (Ong et al., 2020). Accordingly, studies 1, 2, and 3 in the current programme of research feature nomothetic methods. Mid-level adaptive processes are also amenable to investigation in this model because of their clinical, research, and translational utility (Ong et al., 2020). In keeping with this assertion, mid-level adaptive processes were the focus of studies 1, 2, and 3.

Although process-based CBT presents clear advantages, it requires a set of processes that can be applied with precision, scope and depth to conceptualise cases and effect change through evidence based procedures (Ong et al., 2020). Harvey et al. (2004) identified in excess of 100 cognitive behavioural processes of change. In the 18 years since, researchers have proposed several more (Hayes, Hofmann, & Ciarrochi, 2020). Key psychotherapeutic processes studied in the current programme

of research include mindfulness, arousal reduction, self-management, interpersonal skills, emotional literacy, and cognitive reappraisal.

Mindfulness. Mindfulness is a core process of change in a number of cognitive and behavioural approaches to psychotherapy, including acceptance and commitment therapy (ACT), dialectical behaviour therapy (DBT), mindfulness-based cognitive therapy (MBCT), and compassion-focused therapy (CFT). This process involves paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally (Kabat-Zinn, 2012). Mindfulness is theorised to promote positive mental health by enhancing and broadening one's ability to flexibly allocate attention (Hayes et al., 2012). Indeed, the process of mindfulness is investigated in each of the three studies in this programme of research. Systematic reviews of the processes of change in ACT (Stockton et al., 2019) and MBCT (van der Velden et al., 2015) found that mindfulness predicted or mediated intervention effects on mental health outcomes.

Arousal reduction. Arousal reduction is a central feature of mindfulness-based stress reduction and DBT approaches. This process involves the downregulation of sympathetic nervous system arousal (McKay, 2018; Selye, 1955). The process of arousal reduction is enacted by cognitive and behavioural techniques such as progressive muscle relaxation (Jacobson, 1929), diaphragmatic breathing (Hirsch & Bishop, 1981), autogenics (Schultz & Luthe, 1959), and visualisation (Achterberg et al., 1994). Accordingly, this process was targeted by the process-based CBT intervention that was trialled in Study 3.

Self-management. Self-management refers to the process of modifying conditions that promote undesirable behaviour or discourage desirable behaviour (Sarafino, 2018). This process focuses on a *target behaviour* – the behaviour the

client wants to change – with a view to achieving a *behavioural goal* – the client's desired level of the target behaviour. Target behaviours may present as behavioural deficits (e.g., insufficient study) or behavioural excesses (e.g., excessive social media usage). The process of self-management can be enacted with a focus on operant or respondent behaviour. In Study 3, self-statement training – a cognitive technique for modifying thoughts that function as antecedents for emotional respondent behaviour – was provided.

Interpersonal skills. Interpersonal skills are the processes that underpin the seamless and smooth integration of behaviours needed for effective communication and achieving instrumental and social goals (Liberman et al., 1989). The promotion of such skills is a critical feature in cognitive and behavioural therapies, such as DBT. In accordance, the process-based CBT intervention in Study 3 targeted each type of interpersonal skill: nonverbal skills (e.g., good eye-contact and welcoming facial expression), paralinguistic features (e.g., appropriate vocal tone and volume), verbal content (e.g., choosing the appropriate words and phrases to include others), interactive balance (e.g., taking time to listen), and social cognition skills (e.g., perspective taking). A systematic review by Lyman et al. (2014) supported the efficacy of these processes in improving a host of mental health outcomes.

Emotional literacy. Emotional literacy refers to the processes of recognising, understanding, managing and appropriately expressing one's emotions as well as recognising, understanding and appropriately responding to the emotions of others (Faupel, Southampton Psychology Service, 2003). These processes have been posited to underpin the development of adaptive behaviours needed to navigate the challenges and demands of daily living (Duff et al., 2020; Figueroa-Sánchez, 2008). In the

current programme of research, emotional literacy processes were investigated in Studies 2 and 3.

Cognitive reappraisal. Cognitive reappraisal is a process in which the meaning of a stimulus is reinterpreted in order to modify its emotional response (Gross, 1998). Cognitive reappraisal, in the form of cognitive restructuring, is a key process of change in Beck's cognitive therapy (Beck et al., 1979). Mediation analyses have shown that changes in cognition mediated the effects of cognitive behaviour interventions on symptom measures in disparate cohorts (Hofmann, 2004; Hofmann et al., 2007). This process facilitates the recognition of maladaptive thinking and, in turn, efforts to ensure that one's thought content is accurate and helpful or has no direct effect on reality and how one chooses to live (Wenzel, 2018). The three steps for enacting the process of cognitive reappraisal – identification, evaluation, and modification of cognition – were implemented as part of the process-based CBT intervention in Study 3.

Extended Evolutionary Meta Model

Discrete processes of change do not present a coherent system for conceptualising adaptive psychological functioning, psychopathology, and intervention packages. In accordance, a clinical practitioner could easily be overwhelmed by the prospect of delivering a process-based CBT intervention, given the broad variety of such therapeutic processes. Consequently, a comprehensive, functional, and internally coherent model is necessary to guide practitioners (Hayes, Hofmann, & Ciarrochi, 2020). The extended evolutionary meta model was developed to address this need for an overarching model under which process-based efforts can be conceptualised. This model is posited to account for virtually all theoretically-derived and empirically-supported therapeutic processes (Hayes, Hofmann, &

Ciarrochi, 2020). It presents a meta-theory of psychological assessment and intervention in which discrete models can be compared and developed. Furthermore, the extended evolutionary meta model is purported to offer a nascent alternative to the conceptualizations of adaptive and maladaptive functioning proposed by existing nosological systems, including the DSM-5 (American Psychiatric Association, 2013), ICD-10 (World Health Organization, 2016), and RDoC (Insel et al., 2010). The principles of evolutionary science form the foundation of the model.

Given the central role that evolutionary theory plays in the life sciences, Hayes, Hofmann, and Ciarrochi (2020) sought to apply evolutionary principles to the organisation of therapeutic processes. Indeed, psychological and behavioural processes were purported to be as amenable to evolutionary theory as anatomical or physical processes. In the model, the key evolutionary principles of *variation*, *selection*, and *retention* in *context* are employed to conceptualise the pathways through which psychological processes promote adaptive functioning, psychopathology, and therapeutic change (Hayes, Hofmann, & Wilson, 2020). *Variation* is necessary to effect change and its absence characterises maladaptive processes, such as psychological inflexibility, perseveration, cognitive fusion, behavioural avoidance, and compulsive rituals to name but a few. *Selection* typifies contracting for therapy with clients and choosing the primary outcomes of such interventions, including positive mental health or values-congruent living. *Retention* is a key feature of effective psychological interventions and is promoted through between-session assignments, reinforcing skills practice, and booster sessions. *Context* is a further consideration in assessment and intervention, as no psychological process – present-moment awareness, behavioural activation, or emotional acceptance – is useful across all contexts (Hayes, Hofmann, & Ciarrochi, 2020).

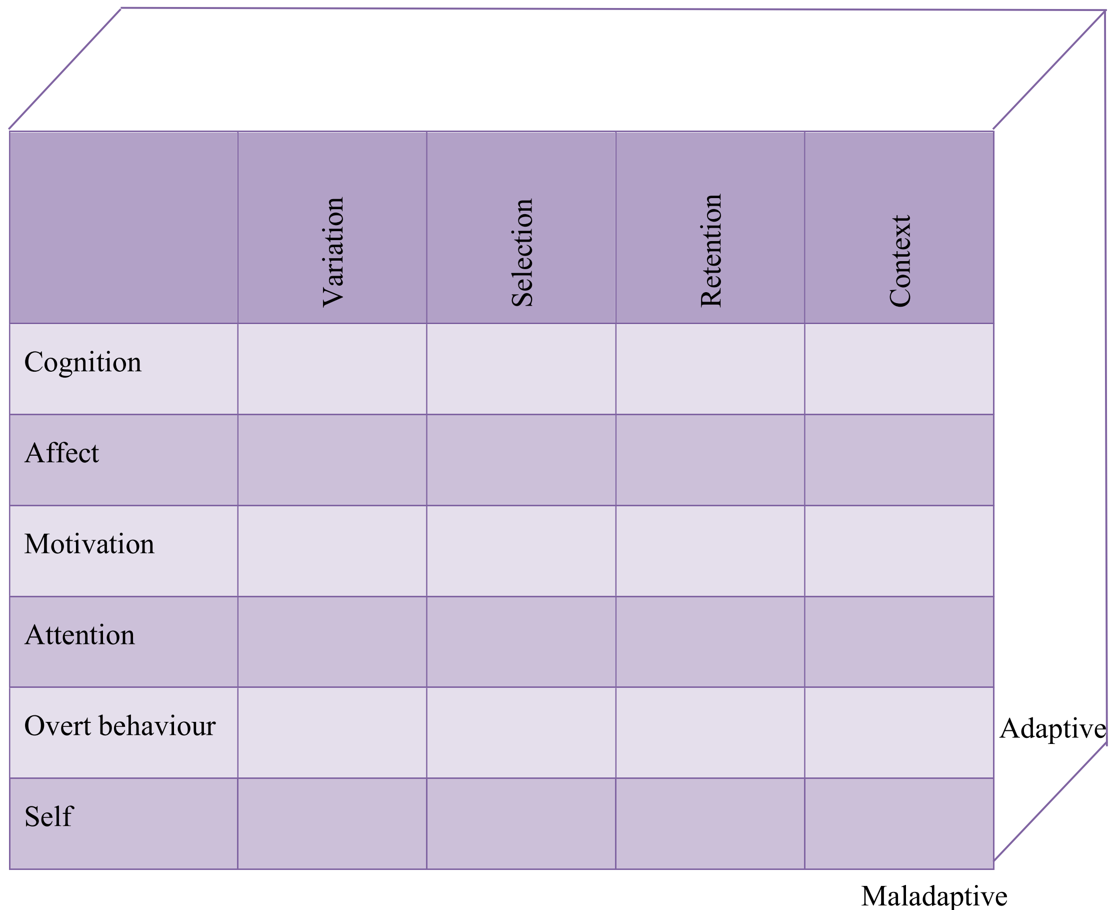


Figure 1.1 The extended evolutionary meta model of processes of change.

As shown in Figure 1.1, the aforementioned evolutionary principles of variation, selection, and retention in context are depicted on the x axis of the model and apply to all psychological dimensions: cognition, affect, motivation, attention, overt behaviour, and self. Such dimensions, depicted on the y axis of the model, represent the domains in which the processes are organised (Hayes, Hofmann, & Ciarrochi, 2020). This psychological level contains a physiological level (e.g., neural pathways, genetics) and, in turn, is nested in a sociocultural level (e.g., cultural norms, social support). The extent to which processes are adaptive or maladaptive is represented on the z axis of the model. Dysfunction is posited to manifest as a result of difficulties in variation, selection, or retention in context in any one or more of the dimensions (Hayes, Hofmann, & Ciarrochi, 2020). The model's consideration of

adaptive processes, however, is a key feature given that the overarching aim of this programme of research is to promote positive psychological functioning. For example, the mindfulness processes investigated in Studies 1, 2, and 3 may promote variation on the attentional dimension, their selection may be due to the resilience and positive mental health that they elicit in given contexts, and the retention that they evidence on follow-up outcome measures may be a product of continued practice. In short, the extended evolutionary meta model provides a common language for the therapeutic processes studied in this programme of research.

The Current Programme of Research

On the basis of the aforementioned literature, process-based CBT holds promise for promoting positive psychological functioning. This goal is consistent with the model of mental health proposed by Keyes (2005) as more than the absence of psychopathology, but rather a complete state in which people are free from psychological difficulties and experiencing high levels of psychological, social, and emotional well-being. Moreover, process-based CBT provides a coherent system for integrating a wide range of therapeutic processes, including mindfulness, arousal reduction, self-management, interpersonal skills, emotional literacy, and cognitive reappraisal, to effect adaptive functioning. Thus, the research programme presented in this thesis focuses on the promotion of positive psychological functioning through such processes. The studies detailed in chapters 2, 3, and 4 investigate a conceptual model derived from this framework, synthesise the empirical evidence, and trial a process-based CBT intervention, respectively.

As previously discussed, a key objective of process-based CBT is the application of processes to conceptualise cases (Ong et al., 2020). In accordance, empirically supported conceptual models are needed to elucidate the pathways

through which processes promote positive mental health. Empirical evidence of the pathways through which mindfulness processes promote adaptive psychological functioning in young people, however, is sparse. Study 1 in this programme of research focuses on investigating resilience as a putative pathway through which these processes promote positive mental health in young people.

In order to inform policy makers, practitioners, and researchers about the empirical support for specific processes in effecting change through the aforementioned pathways, concise syntheses of the existing evidence are needed. Although mindfulness processes are frequently applied to this end, there has not been a systematic review of the evidence for the efficacy of such processes in promoting resilience. Accordingly, Study 2 systematically reviews the efficacy of mindfulness processes in promoting resilience. In line with the emphasis placed on contextual factors in process-based CBT, potential moderators of interventions effects are explored.

To build upon the conceptual and empirical foundations laid in Studies 1 and 2, interventional research is needed. Despite calls to extend the evidence base by evaluating process-based interventions for early adolescents, the literature is devoid of such investigations in this cohort. Hence, Study 3 focuses on evaluating the efficacy of a universal process-based CBT intervention in promoting positive mental health among early adolescents. Taken together, the three studies help to advance the empirical literature on the promotion of positive psychological functioning through cognitive and behavioural processes.

Study 1

Mindfulness is a core process of change in process-based CBT (Baer, 2018). In accordance, a plethora of studies attest to the beneficial effects of mindfulness on

positive mental health outcomes (e.g., Greco et al., 2011; Pidgeon & Keye, 2014; Wenzel et al., 2015). In light of these beneficial effects, researchers have attempted to elucidate the pathways through which the process of mindfulness promotes positive mental health. Such conceptual models help facilitate a greater understanding of the mechanisms of mindfulness and its utility for practitioners in promoting mental health. Although emotional intelligence, sleep quality, and self-esteem have been found to partially mediate the effects of mindfulness on positive mental health outcomes, other mediational pathways are also likely traversed (Howell et al., 2008; Pepping et al., 2013; Schutte & Malouff, 2011). Resilience has been posited as one such pathway through which mindfulness influences mental health (e.g., Cheung et al., 2020; Chin et al., 2019; Creswell & Lindsay, 2014). That is, the process of mindfulness may facilitate positive adaptation or resilience and, in turn, promote mental health. Although studies have provided empirical support for this model in university and secondary school students (Bajaj & Pande, 2016; Cheung et al., 2020), there is a paucity of research on this model in early adolescents. Given that early adolescence is a key phase in psychosocial development (AlBuhairan et al., 2012), it is important to elucidate the pathways to positive mental health in this population.

Study 1 aimed to extend the empirical literature on process-based CBT by investigating resilience as a mediator in the putative relationship between mindfulness and positive mental health. It was hypothesised that resilience would mediate this relationship. This study was published in the *Journal of Contextual Behavioural Science*. The publication helps to lay the conceptual foundation for the subsequent studies in this programme of research.

Study 2

Given that an explicit objective of process-based CBT is to distil the literature on empirically supported processes to promote the prosperity of people (Hofmann & Hayes, 2019; Ong et al., 2020), comprehensive syntheses of the evidence for such processes are required to advance this scientific agenda. Such syntheses can inform decision-making and the allocation of resources to processes that are efficacious in promoting positive psychological functioning. Accordingly, a growing body of systematic reviews and meta-analyses indicate that mindfulness processes are helpful in promoting a host of positive functioning outcomes, including well-being (Lomas et al., 2018, 2019), prosocial behaviour (Berry et al., 2020; Donald et al., 2019;), and quality of life (de Vibe et al., 2017). Although mindfulness processes are frequently cited in the literature as a means of cultivating psychological resilience (e.g., Greeson et al., 2014; Steinebach & Langer, 2019; Turow, 2017), there has not been a systematic review of the evidence for the efficacy of mindfulness in promoting resilience. Consequently, Study 2 sought to address this gap in the empirical literature.

Study 2 aimed to determine the efficacy of mindfulness in promoting resilience through a systematic review and meta-analysis of randomised controlled trials. The secondary aims of Study 2 were to elucidate the maintenance of the aforementioned effects at follow-up and to identify moderators of the effects of mindfulness on resilience. It was hypothesised that mindfulness would significantly outperform control conditions in promoting resilience at post-intervention and follow-up. This study is currently under review for publication in the journal *Mindfulness*. The study helps to inform the development of contextually sensitive process-based CBT interventions by enabling trialists to select efficacious therapeutic processes and

disregard inefficacious processes. This goal served as the impetus for the final study in the current programme of research.

Study 3

Process-based CBT has strong roots in evidence based behavioural and cognitive therapies. The framework for integrating their processes of change, however, is relatively novel. Indeed, the first text on process-based CBT was only recently published (Hayes & Hofmann, 2018) and empirical investigations of this model are at a nascent stage (i.e., Coniglio & Farris, 2021; Pavlacic & Young, 2020). Interventional studies are therefore needed to extend the evidence base for this promising approach. Moreover, the promotion of positive mental health in early adolescence is a major public health need and a key objective of many public health agendas (Sawyer et al., 2012; Stockings et al., 2016; World Health Organization, 2008). Despite calls to develop the evidence base for such initiatives in early adolescence (Fusar-Poli et al., 2021) and the promise of process-based CBT for enhancing psychological functioning, no study has investigated the efficacy of process-based CBT for promoting positive mental health in this cohort. Thus, Study 3 was designed to help fill this void in the evidence base.

Study 3 reports on a cluster randomised controlled trial of a universal process-based CBT intervention for early adolescents. The primary aim of this trial was to determine if the intervention would yield improvements in positive mental health relative to an inactive control condition from baseline to post-intervention and follow-up. Secondary aims were to elucidate the comparative effects of the intervention on resilience, mindfulness, and emotional literacy. It was hypothesised that the process-based CBT group would evidence statistically significant improvements in positive mental health relative to the inactive control condition at post-intervention and

follow-up. Similarly, it was predicted that the intervention group would display statistically significant increases in resilience, mindfulness, and emotional literacy relative to the control group. This study is currently under review for publication in the journal *Behaviour Research and Therapy*.

Conclusion

In this chapter, the process-based CBT model was discussed. This model is firmly situated in the sphere of behavioural and cognitive therapies and emerged to address controversies in the field. Underpinned by the extended evolutionary meta model, process-based CBT applies empirically supported processes, such as mindfulness, arousal reduction, self-management, interpersonal skills, emotional literacy, and cognitive reappraisal, with context sensitivity to promote the prosperity of people. Accordingly, the research programme reported in this thesis focuses on the promotion of positive psychological functioning through such processes. The next chapter advances this agenda by elucidating a pathway through which mindfulness processes promote positive mental health.

References

Achterberg, J., Dossey, B. M., & Kolkmeier, L. (1994). *Rituals of healing: Using imagery for health and wellness*. Bantam.

Agras, S., Leitenberg, H., & Barlow, D. H. (1968). Social reinforcement in the modification of agoraphobia. *Archives of General Psychiatry*, *19*(4), 423-427. https://doi:10.1001/archpsyc.1968.01740100039006

AlBuhairan, F., Areemit, R., Harrison, A., & Kaufman, M. (2012). Adolescent psychosocial development and evaluation: Global perspectives. In Ö. Özdemir (Ed.), *Complementary Pediatrics* (pp. 179-202). IntechOpen.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5)*. American Psychiatric Pub.

American Psychological Association Division of Clinical Psychology. (2022). *Psychological treatments*. https://div12.org/treatments/

Baer, R. (2018). Mindfulness practice. In S. C. Hayes & S. G. Hofmann (Eds.), *Process-based CBT: The science and core clinical competencies of cognitive behavioral therapy* (pp. 389-402). New Harbinger Publications.

Bajaj, B., & Pande, N. (2016). Mediating role of resilience in the impact of mindfulness on life satisfaction and affect as indices of subjective well-being. *Personality and Individual Differences*, 93, 63–67. https://doi.org/10.1016/j.paid.2015.09.005

Barlow, D. H. (2004). *Anxiety and its disorders: The nature and treatment of anxiety and panic*. Guilford Press.

Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. New York, NY: International Universities Press.

Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy of depression*. Guilford Press.

Berry, D. R., Hoerr, J. P., Cesko, S., Alayoubi, A., Carpio, K., Zirzow, H., Walters, W., Scram, G., Rodriguez, K., & Beaver, V. (2020). Does mindfulness training without explicit ethics-based instruction promote prosocial behaviors? A meta-analysis. *Personality and Social Psychology Bulletin*, *46*(8), 1247-1269. https://doi.org/10.1177/0146167219900418

Cheung, S., Xie, X., & Huang, C. (2020). Mind over matter: Mindfulness, income, resilience, and life quality of vocational high school students in China. *International Journal of Environmental Research and Public Health*, 17(16), 5701. https://doi.org/10.3390/ijerph17165701

Chin, B., Lindsay, E. K., Greco, C. M., Brown, K. W., Smyth, J. M., Wright, A. G. C., & Creswell, J. D. (2019). Psychological mechanisms driving stress resilience in mindfulness training: A randomized controlled trial. *Health Psychology*, 38(8), 759–768. https://doi.org/10.1037/hea0000763

Chomsky, N. (1959). A review of B. F. Skinner's verbal behavior. *Language*, *35*(1), 26-58. https://doi:10.2307/411334

Coniglio, K. A., & Farris, S. G. (2021). Treatment of comorbid pica and generalized anxiety disorder: A case study. *Cognitive and Behavioral Practice*. https://doi.org/10.1016/j.cbpra.2020.11.005

Cover Jones, M. (1960). A laboratory study of fear: The case of Peter. In H. J. Eysenck (Ed.), *Behavior therapy and neurosis* (pp. 45-51). New York, NY: Pergamon Press.

Creswell, J. D., & Lindsay, E. K. (2014). How does mindfulness training affect health? A mindfulness stress buffering account. *Current Directions in*

Psychological Science, 23(6), 401–407. https://doi.org/10.1177/0963721414547415

de Vibe, M., Bjørndal, A., Fattah, S., Dyrdal, G. M., Halland, E., & Tanner-Smith, E. E. (2017). Mindfulness-based stress reduction (MBSR) for improving health, quality of life and social functioning in adults: A systematic review and meta-analysis. *Campbell Systematic Reviews*, *13*(1), 1-264. https://doi.org/10.4073/csr.2017.11

Donald, J. N., Sahdra, B. K., Van Zanden, B., Duineveld, J. J., Atkins, P. W., Marshall, S. L., & Ciarrochi, J. (2019). Does your mindfulness benefit others? A systematic review and meta-analysis of the link between mindfulness and prosocial behaviour. *British Journal of Psychology*, *110*(1), 101-125. https://doi.org/10.1111/bjop.12338

Duff, C., McPherson, A. C., & King, G. (2020). Residential immersive life skills programs: A catalyst for facilitating emotional literacy development for youth with disabilities. *Developmental Neurorehabilitation*, *23*(5), 294-301. https://doi.org/10.1080/17518423.2019.1657198

Ellis, A. (1971). *Growth through reason*. North Hollywood, CA: Wilshire Books.

Faupel, A., & Southampton Psychology Service (Eds.). (2003). *Emotional literacy: Assessment and intervention*. GL Assessment.

Figueroa-Sánchez, M. (2008). Building emotional literacy: Groundwork to early learning. *Childhood Education*, *84*(5), 301-304. https://doi.org/10.1080/00094056.2008.10523030

Fordham, B., Sugavanam, T., Edwards, K., Stallard, P., Howard, R., Das Nair, R., Copsey, B., Lee, H., Howick, J., Hemming, K., & Lamb, S. E. (2021). The evidence for cognitive behavioural therapy in any condition, population or

context: A meta-review of systematic reviews and panoramic meta-analysis. *Psychological Medicine*, *51*(1), 21-29. https://doi.org/10.1017/s0033291720005292

Fusar-Poli, P., Correll, C. U., Arango, C., Berk, M., Patel, V., & Ioannidis, J. P. (2021). Preventive psychiatry: A blueprint for improving the mental health of young people. *World Psychiatry*, *20*(2), 200-221. https://doi.org/10.1002/wps.20869

Gilbert, P. (2010). *Compassion focused therapy: Distinctive features*. NY: Routledge.

Gloster, A. T., Walder, N., Levin, M. E., Twohig, M. P., & Karekla, M. (2020). The empirical status of acceptance and commitment therapy: A review of meta-analyses. *Journal of Contextual Behavioral Science*, *18*, 181-192. https://doi.org/10.1016/j.jcbs.2020.09.009

Greco, L. A., Baer, R. A., & Smith, G. T. (2011). Assessing mindfulness in children and adolescents: Development and validation of the child and adolescent mindfulness measure (CAMM). *Psychological Assessment*, 23(3), 606–614. https://doi.org/10.1037/a0022819

Greeson, J., Garland, E. L., & Black, D. (2014). Mindfulness: A transtherapeutic approach for transdiagnostic mental processes. In A. Ie, C. T. Ngnoumen, & E. J. Langer (Eds.), *The Wiley Blackwell handbook of mindfulness* (pp. 533-562). John Wiley & Sons.

Gross, J. J. (1998). The emerging Field of emotion regulation: An integrative review. *Review of General Psychology*, *2*(3), 271-299. https://doi.org/10.1037/1089-2680.2.3.271

Harvey, A. G., Watkins, E., & Mansell, W. (2004). *Cognitive behavioural processes across psychological disorders: A transdiagnostic approach to research and treatment*. Oxford University Press, USA.

Hayes, S. C. (2004). Acceptance and commitment therapy, relational frame theory, and the third wave of behavioral and cognitive therapies. *Behavior Therapy*, *35*(4), 639-665. https://doi:10.1016/s0005-7894(04)80013-3

Hayes, S. C., & Hofmann, S. G. (2017). The third wave of cognitive behavioral therapy and the rise of process-based care. *World Psychiatry*, *16*(3), 245-246. https://doi.org/10.1002/wps.20442

Hayes, S. C., & Hofmann, S. G. (2018). *Process-based CBT: The science and core clinical competencies of cognitive behavioral therapy*. New Harbinger Publications.

Hayes, S. C., Hofmann, S. G., & Ciarrochi, J. (2020). A process-based approach to psychological diagnosis and treatment: The conceptual and treatment utility of an extended evolutionary meta model. *Clinical Psychology Review*, *82*, 101908. https://doi.org/10.1016/j.cpr.2020.101908

Hayes, S. C., Hofmann, S. G., & Wilson, D. S. (2020). Clinical psychology is an applied evolutionary science. *Clinical psychology review*, *81*, 101892. https://doi.org/10.1016/j.cpr.2020.101892

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and commitment therapy: An experiential approach to behaviour change*. London, England: The Guilford Press.

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2012). *Acceptance and commitment therapy: The process and practice of mindful change* (2nd ed.). Guilford Publications.

Hirsch, J. A., & Bishop, B. (1981). Respiratory sinus arrhythmia in humans: How breathing pattern modulates heart rate. *American Journal of Physiology-Heart and Circulatory Physiology*, *241*(4), H620-H629. https://doi.org/10.1152/ajpheart.1981.241.4.h620

Hofmann, S. G. (2004). Cognitive mediation of treatment change in social phobia. *Journal of Consulting and Clinical Psychology*, *72*(3), 392-399. https://doi.org/10.1037/0022-006x.72.3.392

Hofmann, S. G., & Hayes, S. C. (2018a). The future of intervention science: Process-based therapy. *Clinical Psychological Science*, *7*(1), 37-50. https://doi.org/10.1177/2167702618772296

Hofmann, S. G., & Hayes, S. C. (2018b). The history and current status of CBT as an evidence-based therapy. In S. C. Hayes & S. G. Hofmann (Eds.), *Process-based CBT: The science and core clinical competencies of cognitive behavioral therapy* (pp. 7-22). New Harbinger Publications.

Hofmann, S. G., & Hayes, S. C. (2019). The future of intervention science: Process-based therapy. *Clinical Psychological Science*, *7*(1), 37-50. https://doi.org/10.1177/2167702618772296

Hofmann, S. G., Meuret, A. E., Rosenfield, D., Suvak, M. K., Barlow, D. H., Gorman, J. M., Shear, M. K., & Woods, S. W. (2007). Preliminary evidence for cognitive mediation during cognitive-behavioral therapy of panic disorder. *Journal of Consulting and Clinical Psychology*, *75*(3), 374-379. https://doi.org/10.1037/0022-006x.75.3.374

Hooper, N., & Larsson, A. (2015). *The research journey of acceptance and commitment therapy (ACT)*. Hampshire, United Kingdom: Palgrave Macmillan.

Howell, A. J., Digdon, N. L., Buro, K., & Sheptycki, A. R. (2008). Relations among mindfulness, well-being, and sleep. *Personality and Individual Differences*, 45(8), 773–777. https://doi.org/10.1016/j.paid.2008.08.005

Hughes, S. (2018). The philosophy of science as it applies to clinical psychology. In S. C. Hayes & S. G. Hofmann (Eds.), *Process-based CBT: The science and core clinical competencies of cognitive behavioral therapy* (pp. 23-43). New Harbinger Publications.

Insel, T., Cuthbert, B., Garvey, M., Heinssen, R., Pine, D. S., Quinn, K., Sanislow, C., & Wang, P. (2010). Research domain criteria (RDoC): Toward a new classification framework for research on mental disorders. *American Journal of Psychiatry*, *167*(7), 748-751. https://doi.org/10.1176/appi.ajp.2010.09091379

Jacobson, E. (1929). *Progressive relaxation*. University of Chicago press.

Jacobson, N. S., & Christensen, A. (1996). *Integrative couple therapy: Promoting acceptance and change*. New York, NY: Norton.

Kabat-Zinn, J. (2012). *Mindfulness for beginners: Reclaiming the present moment—and your life*. Sounds True.

Keyes, C. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology*, *73*(3), 539–548. https://doi:10.1037/0022-006X.73.3.539

Kohlenberg, R. J., & Tsai, M. (1991). *Functional analytic psychotherapy: Creating intense and curative therapeutic relationships*. New York, NY: Plenum.

Laird, J. (1919). The law of parsimony. *Monist*, *29*(3), 321-344. https://doi.org/10.5840/monist191929317

Laska, K. M., Gurman, A. S., & Wampold, B. E. (2014). Expanding the lens of evidence-based practice in psychotherapy: A common factors perspective. *Psychotherapy*, *51*(4), 467-481. https://doi.org/10.1037/a0034332

Liberman, R. P., DeRisi, W. J., & Mueser, K. T. (1989). *Social skills training for psychiatric patients*. Pergamon.

Linehan, M. M. (1993). *Cognitive-behavioural treatment of borderline personality disorder*. New York, NY: The Guilford Press.

Lomas, T., Medina, J., Ivtzan, I., Rupprecht, S., & Eiroa-Orosa, F. (2018). Mindfulness-based interventions in the workplace: An inclusive systematic review and meta-analysis of their impact upon wellbeing. *The Journal of Positive Psychology,14*(5), 1–16. https://doi:10.1080/17439760.2018.1519588

Lomas, T., Medina, J., Ivtzan, I., Rupprecht, S., & Eiroa-Orosa, F. (2019). A systematic review and meta-analysis of the impact of mindfulness-based interventions on the well-being of healthcare professionals. *Mindfulness, 10*(7), 1193–1216. https://doi:10.1007/s12671-018-1062- 5

Lyman, D. R., Kurtz, M. M., Farkas, M., George, P., Dougherty, R. H., Daniels, A. S., Ghose, S. S., & Delphin-Rittmon, M. E. (2014). Skill building: Assessing the evidence. *Psychiatric Services*, *65*(6), 727-738. https://doi.org/10.1176/appi.ps.201300251

Masuda, A., Hayes, S. C., Sackett, C. F., & Twohig, M. P. (2004). Cognitive defusion and self-relevant negative thoughts: Examining the impact of a ninety year old technique. *Behaviour Research and Therapy*, *42*(4), 477-485. https://doi.org/10.1016/j.brat.2003.10.008

Matlin, M. W. (2003). *Cognition* (5th ed.). John Wiley & Sons.

McCullough, J. P. (2000). *Treatment for chronic depression: Cognitive behavioural analysis system of psychotherapy (CBASP)*. New York, NY: The Guilford Press.

McHugh, R. K., Murray, H. W., & Barlow, D. H. (2009). Balancing fidelity and adaptation in the dissemination of empirically-supported treatments: The promise of transdiagnostic interventions. *Behaviour Research and Therapy*, *47*(11), 946-953. https://doi.org/10.1016/j.brat.2009.07.005

McKay, M. (2018). Arousal reduction. In S. C. Hayes & S. G. Hofmann (Eds.), *Process-based CBT: The science and core clinical competencies of cognitive behavioral therapy* (pp. 245-260). New Harbinger Publications.

Meichenbaum, D. H. (1977). *Cognitive-behaviour modification: An integrative approach*. New York, NY: Plenum.

National Institute for Health and Care Excellence. (2022). *Mental health and behavioural conditions*. https://www.nice.org.uk/guidance/conditions-and-diseases/mental-health-and-behavioural-conditions

Ong, C. W., Levin, M. E., & Twohig, M. P. (2020). Beyond acceptance and commitment therapy: Process-based therapy. *The Psychological Record*, *70*(4), 637-648. https://doi.org/10.1007/s40732-020-00397-z

Pavlacic, J. M., & Young, J. (2020). Process-based cognitive behavioral therapy: A framework for conceptualization and treatment. *Clinical Case Studies*, *19*(6), 456-472. https://doi.org/10.1177/1534650120951858

Pavlov, I. P. (1927). *Conditioned reflexes: An investigation of the physiological activity of the cerebral cortex*. Oxford University Press.

Pepping, C. A., O'Donovan, A., & Davis, P. J. (2013). The positive effects of mindfulness on self-esteem. *The Journal of Positive Psychology*, 8(5), 376–386. https://doi.org/10.1080/17439760.2013.807353

Pidgeon, A. M., & Keye, M. (2014). Relationship between resilience, mindfulness, and psychological well-being in university students. *International Journal of Liberal Arts and Social Science*, *2*(5), 27-32. http://www.ijlass.org/data/frontImages/gallery/Vol._2_No._5/3.pdf

Sarafino, E. P. (2018). Self-management. In S. C. Hayes & S. G. Hofmann (Eds.), *Process-based CBT: The science and core clinical competencies of cognitive behavioral therapy* (pp. 233-244). New Harbinger Publications.

Sawyer, S. M., Afifi, R. A., Bearinger, L. H., Blakemore, S., Dick, B., Ezeh, A. C., & Patton, G. C. (2012). Adolescence: A foundation for future health. *The Lancet*, *379*(9826), 1630-1640. https://doi.org/10.1016/s0140-6736(12)60072-5

Schultz, J. H., & Luthe, W. (1959). *Autogenic training*. Grune and Stratton.

Schutte, N. S., & Malouff, J. M. (2011). Emotional intelligence mediates the relationship between mindfulness and subjective well-being. *Personality and Individual Differences*, 50(7), 1116–1119. https://doi.org/10.1016/j.paid.2011.01.037

Segal, Z. V., Williams, J. M., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse*. NY: The Guilford Press.

Selye, H. (1955). Stress and disease. *Science*, *122*(3171), 625-631. https://doi.org/10.1126/science.122.3171.625

Skinner, B. F. (1938). *The behavior of organisms*. Appleton-Century-Crofts, Inc.

Steinebach, C., & Langer, Á. I. (Eds.). (2019). *Enhancing resilience in youth: Mindfulness-based interventions in positive environments*. Springer Nature.

Stockings, E. A., Degenhardt, L., Dobbins, T., Lee, Y. Y., Erskine, H. E., Whiteford, H. A., & Patton, G. (2016). Preventing depression and anxiety in young people: A review of the joint efficacy of universal, selective and indicated prevention. *Psychological Medicine*, *46*(1), 11-26. https://doi.org/10.1017/s0033291715001725

Stockton, D., Kellett, S., Berrios, R., Sirois, F., Wilkinson, N., & Miles, G. (2019). Identifying the underlying mechanisms of change during acceptance and commitment therapy (ACT): A systematic review of contemporary mediation studies. *Behavioural and Cognitive Psychotherapy*, *47*(3), 332-362. https://doi.org/10.1017/s1352465818000553

Turow, R. G. (2017). *Mindfulness skills for trauma and ptsd: Practices for recovery and resilience*. W. W. Norton & Company.

van der Velden, A. M., Kuyken, W., Wattar, U., Crane, C., Pallesen, K. J., Dahlgaard, J., Fjorback, L. O., & Piet, J. (2015). A systematic review of mechanisms of change in mindfulness-based cognitive therapy in the treatment of recurrent major depressive disorder. *Clinical Psychology Review*, *37*, 26-39. https://doi.org/10.1016/j.cpr.2015.02.001

Watson, J. B. (1913). Psychology as the behaviorist views it. *Psychological Review*, *20*(2), 158–177. https://doi.org/10.1037/h0074428

Wells, A. (2009). *Metacognitive therapy for anxiety and depression*. London, England: The Guilford Press.

Wenzel, A. (2018). Cognitive reappraisal. In S. C. Hayes & S. G. Hofmann (Eds.), *Process-based CBT: The science and core clinical competencies of cognitive behavioral therapy* (pp. 325-337). New Harbinger Publications.

Wenzel, M., von Versen, C., Hirschmüller, S., & Kubiak, T. (2015). Curb your neuroticism – Mindfulness mediates the link between neuroticism and subjective well-being. *Personality and Individual Differences*, 80, 68–75. https://doi.org/10.1016/j.paid.2015.02.020

Westbrook, D., Kennerley, H., & Kirk, J. (2011). *An introduction to cognitive behaviour therapy: Skills and applications* (2nd ed.). London, England: Sage Publications Inc.

Wolpe, J. (1954). Reciprocal inhibition as the main basis of psychotherapeutic effects. *American Medical Association Archives of Neurology and Psychiatry*, *72*(2), 205-226. https://doi:10.1001/archneurpsyc.1954.02330020073007

World Health Organization. (2008). *Mental health gap action programme: Scaling up care for mental, neurological, and substance use disorders*. WHO Press.

World Health Organization. (2016). *International statistical classification of diseases and related health problems*. https://icd.who.int/browse10/2016/en

Young, J. E. (1990). *Cognitive therapy for personality disorders: A schema focused approach*. Sarasota, FL: Professional Resource Exchange.

Chapter 2: Study 1

The following study, 'Resilience Mediates the Cross-sectional Relationship Between Mindfulness and Positive Mental Health in Early Adolescence', was published in the *Journal of Contextual Behavioral Science*, vol. 21 (2021), 171-175. The co-authors are Prof. Gary O'Reilly, Dr. Eddie Murphy, Ms. Leda Connaughton, Ms. Emma Hoctor, and Prof. Louise McHugh.

Abstract

Resilience has been conceptualised as a pathway through which mindfulness influences mental health. Despite a growing body of research evidence substantiating this claim, the empirical literature is devoid of support for this account in early adolescence. This study aimed to extend the evidence base by investigating resilience as a mediator in the putative cross-sectional relationship between mindfulness and positive mental health. One hundred twenty-nine primary school students completed the Mindful Attention Awareness Scale for Children, Connor-Davidson Resilience Scale–10, and Adolescent Mental Health Continuum-Short Form. Correlational analyses revealed small-to-moderate, statistically significant relationships between the variables. Mediation analysis demonstrated a statistically significant indirect effect of mindfulness on positive mental health through resilience. The findings provide preliminary support for the aforementioned conceptual model and have implications for innovative research in mindfulness.

Mindfulness has garnered broad interest and popularity over recent decades (Grossman, 2019). Accordingly, the publication of systematic reviews on the topic of mindfulness has been growing at a rate of 19% per annum (Chiesa et al., 2017). This process is the cornerstone of interventions such as mindfulness-based stress reduction (Kabat-Zinn, 1990), mindfulness-based cognitive therapy (Segal et al., 2002) and mindfulness-based relapse prevention (Bowen et al., 2011) as well as a key component of contextual cognitive behavioural therapies, including acceptance and commitment therapy (Hayes et al., 1999), compassion focused therapy (Gilbert, 2010) and dialectical behaviour therapy (Linehan, 1993).

A growing body of empirical evidence indicates that mindfulness acts as a protective factor that inoculates against psychological distress and promotes positive mental health. Cross-sectional studies have revealed positive correlations between mindfulness and well-being (Baer et al., 2008; Howell et al., 2008; Pidgeon & Keye, 2014; Wenzel et al., 2015), life satisfaction (Bajaj & Pande, 2016; Kong et al., 2014), quality of life (Greco et al., 2011), resourcefulness (Musil et al., 2020), self-compassion (Bluth & Blanton, 2014) and vitality (Brown & Ryan, 2003). Similarly, mindfulness has been found to demonstrate negative correlations with rumination (Raes & Williams, 2010), role stress (Musil et al., 2020), compassion fatigue (Chamberlain et al., 2016), depressive symptoms (Barnhofer et al., 2011; Bowlin & Baer, 2012) and social anxiety (Rasmussen & Pidgeon, 2010). In line with the findings of cross-sectional studies, a body of interventional research has yielded support for mindfulness-based interventions (MBIs) in improving a range of mental health outcomes. Systematic reviews have found MBIs to be efficacious in promoting well-being (Lomas et al., 2018, 2019) and remediating anxious symptoms (Hofmann

et al., 2010; McConville et al., 2017) and depressive symptoms (Chi et al., 2018; Lenz et al., 2016) as well as preventing depressive relapse (Kuyken et al., 2016).

Despite the growing body of empirical support for the benefits of mindfulness, there is no consensus on an unequivocal conceptualisation of mindfulness within Western psychology (Chiesa, 2013). Nilsson and Kazemi (2016) extracted 33 definitions of mindfulness from 308 peer-reviewed articles and identified five core elements in conceptualisations of mindfulness: present-centeredness, attention and awareness, external events, ethical-mindedness, and cultivation. The conceptualisation of mindfulness proposed by Brown et al. (2007) is receptive attention and awareness of present-moment experience and events. This process may facilitate positive adaptation or resilience and, in turn, promote mental health. Conversely, frequent experience of mindless states may have adverse effects on mental health that are mediated by lower levels of resilience. Of the two mindfulness measures validated for use with early adolescents that were identified in a review of youth mindfulness measures by Goodman et al. (2017), the Mindful Attention Awareness Scale for Children (Lawlor et al., 2014) aligns with the aforementioned account.

Given the empirical support for the influence of mindfulness on mental health, researchers have attempted to elucidate the mediators of change underlying this relationship. Schutte and Malouff (2011) found that emotional intelligence partially mediated the relationship between mindfulness and life satisfaction. Another study demonstrated that sleep quality mediated the relationship between mindfulness and well-being (Howell et al., 2008). Self-esteem was also shown by Pepping et al. (2013) to partially mediate the relationship between mindfulness and life satisfaction.

Pepping et al. concluded, however, that other variables also likely function as mediators in this relationship.

Resilience has been posited by theorists (Creswell & Lindsay, 2014) and researchers (Bajaj & Pande, 2016; Cheung et al., 2020; Chin et al., 2019; Wang et al., 2016) as a putative pathway through which mindfulness influences mental health. Resilience refers to the dynamic process of positive adaptation in the context of adversity (Luthar et al., 2000). In light of empirical evidence for the direct effect of mindfulness on resilience (Calvo et al., 2020; Chamberlain et al., 2016; Keye & Pidgeon, 2013) and resilience on facets of positive mental health (Özbey et al., 2014; Pidgeon & Keye, 2014; Singh & Yu, 2010), researchers have tested the hypothesis that mindfulness has an indirect effect on mental health through resilience. A study by Bajaj and Pande (2016) found that resilience mediated the relationship between mindfulness and life satisfaction, positive affect, and negative affect in university students. Similarly, Wang et al. (2016) demonstrated that resilience mediated the relationship between mindfulness and mood in university students. Resilience was also shown by Cheung et al. (2020) to mediate the relationship between mindfulness and quality of life in secondary school students.

Although resilience has been investigated as a putative mediator in the relationship between mindfulness and facets of positive mental health in university undergraduates and secondary school students, there is a paucity of research on this mediation model in primary school students. Given that early adolescence is a key phase for psychosocial development (AlBuhairan et al., 2012), it is important to extend previous research by elucidating the pathways to positive mental health in this population. Such research has the potential to advance researchers' and clinicians' understanding of how mindfulness exerts its beneficial effects on mental health. In

accordance, this study aimed to determine the complex relationships between mindfulness, resilience and positive mental health in primary school students. In line with previous research (Calvo et al., 2020; Pidgeon & Keye, 2014), it was hypothesised that statistically significant correlations would be found between the variables. In addition, based on the findings from university (Bajaj & Pande, 2016; Wang et al., 2016) and secondary school student populations (Cheung et al., 2020), it was hypothesised that resilience would mediate the relationship between mindfulness and positive mental health.

Method

Participants

A power analysis conducted in G*Power (Faul et al., 2009) revealed that 129 participants provided 80% statistical power at $\alpha = .05$ to detect a small effect size (r = .24). This non-probability sample of 129 sixth-class students were recruited from six primary schools in Ireland. Participants' ages ranged from 11 to 13 years (*M* age = 11.67, *SD* age = 0.49), with 65% of the sample (n = 84) identifying as female and 35% (n = 45) identifying as male. The sample was predominantly Caucasian (71.3%, Asian/Pacific Islander: 4.7%, Black: 4.7%, Arabic: 2.3%, Latino: 2.3%, Multiracial: 3.9%, and Other: 10.9%).

Procedure

This study was approved by the University College Dublin Human Research Ethics Committee (see Appendix A for approval letter) and procedures were performed in line with the Declaration of Helsinki (World Medical Association, 2013). All participants provided written informed assent and their parents/guardians provided written informed consent prior to their enrolment in the study. The participants completed a socio-demographic questionnaire, the Mindful Attention

Awareness Scale for Children (Lawlor et al., 2014), Connor-Davidson Resilience Scale–10 (Campbell-Sills & Stein, 2007) and Adolescent Mental Health Continuum-Short Form (Keyes, 2002) in a classroom setting. The first author was present throughout all data collection to answer participants' questions and ensure their independent responding. The test battery took approximately 15 minutes to complete.

Measures

Mindfulness. The Mindful Attention Awareness Scale for Children (Lawlor et al., 2014) is a 15-item measure of mindfulness. To facilitate accessibility, respondents rate the frequency with which they experience *mindless* states on a 6-point scale from 1 (*almost never*) to 6 (*almost always*). Sample items include: "I find myself doing things without paying attention" and "I can't stop thinking about the past or the future." To aid interpretability, scores were recoded in this study so that higher scores indicate higher levels of mindfulness. A psychometric evaluation by Lawlor et al. (2014) supported the measure's unidimensional factor structure, convergent and discriminant validity. The internal consistency of the Mindful Attention Awareness Scale for Children in the present study was $\alpha = .83$.

Resilience. The Connor-Davidson Resilience Scale–10 (Campbell-Sills & Stein, 2007) is a 10-item self-report measure of resilience. Items are rated on a 5-point scale from 0 (*not true at all*) to 4 (*true nearly all the time*); higher scores reflect greater ability to thrive despite adversity. Sample items include: "I tend to bounce back after illness, injury or other hardships" and "I believe I can achieve my goals, even if there are obstacles." Research by She et al. (2020) supported its unidimensional factor structure and criterion-related validity. A critical review of measures used in resilience research by Salisu and Hashim (2017) found that the

Connor-Davidson Resilience Scale–10 possessed the best psychometric properties. The internal consistency of the measure in the present study was α = .86.

Positive mental health. The Adolescent Mental Health Continuum-Short Form (Keyes, 2002) is a 14-item self-report inventory that assesses positive mental health. Items are rated on a 6-point scale from 1 (*every day*) to 6 (*never*). To facilitate interpretability, scores were recoded in the present study so that higher scores indicate higher levels of positive mental health. Sample items include: "in the past month, how often did you feel satisfied with your life?" and "how often did you feel that people are basically good?" Psychometric evaluations have supported the measure's convergent and discriminant validity in child and adolescent samples (de Carvalho et al., 2016; Luijten et al., 2019; Matos et al., 2010). The internal consistency of the measure in the present study was α = 88.

Data Analyses

Bi-variate correlation analyses were conducted to explore the relationships between mindfulness, resilience and positive mental health. Bias-corrected and accelerated (BCa) 95% confidence intervals around the Pearson's correlation coefficients were calculated based on 1,000 bootstrap samples. Following this, a simple mediation analysis was performed using the PROCESS macro for SPSS (Hayes, 2013) to test the hypothesis that resilience would mediate the impact of mindfulness on positive mental health. In the model, mindfulness was entered as the predictor (X), positive mental health as the criterion (Y) and resilience as the mediator (M). The analysis determines the impact of X on M, or the a path, and the impact of M on Y controlling for X, or the b path. Given that the cross product of the a and b coefficients (ab) is equivalent to the difference between the total effect (c) and direct effect (c'), mediation is demonstrated by a statistically significant ab or indirect effect.

Bias-corrected and accelerated (BCa) 95% confidence intervals around the indirect effect were calculated based on 5,000 bootstrap samples. This analytic approach helps mitigate against problems associated with reduced statistical power and data that violates the assumption of normality (Hayes, 2013; Preacher & Hayes, 2008), and a comparison of mediation analytic methods by MacKinnon et al. (2002) found it to be an optimal cross-sectional mediation analytic approach.

Data Availability

The data for this study have been made publicly available on the Open Science Framework: https://osf.io/xfnm3/.

Results

Descriptive statistics for participants' scores on the Adolescent Mental Health Continuum-Short Form (Keyes, 2002), Connor-Davidson Resilience Scale-10 (Campbell-Sills & Stein, 2007), and Mindful Attention Awareness Scale for Children (Lawlor et al., 2014) are shown in Table 2.1. According to Keyes's (2002) categorisation of levels of positive mental health, 72.9% of the sample (n = 94) were experiencing *flourishing* mental health (i.e., high positive emotions and functioning), 22.4% (n = 29) were experiencing *moderate* mental health (i.e., neither flourishing nor languishing), while 4.7% of the sample (n = 6) reported *languishing* mental health (i.e., low positive emotions and functioning).

Correlation Analyses

A bi-variate correlation analysis revealed a small, statistically significant positive correlation between mindfulness and resilience, $r = .195$, 95% BCa CI [0.014, 0.378], $p < .05$. Resilience was found to demonstrate a moderate, statistically significant positive correlation with positive mental health, $r = .426$, 95% BCa CI [0.277, 0.570], $p < .001$. Similarly, the analyses revealed a moderate, statistically

significant positive correlation between mindfulness and positive mental health, r = .317, 95% BCa CI [0.133, 0.486], $p < .001$.

Table 2.1

Descriptive Statistics for the Study Variables

Variable	*N*	*M*	*SD*	Range
Mental Health Continuum	129	65.51	12.29	23–84
Connor-Davidson Resilience Scale	129	24.21	7.89	8–40
Mindful Attention Awareness Scale	129	53.02	13.44	18–84

Note. Scores on the Adolescent Mental Health Continuum-Short Form and Mindful Attention Awareness Scale for Children were recoded so that higher scores indicate higher levels of positive mental health and mindfulness, respectively.

Mediation Analysis

A mediation analysis revealed that the relationship between mindfulness and positive mental health was mediated by resilience. This mediation model is illustrated in Figure 2.1. The indirect effect of mindfulness on positive mental health through resilience was statistically significant based on a 95% bias-corrected and accelerated confidence interval generated from 5,000 bootstrap samples, b = 0.067, BCa CI [0.003, 0.158]. The proportion of the total effect of mindfulness on positive mental health mediated by resilience was 23.33%. The completely standardised indirect effect of mindfulness on positive mental health was 0.074, BCa CI [0.004, 0.166], such that an increase of one standard deviation on mindfulness produced an increase of 0.074 standard deviations on positive mental health through the indirect effect of resilience.

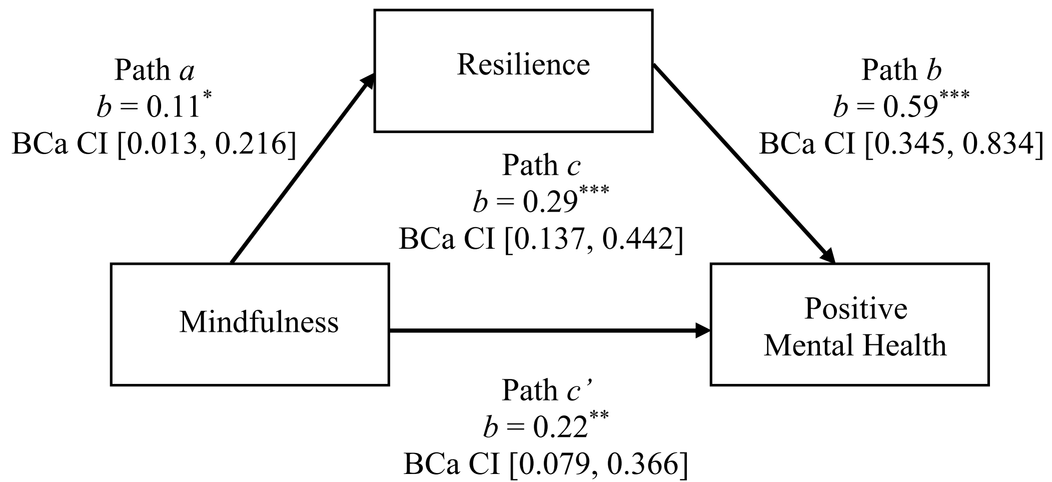


Figure 2.1. Model of mindfulness as a predictor of positive mental health, mediated by resilience. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Discussion

This study aimed to elucidate the complex relationships between mindfulness, resilience and positive mental health in primary school students. In line with hypotheses, the findings revealed a small, statistically significant correlation between mindfulness and resilience, and moderate, statistically significant correlations between resilience and positive mental health as well as mindfulness and positive mental health. Furthermore, the findings supported the hypothesised indirect effect of mindfulness on positive mental health through resilience. These preliminary findings augment empirical research and theory attesting to the role of resilience as a mediator of change in the relationship between mindfulness and positive mental health.

The current findings are consistent with those of previous research in older age groups. For example, in university students, resilience has been found to mediate the relationship between mindfulness and life satisfaction – a component of positive mental health (Bajaj & Pande, 2016). Similarly, the relationship between mindfulness and positive emotion, a component of the emotional well-being facet of positive mental health, was shown to be mediated by resilience in a sample of university students (Wang et al., 2016). Research in secondary school students that found

resilience mediates the relationship between mindfulness and quality of life (Cheung et al., 2020) also concurs with the current findings. These preliminary findings contribute to the evidence base supporting resilience as a process through which mindfulness influences positive mental health and extend it to encompass early adolescence. In accordance with the research evidence, the model of three mental resilience system mechanisms (Davydov et al., 2010) provides an explanation of how resilience influences mental health by protecting against adversity, facilitating quick and effective recovery, and promoting positive experiences.

The primary school students in the current study exhibited relatively high levels of positive mental health, as 72.9% of the sample met the criteria for flourishing mental health, while 22.4% and 4.7% of participants were categorised as experiencing moderate and languishing mental health, respectively. These levels of positive mental health are higher than those reported by 11 to 14 year old Portuguese students in previous research (de Carvalho et al., 2016). Conversely, the resilience levels observed in the current study were lower than those previously reported by Singaporean students of a similar age (Lim et al., 2011). Mindfulness scores in the current study were also lower than those reported by age-matched students in previous research by Lawlor et al. (2014). These disparities highlight a potential pathway for public health initiatives to further enhance psychological functioning in this cohort.

The limitations of this study should be taken into account when making inferences from its findings. Firstly, the mediation analysis in this study was conducted on data collected at a single point in time. Mediation, however, is a process that unfolds across time: change in the independent variable should precede change in the mediator which, in turn, should precede change in the dependent variable (MacKinnon, 2008; O'Laughlin et al., 2018). In order to support inferences of

causality, the variables in this study should be modelled using data collected sequentially rather than concurrently. Indeed, research by Maxwell et al. (2011) found that cross-sectional mediation analysis can produce biased estimates of longitudinal parameters. To address this limitation, future research should analyse the model in this study with longitudinal mediation approaches rooted in structural equation modelling, such as latent growth curve or cross-lagged panel models. Secondly, the study sample was small ($N = 129$) and selected through non-probability sampling rather than random selection. This raises the risk that participants were not fully representative of the population from which they were drawn and potentially limits the generalisability of the findings (Thomas & Hersen, 2011). In accordance, the preliminary nature of this study's findings should be kept in mind. Thirdly, this study relied on self-report measures of mindfulness, resilience and positive mental health that have the potential to be influenced by socially desirable responding. The inclusion of more objective measures, such as performance on a breath counting test as an index of mindfulness (Levinson et al., 2014; Wong et al., 2018), could help control for this potential bias. Fourthly, although the relationships between the variables in this study were statistically significant in the expected directions, their correlation coefficients were small-to-moderate in magnitude. It is therefore important to expand the mediation model from this study to include other theoretically-derived variables.

With the aforementioned limitations in mind, the findings from this study have implications for future research. In accordance, future research could extend this study by conducting a more fine-grained analysis to elucidate the specific facets of mindfulness, such as observing, describing, non-judging of inner experience, non-reactivity to inner experience, and acting with awareness (Baer et al., 2008), that

account for its indirect effect on positive mental health through resilience. Similarly, future research could expand the current findings by conducting a conditional process analysis to investigate the extent to which the indirect effect of mindfulness on positive mental health through resilience is moderated by a fourth variable, such as perceived stress (Creswell & Lindsay, 2014). Another avenue for future research is to investigate the generalisability of the current findings to other populations, such as mental health service users.

In conclusion, the findings of this study provide preliminary support for resilience as a mediator in the relationship between mindfulness and positive mental health. However, the limitations of this study should be carefully considered when interpreting these findings. Future studies could extend this programme of research by identifying the specific facets of mindfulness that account for the indirect effects observed in this study and by exploring the moderators of this mediation model. This research will help facilitate a greater understanding of the mechanisms of mindfulness and its utility for practitioners in alleviating psychological distress and promoting mental health.

References

AlBuhairan, F., Areemit, R., Harrison, A., & Kaufman, M. (2012). Adolescent psychosocial development and evaluation: Global perspectives. In Ö. Özdemir (Ed.), *Complementary Pediatrics* (pp. 179-202). IntechOpen.

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., Walsh, E., Duggan, D., & Williams, J. M. G. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and non-meditating samples. *Assessment*, 15(3), 329–342. https://doi.org/10.1177/1073191107313003

Bajaj, B., & Pande, N. (2016). Mediating role of resilience in the impact of mindfulness on life satisfaction and affect as indices of subjective well-being. *Personality and Individual Differences*, 93, 63–67. https://doi.org/10.1016/j.paid.2015.09.005

Barnhofer, T., Duggan, D. S., & Griffith, J. W. (2011). Dispositional mindfulness moderates the relation between neuroticism and depressive symptoms. *Personality and individual differences*, *51*(8), 958–962. https://doi:10.1016/j.paid.2011.07.032

Bluth, K., & Blanton, P. W. (2014). Mindfulness and self-compassion: Exploring pathways to adolescent emotional well-being. *Journal of Child and Family Studies*, 23(7), 1298–1309. https://doi.org/10.1007/s10826-013-9830-2

Bowen, S., Chawla, N., & Marlatt, G. A. (2011). *Mindfulness-based relapse prevention for addictive behaviors: A clinician's guide*. Guilford Press.

Bowlin, S. L., & Baer, R. A. (2012). Relationships between mindfulness, self-control, and psychological functioning. *Personality and Individual Differences*, 52(3), 411–415. https://doi.org/10.1016/j.paid.2011.10.050

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, 84(4), 822–848. https://doi.org/10.1037/0022-3514.84.4.822

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry*, *18*(4), 211-237. https://doi.org/10.1080/10478400701598298

Calvo, V., D'Aquila, C., Rocco, D., & Carraro, E. (2020). Attachment and well-being: Mediatory roles of mindfulness, psychological inflexibility, and resilience. *Current Psychology*, 1–14. https://doi.org/10.1007/s12144-020-00820-2

Campbell-Sills, L., & Stein, M. B. (2007). Psychometric analysis and refinement of the Connor–Davidson resilience scale (CD-RISC): Validation of a 10-item measure of resilience. *Journal of Traumatic Stress*, *20*(6), 1019-1028. https://doi.org/10.1002/jts.20271

Chamberlain, D., Williams, A., Stanley, D., Mellor, P., Cross, W., & Siegloff, L. (2016). Dispositional mindfulness and employment status as predictors of resilience in third year nursing students: A quantitative study. *Nursing Open*, 3(4), 212–221. https://doi.org/10.1002/nop2.56

Cheung, S., Xie, X., & Huang, C. (2020). Mind over matter: Mindfulness, income, resilience, and life quality of vocational high school students in China. *International Journal of Environmental Research and Public Health*, 17(16), 5701. https://doi.org/10.3390/ijerph17165701

Chi, X., Bo, A., Liu, T., Zhang, P., & Chi, I. (2018). Effects of mindfulness-based stress reduction on depression in adolescents and young adults: A systematic review and meta-analysis. *Frontiers in Psychology, 9*, 1034. https://doi:10.3389/fpsyg.2018.01034

Chiesa, A. (2013). The difficulty of defining mindfulness: Current thought and critical issues. *Mindfulness*, *4*, 255-268. https://doi.org/10.1007/s12671-012-0123-4

Chiesa, A., Fazia, T., Bernardinelli, L., & Morandi, G. (2017). Citation patterns and trends of systematic reviews about mindfulness. *Complementary Therapies in Clinical Practice*, 28(J. Psychosom. Res.762014), 26–37. https://doi.org/10.1016/j.ctcp.2017.04.006

Chin, B., Lindsay, E. K., Greco, C. M., Brown, K. W., Smyth, J. M., Wright, A. G. C., & Creswell, J. D. (2019). Psychological mechanisms driving stress resilience in mindfulness training: A randomized controlled trial. *Health Psychology*, 38(8), 759–768. https://doi.org/10.1037/hea0000763

Creswell, J. D., & Lindsay, E. K. (2014). How does mindfulness training affect health? A mindfulness stress buffering account. *Current Directions in Psychological Science*, 23(6), 401–407. https://doi.org/10.1177/0963721414547415

Davydov, D., Stewart, R., Ritchie, K., & Chaudieu, I. (2010). Resilience and mental health. *Clinical Psychology Review*, *30*(5), 479-495. https://doi.org/10.1016/j.cpr.2010.03.003

de Carvalho, J. S., Pereira, N. S., Pinto, A. M., & Marôco, J. (2016). Psychometric properties of the mental health continuum-short form: A study of Portuguese speaking children/youths. *Journal of Child and Family Studies*, 25(7), 2141–2154. Retrieved from https://doi.org/10.1007/s10826-016-0396-7

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*(4), 1149–1160. https://doi.org/10.3758/BRM.41.4.1149

Gilbert, P. (2010). *Compassion focused therapy: Distinctive features*. Routledge.

Goodman, M. S., Madni, L. A., & Semple, R. J. (2017). Measuring mindfulness in youth: Review of current assessments, challenges, and future directions. *Mindfulness*, *8*(6), 1409-1420. https://doi.org/10.1007/s12671-017-0719-9

Greco, L. A., Baer, R. A., & Smith, G. T. (2011). Assessing mindfulness in children and adolescents: Development and validation of the child and adolescent mindfulness measure (CAMM). *Psychological Assessment*, 23(3), 606–614. https://doi.org/10.1037/a0022819

Grossman, P. (2019). On the porosity of subject and object in “mindfulness” scientific study: Challenges to “scientific” construction, operationalization and measurement of mindfulness. *Current Opinion in Psychology*, 28, 102–107. https://doi.org/10.1016/j.copsyc.2018.11.008

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. The Guilford Press.

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and commitment therapy: An experiential approach to behaviour change*. The Guilford Press.

Hofmann, S., Sawyer, A., Witt, A., & Oh, D. (2010). The Effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of Consulting and Clinical Psychology, 78*(2), 169–183. https://doi:10.1037/a0018555

Howell, A. J., Digdon, N. L., Buro, K., & Sheptycki, A. R. (2008). Relations among mindfulness, well-being, and sleep. *Personality and Individual Differences*, 45(8), 773–777. https://doi.org/10.1016/j.paid.2008.08.005

Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain and illness*. Random House Publishing Group.

Keye, M. D., & Pidgeon, A. M. (2013). Investigation of the relationship between resilience, mindfulness, and academic self-efficacy. *Open Journal of Social Sciences*, 01(06), 1–4. https://doi.org/10.4236/jss.2013.16001

Keyes, C. L. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behavior*, *43*(2), 207. https://doi.org/10.2307/3090197

Kong, F., Wang, X., & Zhao, J. (2014). Dispositional mindfulness and life satisfaction: The role of core self-evaluations. *Personality and Individual Differences*, 56, 165–169. https://doi.org/10.1016/j.paid.2013.09.002

Kuyken, W., Warren, F., Taylor, R., Whalley, B., Crane, C., Bondolfi, G., Hayes, R., Huijbers, M., Ma, H., Schweizer, S., Segal, Z., Speckens, A., Teasdale, J. D., Van Heeringen, K., Williams, M., Byford, S., Byng, R., & Dalgleish, T. (2016). Efficacy of mindfulness-based cognitive therapy in prevention of depressive relapse: An individual patient data meta-analysis from randomized trials. *JAMA Psychiatry, 73*(6), 565. https://doi:10.1001/jamapsychiatry.2016.0076

Lawlor, M. S., Schonert-Reichl, K. A., Gadermann, A. M., & Zumbo, B. D. (2014). A validation study of the mindful attention awareness scale adapted for children. *Mindfulness*, 5(6), 730–741. https://doi.org/10.1007/s12671-013-0228-4

Lenz, A., Hall, J., & Smith, L. (2016). Meta-analysis of group mindfulness-based cognitive therapy for decreasing symptoms of acute depression. *The Journal for Specialists in Group Work, 41*(1), 44–70. https://doi:10.1080/01933922.2015.1111488

Levinson, D. B., Stoll, E. L., Kindy, S. D., Merry, H. L., & Davidson, R. J. (2014). A mind you can count on: Validating breath counting as a behavioral measure of mindfulness. *Frontiers in Psychology*, *5*, 1202. https://doi:10.3389/fpsyg.2014.01202

Lim, M., Broekman, B. F., Wong, J. C., Wong, S., & Ng, T. (2011). The development and validation of the Singapore youth resilience scale (SYRESS). *The International Journal of Educational and Psychological Assessment*, *8*(2), 16-30. https://sites.google.com/site/tijepa2012/articles/vol-8-2

Linehan, M. M. (1993). *Cognitive-behavioural treatment of borderline personality disorder*. The Guilford Press.

Lomas, T., Medina, J., Ivtzan, I., Rupprecht, S., & Eiroa-Orosa, F. (2018). Mindfulness-based interventions in the workplace: An inclusive systematic review and meta-analysis of their impact upon wellbeing. *The Journal of Positive Psychology,14*(5), 1–16. https://doi:10.1080/17439760.2018.1519588

Lomas, T., Medina, J., Ivtzan, I., Rupprecht, S., & Eiroa-Orosa, F. (2019). A systematic review and meta-analysis of the impact of mindfulness-based interventions on the well-being of healthcare professionals. *Mindfulness, 10*(7), 1193–1216. https://doi:10.1007/s12671-018-1062- 5

Luijten, C. C., Kuppens, S., van de Bongardt, D., & Nieboer, A. P. (2019). Evaluating the psychometric properties of the mental health continuum-short form (MHC-SF) in Dutch adolescents. *Health and Quality of Life Outcomes*, 17(1), 157. https://doi.org/10.1186/s12955-019-1221-y

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*, 71(3), 543–562. https://doi.org/10.1111/1467-8624.00164

MacKinnon, D. P. (2008). *Introduction to statistical mediation analysis*. Routledge.

MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*, 7(1), 83–104. https://doi.org/10.1037/1082-989x.7.1.83

Matos, A. P., André, R. S., Cherpe, S., Rodrigues, D., Figueira, C., & Pinto, A. M. (2010). Preliminary psychometric study of the Mental Health Continuum – Short Form – for youth, in a sample of Portuguese adolescents. *Psychologica*, (53), 131–156. https://doi.org/10.14195/1647-8606_53_7

Maxwell, S. E., Cole, D. A., & Mitchell, M. A. (2011). Bias in cross-sectional analyses of longitudinal mediation: Partial and complete mediation under an autoregressive model. *Multivariate Behavioral Research*, *46*(5), 816-841. https://doi.org/10.1080/00273171.2011.606716

McConville, J., McAleer, R., & Hahne, A. (2017). Mindfulness training for health profession students—The effect of mindfulness training on psychological well-being, learning and clinical performance of health professional students: A systematic review of randomized and non-randomized controlled trials. *EXPLORE: The Journal of Science and Healing, 13*(1), 26– 45. https://doi:10.1016/j.explore.2016.10.002

Musil, C. M., Wallace, M. K., Jeanblanc, A. B., Toly, V. B., Zauszniewski, J. A., & Burant, C. J. (2020). Theoretical and operational consideration of mindfulness,

resilience, and resourcefulness. *Western Journal of Nursing Research*, 019394592095668. https://doi.org/10.1177/0193945920956684

Nilsson, H., & Kazemi, A. (2016). Reconciling and thematizing definitions of mindfulness: The big five of mindfulness. *Review of general psychology*, *20*(2), 183-193. https://doi.org/10.1037/gpr0000074

O'Laughlin, K. D., Martin, M. J., & Ferrer, E. (2018). Cross-sectional analysis of longitudinal mediation processes. *Multivariate Behavioral Research*, *53*(3), 375-402. https://doi.org/10.1080/00273171.2018.1454822

Özbey, S., Büyüktanir, A., & Türkoğlu, D. (2014). An investigation of preservice pre-school teachers' resilience skills. *Procedia - Social and Behavioral Sciences*, *116*, 4040-4046. https://doi.org/10.1016/j.sbspro.2014.01.887

Pepping, C. A., O'Donovan, A., & Davis, P. J. (2013). The positive effects of mindfulness on self-esteem. *The Journal of Positive Psychology*, 8(5), 376–386. https://doi.org/10.1080/17439760.2013.807353

Pidgeon, A. M., & Keye, M. (2014). Relationship between resilience, mindfulness, and psychological well-being in university students. *International Journal of Liberal Arts and Social Science*, *2*(5), 27-32. https://ijlass.org/data/frontImages/gallery/Vol._2_No._5/3.pdf

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879–891. https://doi.org/10.3758/brm.40.3.879

Raes, F., & Williams, J. M. G. (2010). The Relationship between mindfulness and uncontrollability of ruminative thinking. *Mindfulness*, 1(4), 199–203. https://doi.org/10.1007/s12671-010-0021-6

Rasmussen, M. K., & Pidgeon, A. M. (2010). The direct and indirect benefits of dispositional mindfulness on self-esteem and social anxiety. *Anxiety, Stress & Coping*, 24(2), 227–233. https://doi.org/10.1080/10615806.2010.515681

Salisu, I., & Hashim, N. (2017). A critical review of scales used in resilience research. *IOSR Journal of Business and Management*, *19*(04), 23-33. https://doi.org/10.9790/487x-1904032333

Schutte, N. S., & Malouff, J. M. (2011). Emotional intelligence mediates the relationship between mindfulness and subjective well-being. *Personality and Individual Differences*, 50(7), 1116–1119. https://doi.org/10.1016/j.paid.2011.01.037

Segal, Z. V., Williams, J. M., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse*. The Guilford Press.

She, R., Yang, X., Lau, M. M. C., & Lau, J. T. F. (2020). Psychometric properties and normative data of the 10-item Connor–Davidson Resilience Scale among Chinese adolescent students in Hong Kong. *Child Psychiatry & Human Development*, 51(6), 925–933. https://doi.org/10.1007/s10578-020-00970-1

Singh, K., & Yu, X. (2010). Psychometric evaluation of the Connor-Davidson resilience scale (CD-RISC) in a sample of Indian students. *Journal of Psychology*, 1(1), 23–30. https://doi.org/10.1080/09764224.2010.11885442

Thomas, J., & Hersen, M. (2011). *Understanding research in clinical and counseling psychology* (2nd ed.). Routledge.

Wang, Y., Xu, W., & Luo, F. (2016). Emotional resilience mediates the relationship between mindfulness and emotion. *Psychological Reports*, 118(3), 725–736. https://doi.org/10.1177/0033294116649707

Wenzel, M., von Versen, C., Hirschmüller, S., & Kubiak, T. (2015). Curb your neuroticism – Mindfulness mediates the link between neuroticism and subjective well-being. *Personality and Individual Differences*, 80, 68–75. https://doi.org/10.1016/j.paid.2015.02.020

Wong, K. F., Massar, S. A. A., Chee, M. W. L., & Lim, J. (2018). Towards an objective measure of mindfulness: Replicating and extending the features of the breath-counting task. *Mindfulness*, 9(5), 1402–1410. Retrieved from https://doi.org/10.1007/s12671-017-0880-1

World Medical Association. (2013). Declaration of Helsinki: Ethical principles for medical research involving human subjects. *JAMA*, *310*(20), 2191–2194. https://doi.org/10.1001/jama.2013.281053

Chapter 3: Study 2

The following study, 'The Efficacy of Mindfulness-based Interventions in Promoting Resilience: A Systematic Review and Meta-analysis of Randomised Controlled Trials', is currently under review for publication in the journal *Mindfulness*. The co-authors are Ms. Alison Stapleton, Prof. Gary O'Reilly, Dr. Eddie Murphy, Ms. Leda Connaughton, Ms. Emma Hoctor, and Prof. Louise McHugh.

Abstract

Mindfulness-based interventions (MBIs) are among the most common therapeutic approaches for enhancing psychological resilience. This systematic review and meta-analysis aimed to determine the efficacy of MBIs in promoting resilience. A systematic search of PsycINFO, MEDLINE, CINAHL, and CENTRAL was conducted and relevant review articles, studies, and the journal *Mindfulness* were hand-searched for potentially eligible randomised controlled trials. Fifty-seven trials were selected for inclusion. Meta-analyses revealed that MBIs outperformed inactive control conditions in enhancing resilience at post-intervention and follow-up with medium effect sizes. MBIs were also superior to active control conditions with a small effect size at follow-up, but not at post-intervention. No statistically significant differences were observed relative to comparison interventions. Thus, MBIs are efficacious in promoting resilience, but not more so than comparison interventions. Implications for clinical practice and future research are discussed.

The promotion of psychological resilience is now more pressing than ever due to exceptional worldwide forces, such as the COVID-19 pandemic, climate change, and unsustainable ecosystems, coupled with the increasing prevalence of mental health difficulties (Christensen et al., 2017; Czeisler et al., 2020; Fusar-Poli et al., 2021; Proudman et al., 2021; Racine et al., 2021). As a result, the cultivation of psychological resilience has garnered increased interest in the clinical research literature (Bolsinger et al., 2018; Ferreira et al., 2021; Fox et al., 2018). Indeed, increased resilience has been found to mitigate the effects of life stress and trauma on sleep quality, clinically significant distress, impairment in functioning, and suicidality (Clukay et al., 2019; Edwards et al., 2017; Hourani et al., 2012; Youssef et al., 2013) and predict greater self-esteem, optimism, and well-being as well as decreased anxious and depressive symptomology (Bitsika et al., 2013; Kukihara et al., 2014; Lee et al., 2008; Liu et al., 2015). Definitions of psychological resilience, however, are diverse and numerous (Hart et al., 2016; Joyce, Shand, Tighe et al., 2018). Some researchers have defined resilience as the capacity to function and maintain well-being in the face of life stress (Bonanno, 2004), while others have described resilience as the ability to "bounce back" following adversity (Janas, 2002). Many definitions encompass both of the aforementioned qualities and refer to this construct as dynamic and multifactorial, including internal (e.g., self-confidence, responsiveness, positivity, altruism, internal locus of control) and external factors (e.g., peer support, committed family, effective community; British Psychological Society, 2019; Dray et al., 2017; Low et al., 2019).

A host of systematic reviews have synthesised the evidence for the efficacy of interventions in promoting resilience across diverse populations and contexts. In adult populations, systematic reviews and meta-analyses by Joyce, Shand, Tighe et al.

(2018) and Leppin et al. (2014) synthesised the evidence from randomised controlled trials of resilience promotion interventions and found small statistically significant effects on measures of resilience relative to control conditions (d = 0.44 and 0.37, respectively). In organisational settings, a systematic review of 14 trials by Robertson et al. (2015) revealed predominantly positive effects of programmes on resilience, while a meta-analytic review by Vanhove et al. (2016) revealed that the statistically significant effects of such programmes were small (d = 0.21) and diminished over time (d = 0.07). More specifically, a systematic review of 16 studies by Rogers (2016) found that programmes improved healthcare professionals' resilience, but inconsistent evidence for improving physicians' resilience was observed across the 22 studies systematically reviewed by Fox et al. (2018). In child and adolescent populations, a systematic review of resilience promotion interventions in school settings by Fenwick-Smith et al. (2018) identified 11 eligible studies and a narrative synthesis supported their positive impact on students' resilience. The most recent meta-analytic review of resilience promotion interventions for children, adolescents and adults synthesised 83 trials and evidenced medium statistically significant effects on measures of resilience (g = 0.72; Liu, Ein et al., 2021). Another recent systematic review by Ferreira et al. (2021) identified mindfulness-based approaches among the most common frameworks underpinning resilience promotion interventions over the last decade.

Mindfulness has garnered significant interest in psychological literature and clinical practice over recent decades (Dawson et al., 2020; Grossman, 2019). Indeed, a host of cross-sectional studies have revealed that higher levels of mindfulness are associated with higher levels of resilience across child, adolescent and adult populations (Bajaj & Pande, 2016; Calvo et al., 2020; Chamberlain et al., 2016;

Cheung et al., 2020; Keye & Pidgeon, 2013; O'Connor et al., 2021; Wang et al., 2016). Similar to resilience, definitions of mindfulness are diverse and plentiful (Chiesa, 2013). A review of mindfulness definitions by Nilsson and Kazemi (2016) identified five core elements from 33 existing definitions: attention and awareness, present-centeredness, ethical-mindedness, external events, and cultivation. These processes constitute the bedrock of mindfulness-based interventions (MBIs), such as Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1990), Mindfulness-Based Cognitive Therapy (MBCT; Segal et al., 2002), Mindfulness-Based Relapse Prevention (MBRP; Bowen et al., 2011), Mindful Self-Compassion (MSC; Gilbert & Choden, 2013), and Mindfulness-Based Resilience Training (MBRT; Christopher et al., 2016). Such MBIs take numerous forms and vary based on delivery mode (i.e., face-to-face individual or group-based, bibliotherapy, telehealth, or eHealth), intervention type (i.e., universal, indicated, or treatment) and duration.

The growing interest in mindfulness has extended to interventional research, evidenced by an exponential increase in published randomised controlled trials of MBIs (Vonderlin et al., 2020). In accordance, there has been a 19% increase per annum in published systematic reviews of MBIs (Chiesa et al., 2017). Such systematic reviews have supported the efficacy of MBIs in improving an array of outcomes, including well-being (Lomas et al., 2018, 2019), anxious symptoms (Hofmann et al., 2010; McConville et al., 2017), depressive symptoms (Chi et al., 2018; Lenz et al., 2016) and recurrent depression (Kuyken et al., 2016). Although MBIs are also frequently cited in clinical texts as a means of increasing resilience (Greeson et al., 2014; Steinebach & Langer, 2019; Turow, 2017), to date, there has not been a systematic review of the evidence base for the efficacy of MBIs in promoting resilience. There is a need for policy makers, practitioners and researchers

to be provided with a concise synthesis of high-quality empirical evidence to inform decision-making and the allocation of resources to MBIs for the promotion of psychological resilience. This systematic review and meta-analysis of randomised controlled trials sought to address this need.

The primary objective of this systematic review and meta-analysis was to determine the efficacy of MBIs in promoting resilience. As the type of comparison condition featured in randomised controlled trials has been found to be a moderating factor in previous meta-analyses (e.g., Grist & Cavanagh, 2013; O'Connor et al., 2018), the effects of the MBIs were evaluated relative to inactive control conditions, active control conditions, and comparison interventions. A secondary objective was to elucidate the maintenance of the aforementioned intervention effects at the longest available follow-up measurement in each trial. Furthermore, potential moderators of the effects of MBIs on resilience – such as type of intervention (i.e., universal, indicated, or treatment), delivery mode (i.e., in-person or self-help), population (child and adolescent or adult), duration of intervention, and risk of bias – were also explored.

Method

This systematic review and meta-analysis was conducted in line with a preregistered review protocol (PROSPERO registration number: CRD42020179433), the Cochrane Collaboration's recommendations for reducing subjectivity biases and data extraction errors (Higgins et al., 2011), and adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Page et al., 2021).

Eligibility Criteria

Types of studies: Randomised controlled trials that were published in English language peer-reviewed journals reporting on the efficacy of MBIs in promoting

resilience relative to inactive control conditions (i.e., waiting list or no treatment), active control conditions (i.e., those that control for the nonspecific effects of activity and attention), or comparison interventions were eligible for inclusion. Studies with an additive or dismantling design, comparing the efficacy of components of an MBI, were excluded.

Types of participants: Eligible participants were individuals who enrolled in trials evaluating the efficacy of MBIs, with no exclusions based on sex/gender, race/ethnicity, age or morbidity.

Types of intervention: MBIs, including, Mindfulness-Based Stress Reduction (MBSR), Mindfulness-Based Cognitive Therapy (MBCT), Mindfulness-Based Relapse Prevention (MBRP), Mindful Self-Compassion (MSC), or Mindfulness-Based Resilience Training (MBRT), in which mindfulness constitutes at least 50% of the interventional content, were eligible for inclusion in the review. All modes of intervention delivery (e.g., face-to-face individual or group treatment, bibliotherapy, telehealth or eHealth) were also included.

Types of outcome measures: Valid and reliable measures of resilience, such as the Connor-Davidson Resilience Scale (Connor & Davidson, 2003), Resilience Scale for Adults (Friborg et al., 2003), and Brief Resilience Scale (Smith et al., 2008), were eligible for inclusion. In cases where two or more measures of resilience were administered in a single study, the specified primary resilience measure was selected.

Information Sources

Studies were identified by searching electronic bibliographic databases including PsycINFO, MEDLINE, CINAHL, and the Cochrane Central Register of Controlled Trials (CENTRAL) for journal articles published before 15th January 2022. The reference lists of all studies eligible for inclusion in this review were screened as

were those of relevant review articles identified in the searches. The journal *Mindfulness* was also hand-searched for potentially eligible studies. Eleven authors were contacted for additional information and clarification in cases where insufficient data were reported in included studies, five of which supplied the requested data.

Search Strategy

To facilitate high rates of recall and precision in the database searches, subject headings and keywords related to *mindfulness* and *resilience* were identified by consulting the APA PsycINFO Thesaurus, CINAHL Subject Headings, and MeSH Thesaurus. Keywords were truncated to enable the retrieval of all variants and were combined with Boolean operators. The full search strategy for PsycINFO (all years), MEDLINE (all years), CINAHL (all years), and CENTRAL (all years) are reported in the Appendix B. Database filters for "humans" and "English language" were used to narrow the scope of the results.

Selection Process

All titles and abstracts identified in the searches were exported to the Covidence systematic review management software package and duplicate records were excluded. Following this, two reviewers (MOC and AS) independently screened all of the remaining titles and abstracts for potentially eligible studies. The full-text papers of such studies were then obtained, and inclusion criteria were independently applied by the two reviewers utilizing standardized forms. Disagreements between the reviewers were resolved by consulting a third reviewer (LMH).

Data Collection Process

To reduce data extraction errors, relevant sections of the included studies were copied and pasted into standardized data extraction forms that were developed and pre-piloted in the Covidence systematic review management software package.

Extracted data were cross-checked for accuracy by a second reviewer. In cases where a single study was published across multiple reports, data from all of the publications were synthesized and considered as a single source.

Data Items

Data were extracted from included studies on author and publication year, country, setting, population, sample size, mean age, percentage of females, type and duration of intervention, comparator(s), resilience measure, effect size estimate on resilience measure at post-intervention and follow-up, and method of data analysis.

Study Risk of Bias Assessment

The Cochrane Risk of Bias 2 (RoB 2; Sterne et al., 2019) tool for randomised trials was employed to evaluate the validity of the included studies. This tool reflects a state-of-the-art understanding of how bias can affect the results of clinical trials. Five domains of bias are covered by the tool: bias arising from the randomisation process, deviations from intended interventions, missing outcome data, measurement of the outcome, and selection of the reported result. Assessments for each domain entail answering signalling questions which inform risk of bias judgements. These judgements are expressed as *low risk*, *some concerns*, or *high risk* of bias. Two reviewers (MOC and AS) independently assessed the risk of bias in each included study using the RoB 2 Excel tool. Disagreements between the reviewers were resolved by consulting a third reviewer (LMH).

Effect Measures

Hedges's *g* effect size was calculated using Comprehensive Meta-Analysis Version 3 to estimate the effects of MBIs relative to comparators on measures of resilience. This effect size statistic yields an unbiased estimate, as it corrects for the overestimation of Cohen's *d* effect size in small samples (Borenstein et al., 2009).

Estimates of effect size were interpreted in line with Cohen (1988): 0.2 constitutes a small effect, 0.5 a medium effect, and 0.8 a large effect. The inter-rater agreement between reviewers on study selection and risk of bias assessments was also calculated ($\frac{Agreements}{Agreements + Disagreements} \times 100$). The agreement was 95% for study selection, and 98% for risk of bias assessments.

Synthesis Methods

Meta-analyses were conducted in Comprehensive Meta-Analysis Version 3 to synthesize the results of the included studies. Pooled estimates of the effects of MBIs on resilience measures were calculated relative to inactive control conditions, active control conditions, and comparison interventions. On account of the variability in interventions and populations sampled by studies in the meta-analyses, these pooled effect estimates and their 95% confidence intervals were calculated in the random effects model. This model assumes that the studies in a meta-analysis sample different populations with different treatment effects (Field & Gillett, 2010). Meta-regression analyses were conducted to explore differences in pooled effect estimates as a function of intervention type (i.e., universal, indicated, or treatment), delivery mode (i.e., in-person or alternative modes), population (child and adolescent or adult), and duration of intervention. In cases where a study in a meta-regression analysis included more than one comparator, the most common comparison condition across studies was selected (Cavanagh et al., 2014; Spijkerman et al., 2016).

The heterogeneity between the studies in the meta-analyses was investigated by visual inspection of forest plots and conducting *Q*-tests for heterogeneity. The I^2 statistic served as an index of heterogeneity and was interpreted in line with Blundell (2014): 25% constitutes low heterogeneity, 50% moderate heterogeneity, and 75%

high heterogeneity. Sensitivity analyses were also performed to examine heterogeneity, excluding trials with elevated standardised residuals from the analyses.

Reporting Bias and Certainty Assessment

To assess potential publication bias across studies, a funnel plot was generated. Duval and Tweedie's (2000) Trim and Fill procedure was conducted to calculate an effect size estimate adjusted for funnel plot asymmetry. Risk of reporting bias in included studies was assessed by searching trial registries, including clinicaltrials.gov, ISRCTN registry, Australian New Zealand Clinical Trials Registry (ANZCTR), and University hospital Medical Information Network (UMIN) Clinical Trials Registry, and comparing the outcomes and analyses specified in the protocols with those reported in the corresponding journal articles. A meta-regression analysis was conducted to investigate the potential moderating effect of risk of bias on effect size estimates.

Results

Study Selection

Searches of electronic bibliographic databases (PsycINFO, MEDLINE, CINAHL, and CENTRAL) and screening the journal *Mindfulness*, previous reviews and relevant articles for potentially eligible studies yielded 2631 citations. After removing duplicates and screening all titles and abstracts for relevant studies, the full-text papers of 186 potentially eligible articles were retrieved and uploaded to Covidence. The inclusion criteria were applied to each full-text paper and 57 studies were selected for inclusion in the systematic review. The flow of information through each phase of the systematic review is depicted in Figure 3.1.

Study Characteristics

The characteristics of the 57 included trials are presented in Table 3.1.

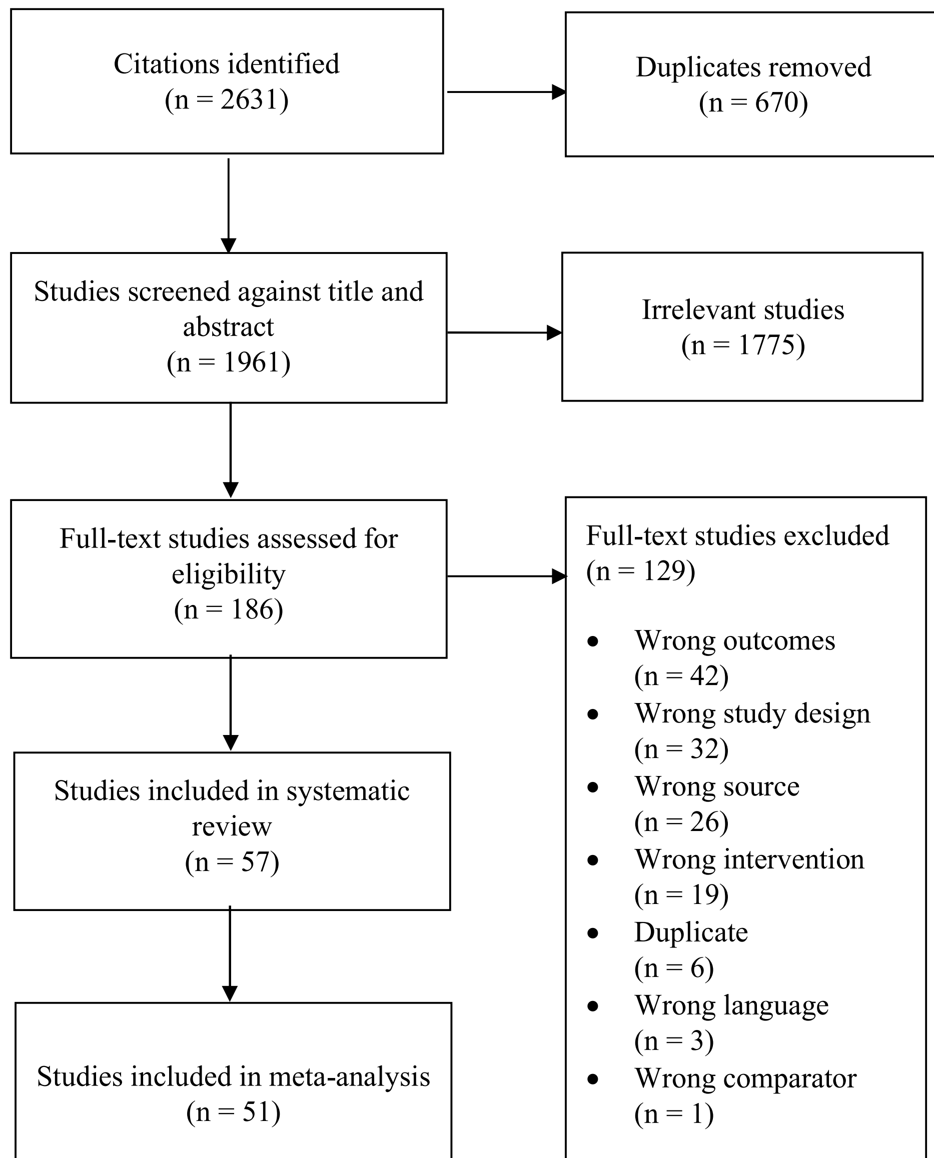


Figure 3.1. Study selection flow diagram.

Note. Six studies included in the systematic review were not included in the meta-analysis, as insufficient data were reported in their respective full-text papers and study authors did not respond to two requests to supply the outstanding data.

Participants: The studies featured a total of 7918 participants. Study sample sizes ranged from 14 to 3519. Participants' mean age in the studies ranged from 3 to 73.71 years. The proportion of females sampled ranged from 0 to 100%. Non-clinical populations were sampled in 40 studies. In 14 studies, indicated interventions targeted

individuals with elevated symptoms or risk of developing a mental disorder, including heightened depressive (n = 1), stress (n = 2), worry (n = 1) and internalising symptoms (n = 1), cognitive impairment (n = 1), incarceration (n = 1), and the sequelae of fibromyalgia (n = 1), HIV (n = 1), mastectomy (n = 2), multiple sclerosis (n = 1), obesity (n = 1) and physical disability (n = 1). The remaining three studies delivered treatment interventions to children (n = 1), adolescents (n = 1) and adults (n = 1) with diagnosed psychological illnesses.

Interventions: Thirteen studies evaluated the efficacy of interventions based on MBSR: twelve were delivered in-person and one combined online and in-person modes. MBCT informed five in-person interventions. MBIs were also delivered online (n = 7), via audio recording (n = 5), smartphone app (n = 3) and mindful colouring (n = 1). Specific mindfulness programs were trialled for children and adolescents (n = 5), educators (n = 1), physicians (n = 1) and medical students (n = 1). The remaining MBIs included MBRT (n = 1), MSC (n = 1), Mindfulness in Motion (MIM; n = 2), Templestay (n = 1), Mindfulness-Acceptance-Insight-Commitment (MAIC; n = 1), Mindfulness and Acceptance-based Intervention (MABI; n = 1), Mindfulness with Metta Training Program (MMTP; n = 1), Mindful-Awareness and Resilience Skills Training (MARST; n = 1), Mindful-Compassion Art-based Therapy (MCAT; n = 1), Mindful Eating and Living (MEAL; n = 1), single-session (n = 1) and group-based mindfulness meditation (n = 3).

Comparators: Forty-two studies compared MBIs with inactive control conditions (e.g., wait list or no treatment). Active control conditions, designed to control for the nonspecific effects of activity and attention, featured in nine studies: educational protocols (n = 3), neutral news audio (n = 1), sitting quietly (n = 1), active listening and reading (n = 1), Evernote smartphone app (n = 1), non-adaptive dual 1-

Table 3.1

Characteristics of Included Studies

Study	Study population	*N*	*M* age	% female	Intervention	Comparator	Follow-up
Aghaie et al., 2021	HIV-positive women	90	NS	100	MBSR	Routine care	4 & 8 weeks
Aikens et al., 2014	Employed adults	90	NS	NS	Online mindfulness	Wait list	6 months*
Azad et al., 2019	Disabled veterans	30	NS	0	MBT	No treatment	None
Barry et al., 2019	University students	82	38.13	74.44	Mindfulness CD	No treatment	None
Bultas et al., 2021	Nursing students	49	19	85.71	Brief MBI	No treatment	None
Cejudo et al., 2019	Women with fibromyalgia	104	47.59	100	Group MBI	Wait list	6 months
Champion et al., 2018	Employed adults	74	39.4	55.4	Mindfulness app	Wait list	30 days
Christopher et al., 2018	Law enforcement officers	61	43.98	10	MBRT	No treatment	3 months
Cohen et al., 2021	Adolescents with early life stress	40	14.3	41	MBSR-T	No treatment	None
Course-Choi et al., 2017	Adults reporting elevated worries	60	28.66	75	Mindfulness audio	N-back training	1 week
Czerwinski et al., 2020	Teachers	43	33.95	76.7	Mindful colouring	Wait list	None
Diachenko et al., 2021	Pre-retirement employees	82	NS	63	MBSR	Wait list	1 year
Erogul et al., 2014	First-year medical students	59	23.5	45.6	MBSR	No treatment	6 months
Felver et al., 2018	High school students	29	16.39	67	L2B	No treatment	None
Fernández-Portero et al., 2021	Female caregivers	117	52.08	100	MABI	Physical activity	None
Flett et al., 2019	Undergraduate students	210	20.08	NS	Mindfulness app	Evernote app	30 days
Flett et al., 2020	First-year university students	250	17.87	67.6	Mindfulness app	Wait list	4 months
Franco et al., 2020	Women who survived mastectomy	36	41.27	100	Flow meditation	Wait list	None
Gordon et al., 2021	Healthy women in menopause	104	48.7	100	MBSR	Wait list	6 months
Hanna et al., 2018	Human service professionals	50	42	80.4	MARST	No treatment	1 month
Ho et al., 2021	Healthcare workers	56	44.4	75	MCAT	Wait list	12 weeks*
Hosseinian et al., 2019	Adolescents in juvenile correction	30	13.57	0	Group MBI	No treatment	None
Hwang et al., 2017	Office workers & graduates	51	30.96	74.5	Templestay	Relaxation	3 months
Joyce et al., 2019	Firefighters	143	42.27	4.2	RAW	HLP	6 months
Juul et al., 2020	Adults with stress-related problems	71	NS	59.15	MBSR	Wait list; ACT	None
Juul et al., 2021	Student teachers	67	26	73.13	MBSR	Wait list	None
Karbasizadeh, 2018	Women aged 20-40	30	NS	100	MBCT	No treatment	None
Kim et al., 2020	Preschool children	83	3	45.78	OM-K	No treatment	7 & 12 months
Klatt et al., 2015	Intensive care unit staff	34	45	80	MIM	Wait list	None
Kor et al., 2019	Caregivers of people with dementia	36	57.1	83.3	Modified MBCT	Usual family care	3 months
Kosugi et al., 2021	Healthy adults	50	46.8	78	Modified MBCT	Wait list	2 months
Laundy et al., 2021	Children with mental health problems	43	11.52	67.65	TMR	Individual counselling	1 & 2 years
Lebares et al., 2019	Postgraduate surgery residents	21	28.31	38.1	Modified MBSR	Active control	1 year
Lemos et al., 2021	Hospital workers	29	37.16	93.33	MBI group	RBI	None
Lin et al., 2019	Nurses	110	31.49	93.33	Modified MBSR	Wait list	3 months

Study	Study population	*N*	*M* age	% female	Intervention	Comparator	Follow-up
Liu et al., 2021	Student athletes	60	19.7	31.58	MAC	Neutral news audio	None
Moir et al., 2016	Medical students	275	20.9	53	Peer-led mindfulness	No treatment	None
Movassagh et al., 2019	Employees	40	42.82	10	MIM	Wait list	9 weeks
Nadler et al., 2020	Employees	275	NS	73.53	Online workplace mindfulness	Wait list	None
Nielsen et al., 2021	Legal professionals	100	46	82.22	Mindful pause	Wait list	None
Perez-Blasco et al., 2016	Elderly adults	45	63.56	67.4	MSC	Wait list	None
Pidgeon et al., 2013	Human service professionals	44	40.7	91	MMTP	No treatment	1 & 4 months*
Polizzi et al., 2019	Undergraduate students	91	18.55	76.9	Brief MBI	SQ	None
Rodrigues de Oliveira et al., 2021	Female teachers	76	44.71	100	MBHPEduca	Neuro-Educa	None
Rullo et al., 2021	Women with FSIAD & partners	60 couples	44.1	NS	Sex SMART	Wait list	None
Schroeder et al., 2018	Primary care physicians	33	42.76	73	MMC	Wait list	3 months
Senders et al., 2019	People with MS	67	52.94	77.42	MBSR	MS education	4, 8, 12 months
Smith et al., 2018	Post-menopausal obese women	40	58.56	100	MEAL	CONT	4 & 9 months
Solati, 2017	Wives of men with schizophrenia	40	NS	100	MBCT	No treatment	None
Tan et al., 2015	Adolescents with primary psychiatric diagnoses	91	15.4	75	TAM	TAU	3 months
Volanen et al., 2020	School children and adolescents	3519	NS	49.97	Stop & breathe/be	Relaxation; no treatment	6 months
Wahbeh, 2018	Older adults with depressive symptoms	50	64.8	80	IMMI	Wait list	7 weeks*
Wang et al., 2020	Breast cancer patients undergoing mastectomies	88	48.2	100	MBSR	TAU	None
Wang et al., 2021	Female college students	67	19.54	100	MAIC	No treatment	None
Wells et al., 2013	Adults with MCI	14	73.71	NS	MBSR	TAU	None
Wright et al., 2019	Children with internalising difficulties	89	10.6	50.53	MBCT-C	FRIENDS	None
Yuan, 2021	Middle school students	180	13.37	50.57	MT recordings	No treatment	None

Note. ACT acceptance and commitment therapy; FRIENDS friends for Life; FSIAD female sexual interest/arousal disorder; HLP healthy living program; IMMI internet mindfulness meditation; L2B learning to BREATHE; MABI mindfulness and acceptance-based intervention; MAC mindfulness-acceptance-commitment approach; MAIC mindfulness-acceptance-insight-commitment training; MARST mindful-awareness and resilience skills training; MBCT Mindfulness-based cognitive therapy; MBCT-C mindfulness-based cognitive therapy for children; MBHPEduca mindfulness-based health program for educators; MBI mindfulness-based intervention; MBRT mindfulness-based resilience training; MBSR mindfulness-based stress reduction; MBSR-T mindfulness-based stress reduction for teens; MBT mindfulness-based training; MCAT mindful-compassion art-based therapy; MCI mild cognitive impairment; MEAL mindful eating and living; MIM mindfulness in motion; MMC mindful medicine curriculum; MMTP mindfulness with metta training; MS multiple sclerosis; MSC mindful self-compassion; MT mindfulness training; Neuro-Educa neuroscience for educators program; NS not stated; OM-K OpenMind-Korea; RAW Resilience@Work online mindfulness; RBI relaxation-based intervention; Sex SMART stress management and resiliency training for sexuality; SQ sitting quietly; TAM taming the adolescent mind; TAU

relaxation (*n* = 3), Acceptance and Commitment Therapy (ACT; *n* = 1), individual counselling (*n* = 1), adaptive dual n-back (*n* = 1), Healthy Living Program (HLP; *n* = 1), physical activity training (*n* = 1) and FRIENDS for Life program (FRIENDS; *n* = 1).

Outcome measures: Resilience was measured with the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003) in 26 studies. The Brief Resilience Scale (BRS; Smith et al., 2008) and Resilience Scale (RS; Wagnild & Young, 1993) were administered in 11 and 9 studies, respectively. The Resilience Quotient (RQ; Reivich & Shatté, 2002) featured in 2 studies, as did the Ego Resilience Scale (ER; Farkas & Orosz, 2015). Specific child and adolescent measures were administered in 3 studies: Resiliency Scales for Children and Adolescents (RSCA; Prince-Embury, 2006), Child and Youth Resilience Measure (CYRM; Liebenberg et al., 2013), and the Korean Personality Rating Scale for Children resilience subscale (KPRC; Cho et al., 2006). Single studies also featured the Brief Resilient Coping Scale (BRCS; Sinclair & Wallston, 2004), Dispositional Resilience Scale-15 (DRS-15; Bartone, 2007), Psychological Capital Questionnaire resilience subscale (PCQ; Luthans et al., 2004), and Social-Emotional Assets and Resilience Scales-Short Form (SEARS-SF; Merrell, 2011).

Risk of Bias in Studies

The findings from the risk of bias assessment of each included study are shown in Table 3.2. A low risk of bias arising from the randomisation process was identified in 15 trials; 35 raised some concerns, and 7 evidenced a high risk of bias. Implementation of protocol interventions yielded a low risk of bias for 43 trials, while some concerns were identified in 10, and the remaining 4 trials produced a high risk of bias due to deviations from intended interventions. Outcome data were available

Table 3.2

Risk of Bias in Studies

Study	Randomisation	Intervention	Outcome Data	Measurement	Selection	Study	Randomisation	Intervention	Outcome Data	Measurement	Selection
Aghaie et al., 2021	✗	?	✓	?	✓	Kor et al., 2019	✓	✓	?	?	?
Aikens et al., 2014	?	✓	✓	?	?	Kosugi et al., 2021	✓	✓	✓	?	✓
Azad et al., 2019	?	✓	✓	?	?	Laundy et al., 2021	✓	?	✗	?	?
Barry et al., 2019	?	✓	✗	?	?	Lebares et al., 2019	?	?	✓	?	✓
Bultas et al., 2021	?	✓	✗	?	?	Lemos et al., 2021	?	?	✗	?	?
Cejudo et al., 2019	?	✗	✗	?	?	Lin et al., 2019	?	✗	?	?	?
Champion et al., 2018	✗	✓	✓	?	✓	Liu et al., 2021	?	?	✓	?	?
Christopher et al., 2018	?	✓	✓	?	?	Moir et al., 2016	✓	✓	?	?	?
Cohen et al., 2021	✗	✓	✓	?	✓	Movassagh et al., 2019	?	✓	✓	?	?
Course-Choi et al., 2017	?	✓	✓	✓	?	Nadler et al., 2020	?	✓	?	?	?
Czerwinski et al., 2020	?	✓	?	?	?	Nielsen et al., 2021	?	✓	✗	?	?
Diachenko et al., 2021	✓	?	?	?	?	Perez-Blasco et al., 2016	?	?	?	?	?
Erogul et al., 2014	✓	?	✓	?	?	Pidgeon et al., 2013	?	✓	?	?	?
Felver et al., 2018	?	✓	✓	?	?	Polizzi et al., 2019	?	✓	✓	?	?
Fernández-Portero et al., 2021	?	✓	✓	✓	?	Rodrigues de Oliveira et al., 2021	✓	✗	✗	?	✓
Flett et al., 2019	?	✓	?	?	?	Rullo et al., 2021	✗	✓	✗	?	?
Flett et al., 2020	✗	✓	✓	?	✓	Schroeder et al., 2018	?	✓	?	?	?
Franco et al., 2020	✓	✓	?	?	?	Senders et al., 2019	✓	✓	✓	?	?
Gordon et al., 2021	✓	✓	✓	?	✓	Smith et al., 2018	✓	?	?	?	?
Hanna et al., 2018	?	✓	?	?	?	Solati, 2017	?	✓	✓	?	?
Ho et al., 2021	✓	✓	✓	?	✓	Tan et al., 2015	?	✓	?	?	?
Hosseinian et al., 2019	?	✓	✓	?	?	Volanen et al., 2020	?	✓	?	?	✓
Hwang et al., 2017	?	✓	✓	?	?	Wahbeh, 2018	?	✓	?	?	?
Joyce et al., 2019	✓	✓	?	?	✓	Wang et al., 2020	?	✓	✓	?	?
Juul et al., 2020	✗	✓	?	?	?	Wang et al., 2021	?	✓	✓	?	?
Juul et al., 2021	✓	✓	✓	?	?	Wells et al., 2013	?	✓	✓	?	?
Karbasizadeh, 2018	?	✓	✓	?	✗	Wright et al., 2019	✓	?	?	?	?
Kim et al., 2020	✗	✓	✓	?	?	Yuan, 2021	?	✗	?	?	?
Klatt et al., 2015	?	✓	✓	?	?						

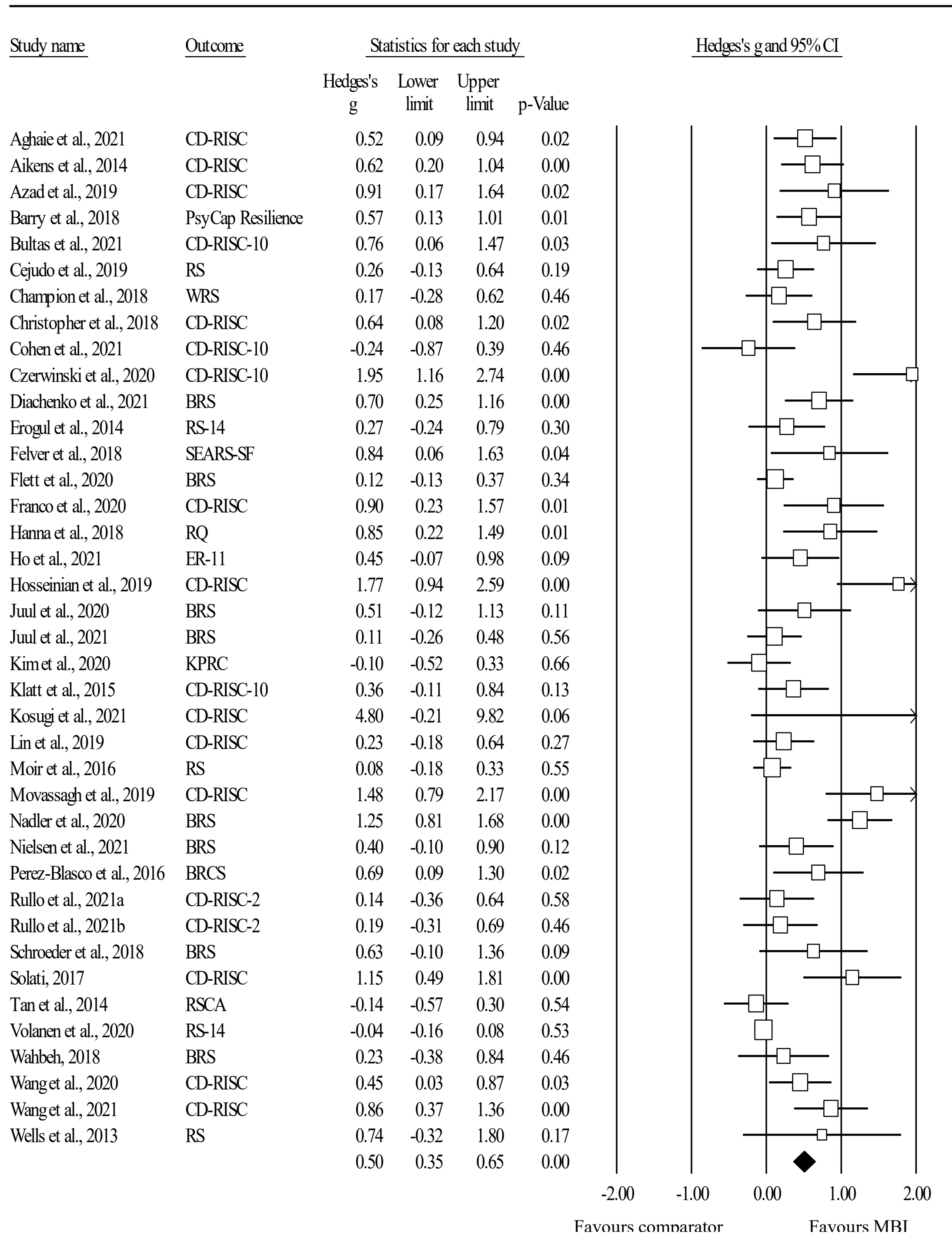
Note. ✓ Low risk; ? Some concerns; ✗ High risk.

for all, or nearly all, randomised participants in 29 trials, whereas missing data posed some concerns for 20 trials, and 8 displayed a high risk of attrition bias. Given the widespread use of self-report measures in trials with inactive control conditions, some concerns of performance bias were present for 55 trials; 2 trials evidenced a low risk of bias. Pre-registered protocols that specified the analysed outcomes were obtained for 11 trials; protocols were not available to determine risk of reporting bias for 45 trials, while a single trial displayed a high risk of reporting bias by presenting data from the CD-RISC as five factors, with mixed results, rather than a conventional total score.

Results of Syntheses

As shown in Figure 3.2, a random effects meta-analysis of 39 studies revealed that MBIs had a medium statistically significant effect on resilience relative to inactive control conditions, $g = 0.50$, $SE = 0.07$, 95% CI = 0.35, 0.65, $p < .01$. Heterogeneity analyses indicated a moderate degree of variability across studies, $Q = 144.37$, $p < .01$, $I^2 = 73.68$. Excluding two studies (Czerwinski et al., 2020; Hosseinian & Nooripour, 2019) with elevated standardised residuals had a negligible effect on this heterogeneity, $Q = 114.61$, $p < .01$, $I^2 = 68.59$. In comparison to active control conditions, however, a random effects meta-analysis of 10 studies indicated no statistically significant difference, $g = 0.22$, $SE = 0.13$, 95% CI = -0.04, 0.48, $p = .09$. Moderate heterogeneity observed in this analysis, $Q = 22.02$, $p = .01$, $I^2 = 59.12$, was removed by excluding one outlier (Rodrigues de Oliveira et al., 2021; $Q = 8.60$, $p = .38$, $I^2 = 6.99$), but the summary effect estimate remained non-significant, $g = 0.11$, $SE = 0.09$, 95% CI = -0.06, 0.28, $p = .19$. A random effects meta-analysis of six studies evaluating MBIs against comparison interventions also revealed no

statistically significant difference on resilience outcomes, g = 0.18, SE = 0.10, 95% CI = -0.01, 0.37, p = .07; Q = 7.16, p = .21, I^2 = 30.14.



Study name	Outcome	Hedges's g	Lower limit	Upper limit	p-Value
Aghaie et al., 2021	CD-RISC	0.52	0.09	0.94	0.02
Aikens et al., 2014	CD-RISC	0.62	0.20	1.04	0.00
Azad et al., 2019	CD-RISC	0.91	0.17	1.64	0.02
Barry et al., 2018	PsyCap Resilience	0.57	0.13	1.01	0.01
Bultas et al., 2021	CD-RISC-10	0.76	0.06	1.47	0.03
Cejudo et al., 2019	RS	0.26	-0.13	0.64	0.19
Champion et al., 2018	WRS	0.17	-0.28	0.62	0.46
Christopher et al., 2018	CD-RISC	0.64	0.08	1.20	0.02
Cohen et al., 2021	CD-RISC-10	-0.24	-0.87	0.39	0.46
Czerwinski et al., 2020	CD-RISC-10	1.95	1.16	2.74	0.00
Diachenko et al., 2021	BRS	0.70	0.25	1.16	0.00
Erogul et al., 2014	RS-14	0.27	-0.24	0.79	0.30
Felver et al., 2018	SEARS-SF	0.84	0.06	1.63	0.04
Flett et al., 2020	BRS	0.12	-0.13	0.37	0.34
Franco et al., 2020	CD-RISC	0.90	0.23	1.57	0.01
Hanna et al., 2018	RQ	0.85	0.22	1.49	0.01
Ho et al., 2021	ER-11	0.45	-0.07	0.98	0.09
Hosseinian et al., 2019	CD-RISC	1.77	0.94	2.59	0.00
Juul et al., 2020	BRS	0.51	-0.12	1.13	0.11
Juul et al., 2021	BRS	0.11	-0.26	0.48	0.56
Kim et al., 2020	KPRC	-0.10	-0.52	0.33	0.66
Klatt et al., 2015	CD-RISC-10	0.36	-0.11	0.84	0.13
Kosugi et al., 2021	CD-RISC	4.80	-0.21	9.82	0.06
Lin et al., 2019	CD-RISC	0.23	-0.18	0.64	0.27
Moir et al., 2016	RS	0.08	-0.18	0.33	0.55
Movassagh et al., 2019	CD-RISC	1.48	0.79	2.17	0.00
Nadler et al., 2020	BRS	1.25	0.81	1.68	0.00
Nielsen et al., 2021	BRS	0.40	-0.10	0.90	0.12
Perez-Blasco et al., 2016	BRCS	0.69	0.09	1.30	0.02
Rullo et al., 2021a	CD-RISC-2	0.14	-0.36	0.64	0.58
Rullo et al., 2021b	CD-RISC-2	0.19	-0.31	0.69	0.46
Schroeder et al., 2018	BRS	0.63	-0.10	1.36	0.09
Solati, 2017	CD-RISC	1.15	0.49	1.81	0.00
Tan et al., 2014	RSCA	-0.14	-0.57	0.30	0.54
Volanen et al., 2020	RS-14	-0.04	-0.16	0.08	0.53
Wahbeh, 2018	BRS	0.23	-0.38	0.84	0.46
Wang et al., 2020	CD-RISC	0.45	0.03	0.87	0.03
Wang et al., 2021	CD-RISC	0.86	0.37	1.36	0.00
Wells et al., 2013	RS	0.74	-0.32	1.80	0.17
		0.50	0.35	0.65	0.00

Figure 3.2. Forest plot depicting the individual and summary effect estimates of MBIs relative to inactive control conditions on resilience.

At follow-up, a random effects meta-analysis of 15 studies revealed MBIs had a medium statistically significant effect on resilience relative to inactive control conditions, $g = 0.71$, $SE = 0.15$, 95% CI = 0.41, 1.01, $p < .01$. A high degree of heterogeneity was observed across studies in this analysis, $Q = 107.99$, $p < .01$, $I^2 = 87.04$, and the exclusion of a study with an elevated standardised residual (Kosugi et al., 2021) had minimal effect on the heterogeneity, $Q = 91.23$, $p < .01$, $I^2 = 85.75$. Relative to active control conditions at follow-up, a random effects meta-analysis of seven studies showed that MBIs were superior in improving resilience outcomes with a small effect size, $g = 0.19$, $SE = 0.10$, 95% CI = 0.00, 0.38, $p = .05$. This analysis featured a low degree of heterogeneity, $Q = 6.11$, $p = .41$, $I^2 = 1.87$. Conversely, a random effects meta-analysis of three studies evaluating MBIs against comparison interventions revealed no statistically significant difference on resilience outcomes at follow-up, $g = 0.37$, $SE = 0.29$, 95% CI = -0.20, 0.94, $p = .20$; $Q = 7.31$, $p = .03$, $I^2 = 72.64$.

Meta-regression Analyses

Meta-regression analyses were conducted to explore potential moderators of the effects of MBIs on resilience. Analyses revealed that type of intervention (i.e., universal, indicated, or treatment), delivery mode (i.e., in-person or alternative modes), population (child and adolescent or adult), duration of intervention, or overall risk of bias did not explain a statistically significant proportion of the variance in the effects of MBIs on resilience ($p > .05$).

Risk of Bias across Studies

A funnel plot was generated to investigate potential publication bias across studies. As shown in Figure 3.3, the funnel plot evidenced asymmetry. Duval and Tweedie's (2000) Trim and Fill procedure was conducted to adjust for this asymmetry

and reduced the pooled effect estimate from g = 0.43, (95% CI = 0.31, 0.55) to g = 0.24 (95% CI = 0.11, 0.37).

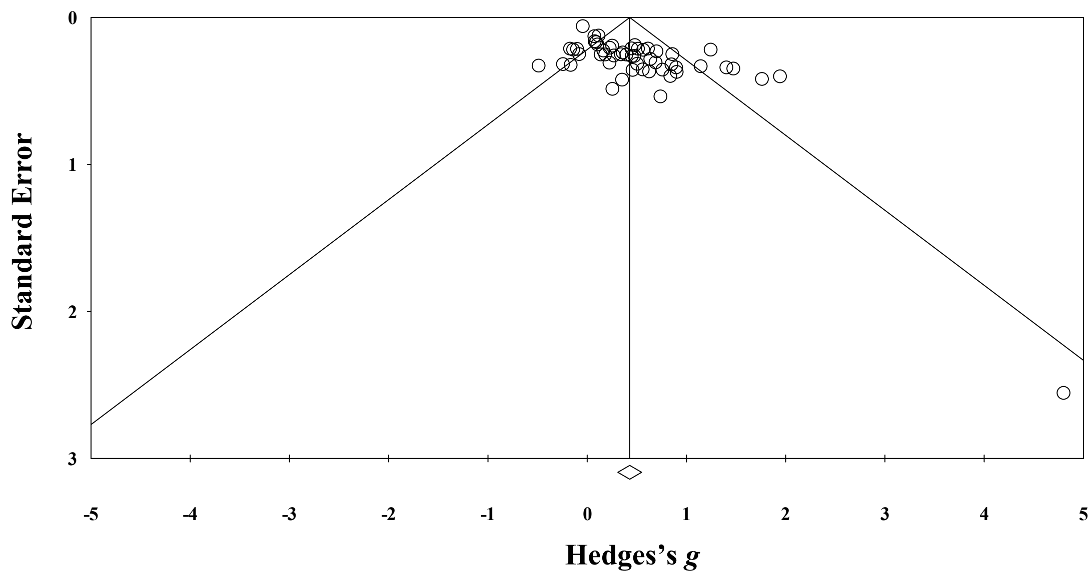


Figure 3.3. Funnel plot depicting MBI effect estimates from individual studies against their standard errors.

Discussion

This systematic review and meta-analysis aimed to determine the efficacy of MBIs in promoting resilience. Accordingly, 57 randomised controlled trials were selected for inclusion. Results indicated that MBIs were significantly more efficacious than inactive control conditions in promoting resilience at post-intervention and follow-up with medium effect sizes. MBIs were also found to significantly outperform active control conditions in promoting resilience with a small effect size at follow-up, but not at post-intervention. No statistically significant differences were observed relative to comparison interventions.

The findings revealed that MBIs yielded larger effect sizes relative to inactive control conditions (post-intervention g = 0.50; follow-up g = 0.71) than active control conditions (follow-up g = 0.19). This indicates that more rigorous trial designs evidence smaller effect sizes. This pattern is also reflected in the individual

interventional research synthesised in the analyses that featured multiple comparators. For example, Course-Choi et al. (2017) found that an MBI had a greater effect size relative to an active control condition (g = 0.46) than a comparison intervention (g = 0.21). Another noteworthy finding is that effect sizes at follow-up were greater than those at post-intervention. As such, this suggests that MBIs may have a *sleeper effect*, wherein the skills learned over the course of an intervention require time for generalisation, independent practice, and consolidation (Hermida et al., 2015). Consequently, such skills not only develop across time but also yield positive growth after the cessation of intervention sessions (Ehman & Gross, 2019; Lee et al., 2015). In accordance, this finding has been observed in previous randomised controlled trials of MBIs (Roche et al., 2019; Zelazo et al., 2018). The meta-analytic finding of no significant differences between MBIs and comparison interventions is disappointing given the particular emphasis placed by clinical texts and programmes on mindfulness as a means of increasing resilience (Ferreira et al., 2021; Greeson et al., 2014; Steinebach & Langer, 2019; Turow, 2017). Inferences from this finding, however, should be tempered on account of the small quantity of trials synthesised in the aforementioned meta-analyses (post-intervention n = 6; follow-up n = 3).

Similar to the current findings, a host of meta-analyses of resilience promotion interventions yielded small to medium statistically significant effects on outcome measures relative to control conditions (Joyce, Shand, Tighe et al., 2018; Leppin et al., 2014; Liu, Ein et al., 2021; Vanhove et al., 2016). Further in line with the current findings, the meta-analyses by Leppin et al. (2014) and Vanhove et al. (2016) revealed that trial designs with more rigorous comparators yielded smaller effect sizes for such interventions. In contrast to the current findings, the meta-analyses by Liu, Ein et al. (2021) and Vanhove et al. (2016) found that intervention delivery mode

moderated effects on outcome measures, such that in-person interventions demonstrated greater efficacy than alternative formats such as self-guided or computer-based interventions, respectively. Although an absence of evidence for moderation in the current review is not evidence that MBIs in alternative formats yield similar effects to in-person interventions, the small to medium pooled effects observed are consistent with those found in systematic reviews and meta-analyses of online and self-help MBIs for mental health outcomes (Cavanagh et al., 2014; Spijkerman et al., 2016). Likewise, the maintenance of effects observed at follow-up in the current study concurs with the results of a systematic review and meta-analysis of resilience promotion interventions by Joyce, Shand, Tighe et al. (2018), but conflicts with those of Vanhove et al. (2016).

The 57 included trials varied in risk of biasing estimates of the efficacy of MBIs in promoting resilience. The randomisation process in most trials raised some concerns (61%), mainly due to trial reports providing no information about allocation concealment. Conversely, the majority of trials evidenced low risk of deviating from their intended MBIs (75%). Mixed findings were observed across trials with respect to missingness in resilience outcomes, as approximately half of the included trials displayed a low risk of bias arising from missing data (51%). The vast majority of included trials, however, raised some concerns of performance bias (96%). Some concerns of reporting bias were also common, as trial protocols could not be found in most cases (79%). As a result, such sources of potential bias in the included trials must be considered when interpreting the findings of this systematic review.

An equally important consideration to potential bias in included trials is limitations in the systematic review process. Indeed, the search strategy in this systematic review was limited to trials published in peer-reviewed journals in the

English language – no grey literature or trials reported in other languages were included. Consequently, publication or language biases may have influenced the findings of this systematic review, as trials with positive findings have a greater likelihood of both being submitted and accepted for publication in English language peer-reviewed journals (Sterne et al., 2011). As trials with small sample sizes typically exhibit more variance in estimates of intervention efficacy (Field & Gillett, 2010), the disproportionate number of small trials with effect size estimates greater than the pooled effect in this systematic review was indicative of publication bias. Moreover, adjustment for this potential bias markedly decreased the pooled effect estimate. In line with this finding, a review of the MBI literature by Coronado-Montoya et al. (2016) also found evidence of potential publication bias. A further limitation of this systematic review is the heterogeneity in resilience outcome measures and populations included. However, this heterogeneity likely mirrors the scope of MBIs for promoting resilience and was accounted for through the use of random effects models.

With the limitations of the systematic review process in mind, the current findings have implications for clinical practice and future research. The findings indicate that MBIs are efficacious in promoting resilience across a range of populations with small to medium sized effects. In addition, analyses revealed that such effects were not moderated by intervention type. Consequently, MBIs may represent a viable approach for promoting resilience across the general population (i.e., universal intervention), those with an elevated risk of developing a mental health difficulty (i.e., indicated intervention), and those diagnosed with such a difficulty (i.e., treatment intervention). However, additional research employing equivalence designs is necessary to support this assertion. Future research should also evaluate the distal

effects of MBIs relative to comparison resilience promotion interventions in order to address the paucity of such research evidenced in this systematic review. Similarly, given the small number of trials evaluating MBIs for promoting resilience in child and adolescent populations (n = 9), future studies should resolve this dearth of research with sufficiently powered trials that minimise the potential sources of bias identified in the included studies. Indeed, three of the included studies that sampled from child and adolescent populations displayed promising findings (Felver et al., 2018; Hosseinian & Nooripour, 2019; Laundy et al., 2021).

In conclusion, this systematic review and meta-analysis revealed that MBIs are efficacious in promoting resilience, but are not superior to comparison interventions. Findings also indicated that MBIs may have a *sleeper effect* on resilience. However, the potential influence of risk of bias in the included studies and limitations of the systematic review process on these findings should be carefully considered. Future research should evaluate the efficacy of such interventions for underrepresented populations and elucidate their distal effects relative to comparison interventions. This research will help to harness the potential of mindfulness for the promotion of psychological resilience.

References

Aghaie, N., SeyedAlinaghi, S., Montazeri, A., & Behboodi Moghadam, Z. (2021). Effectiveness of mindfulness-based stress reduction training on resilience in Iranian HIV-positive women: A clinical trial. *HIV & AIDS Review*, *20*(3), 195-200. https://doi.org/10.5114/hivar.2021.108834

Aikens, K. A., Astin, J., Pelletier, K. R., Levanovich, K., Baase, C. M., Park, Y. Y., & Bodnar, C. M. (2014). Mindfulness goes to work: Impact of an online workplace intervention. *J Occup Environ Med*, *56*(7), 721-731. https://doi.org/10.1097/JOM.0000000000000209

Azad, E., & Ahmadi, T. (2019). Effect of mindfulness-based training on quality of life and resilience of chemical warfare disabled veterans in Sardasht, Iran. *Neuropsychiatria i Neuropsychologia*, *14*(3-4), 49-54. https://doi.org/10.5114/nan.2019.89786

Bajaj, B., & Pande, N. (2016). Mediating role of resilience in the impact of mindfulness on life satisfaction and affect as indices of subjective well-being. *Personality and Individual Differences*, 93, 63–67. https://doi.org/10.1016/j.paid.2015.09.005

Barry, K. M., Woods, M., Martin, A., Stirling, C., & Warnecke, E. (2019). A randomized controlled trial of the effects of mindfulness practice on doctoral candidate psychological status. *J Am Coll Health*, *67*(4), 299-307. https://doi.org/10.1080/07448481.2018.1515760

Bartone, P. T. (2007). Test-retest reliability of the dispositional resilience scale-15, a brief hardiness scale. *Psychol Rep*, *101*(3 Pt 1), 943-944. https://doi.org/10.2466/pr0.101.3.943-944

Bitsika, V., Sharpley, C., & Bell, R. (2013). The Buffering effect of resilience upon stress, anxiety and depression in parents of a child with an autism spectrum disorder. *Journal of Developmental and Physical Disabilities*, *25*(5), 533–543. https://doi:10.1007/s10882-013-9333-5

Blundell, M. (2014). Understanding and synthesizing my numerical data. In A. Boland, M. G. Cherry, & R. Dickson (Eds.), *Doing a systematic review* (pp. 99-123). London, England: Sage.

Bolsinger, J., Seifritz, E., Kleim, B., & Manoliu, A. (2018). Neuroimaging correlates of resilience to traumatic events—A comprehensive review. *Frontiers in Psychiatry*, *9*. https://doi.org/10.3389/fpsyt.2018.00693

Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist*, *59*(1), 20-28. https://doi.org/10.1037/0003-066x.59.1.20

Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. R. (2009). Effect sizes based on means. In *Introduction to meta-analysis* (pp. 21-32). Chichester, United Kingdom: John Wiley & Sons, Ltd.

Bowen, S., Chawla, N., & Marlatt, G. A. (2011). *Mindfulness-based relapse prevention for addictive behaviors: A clinician's guide*. Guilford Press.

British Psychological Society. (2019). *Briefing paper: Resilience and character*. Retrieved from https://www.bps.org.uk/news-and-policy/briefing-paper-resilience-and-character

Bultas, M. W., Boyd, E., & McGroarty, C. (2021). Evaluation of a brief mindfulness intervention on examination anxiety and stress. *J Nurs Educ*, *60*(11), 625-628. https://doi.org/10.3928/01484834-20210913-04

Calvo, V., D'Aquila, C., Rocco, D., & Carraro, E. (2020). Attachment and well-being: Mediatory roles of mindfulness, psychological inflexibility, and resilience. *Current Psychology*, 1–14. https://doi.org/10.1007/s12144-020-00820-2

Cavanagh, K., Strauss, C., Forder, L., & Jones, F. (2014). Can mindfulness and acceptance be learnt by self-help? A systematic review and meta-analysis of mindfulness and acceptance-based self-help interventions. *Clinical Psychology Review*, *34*(2), 118–129. https://doi:10.1016/j.cpr.2014.01.001

Cejudo, J., Garcia-Castillo, F. J., Luna, P., Rodrigo-Ruiz, D., Feltrero, R., & Moreno-Gomez, A. (2019). Using a mindfulness-based intervention to promote subjective well-being, trait emotional intelligence, mental health, and resilience in women with fibromyalgia. *Front Psychol*, *10*, 2541. https://doi.org/10.3389/fpsyg.2019.02541

Chamberlain, D., Williams, A., Stanley, D., Mellor, P., Cross, W., & Siegloff, L. (2016). Dispositional mindfulness and employment status as predictors of resilience in third year nursing students: A quantitative study. *Nursing Open*, 3(4), 212–221. https://doi.org/10.1002/nop2.56

Champion, L., Economides, M., & Chandler, C. (2018). The efficacy of a brief app-based mindfulness intervention on psychosocial outcomes in healthy adults: A pilot randomised controlled trial. *PLoS One*, *13*(12), e0209482. https://doi.org/10.1371/journal.pone.0209482

Cheung, S., Xie, X., & Huang, C. (2020). Mind over matter: Mindfulness, income, resilience, and life quality of vocational high school students in China. *International Journal of Environmental Research and Public Health*, 17(16), 5701. https://doi.org/10.3390/ijerph17165701

Chi, X., Bo, A., Liu, T., Zhang, P., & Chi, I. (2018). Effects of mindfulness-based stress reduction on depression in adolescents and young adults: A systematic review and meta-analysis. *Frontiers in Psychology, 9*, 1034. https://doi:10.3389/fpsyg.2018.01034

Chiesa, A. (2013). The difficulty of defining mindfulness: Current thought and critical issues. *Mindfulness*, *4*, 255-268. https://doi.org/10.1007/s12671-012-0123-4

Chiesa, A., Fazia, T., Bernardinelli, L., & Morandi, G. (2017). Citation patterns and trends of systematic reviews about mindfulness. *Complementary Therapies in Clinical Practice*, 28(J. Psychosom. Res.762014), 26–37. https://doi.org/10.1016/j.ctcp.2017.04.006

Cho, S. M., Park, H. Y., Kim, J. H., Hong, C. H., & Hwang, S. T. (2006). A standardization study of the Korean personality rating scale for children (KPRC). *Korean Journal of Clinical Psychology*, *25*(3), 825-848. http://repository.ajou.ac.kr/handle/201003/6237

Christensen, H., Reynolds, C. F., & Cuijpers, P. (2017). Protecting youth mental health, protecting our future. *World Psychiatry*, *16*(3), 327-328. https://doi.org/10.1002/wps.20437

Christopher, M. S., Goerling, R. J., Rogers, B. S., Hunsinger, M., Baron, G., Bergman, A. L., & Zava, D. T. (2016). A pilot study evaluating the effectiveness of a mindfulness-based intervention on cortisol awakening response and health outcomes among law enforcement officers. *Journal of Police and Criminal Psychology*, *31*(1), 15-28. https://doi.org/10.1007/s11896-015-9161-x

Christopher, M. S., Hunsinger, M., Goerling, L. R. J., Bowen, S., Rogers, B. S., Gross, C. R., Dapolonia, E., & Pruessner, J. C. (2018). Mindfulness-based

resilience training to reduce health risk, stress reactivity, and aggression among law enforcement officers: A feasibility and preliminary efficacy trial. *Psychiatry Res*, *264*, 104-115. https://doi.org/10.1016/j.psychres.2018.03.059

Clukay, C., Dajani, R., Hadfield, K., Quinlan, J., Panter-Brick, C., & Mulligan, C. (2019). Association of MAOA genetic variants and resilience with psychosocial stress: A longitudinal study of Syrian refugees. *PLOS ONE*, *14*(7), e0219385. https://doi:10.1371/journal.pone.0219385

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New Jersey, NJ: Lawrence Erlbaum.

Cohen, Z. P., Cosgrove, K. T., Akeman, E., Coffey, S., Teague, K., Hays-Grudo, J., Paulus, M., Aupperle, R., & Kirlic, N. (2021). The effect of a mindfulness-based stress intervention on neurobiological and symptom measures in adolescents with early life stress: A randomized feasibility study. *BMC Complement Med Ther*, *21*(1), 123. https://doi.org/10.1186/s12906-021-03295-1

Connor, K. M., & Davidson, J. R. (2003). Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). *Depress Anxiety*, *18*(2), 76-82. https://doi.org/10.1002/da.10113

Coronado-Montoya, S., Levis, A. W., Kwakkenbos, L., Steele, R. J., Turner, E. H., & Thombs, B. D. (2016). Reporting of positive results in randomized controlled trials of mindfulness-based mental health interventions. *PLOS ONE*, *11*(4), e0153220. https://doi.org/10.1371/journal.pone.0153220

Course-Choi, J., Saville, H., & Derakshan, N. (2017). The effects of adaptive working memory training and mindfulness meditation training on processing efficiency and worry in high worriers. *Behav Res Ther*, *89*, 1-13.

https://doi.org/10.1016/j.brat.2016.11.002

Czeisler, M. É., Lane, R. I., Petrosky, E., Wiley, J. F., Christensen, A., Njai, R., Weaver, M. D., Robbins, R., Facer-Childs, E. R., Barger, L. K., Czeisler, C. A., Howard, M. E., & Rajaratnam, S. M. (2020). Mental health, substance use, and suicidal ideation during the COVID-19 pandemic — United States, June 24–30, 2020. *Morbidity and Mortality Weekly Report*, *69*(32), 1049-1057. https://doi.org/10.15585/mmwr.mm6932a1

Czerwinski, N., Egan, H., Cook, A., & Mantzios, M. (2020). Teachers and mindful colouring to tackle burnout and increase mindfulness, resiliency and wellbeing. *Contemporary School Psychology*, *25*(4), 535-545. https://doi.org/10.1007/s40688-020-00279-9

Dawson, A. F., Brown, W. W., Anderson, J., Datta, B., Donald, J. N., Hong, K., Allan, S., Mole, T. B., Jones, P. B., & Galante, J. (2020). Mindfulness-based interventions for university students: A systematic review and meta-analysis of randomised controlled trials. *Appl Psychol Health Well Being*, *12*(2), 384-410. https://doi.org/10.1111/aphw.12188

Diachenko, M., Smith, K. K., Fjorback, L., Hansen, N. V., Linkenkaer-Hansen, K., & Pallesen, K. J. (2021). Pre-retirement employees experience lasting improvements in resilience and well-being after mindfulness-based stress reduction. *Front Psychol*, *12*, 699088. https://doi.org/10.3389/fpsyg.2021.699088

Dray, J., Bowman, J., Campbell, E., Freund, M., Wolfenden, L., Hodder, R. K., McElwaine, K., Tremain, D., Bartlem, K., Bailey, J., Small, T., Palazzi, K., Oldmeadow, C., & Wiggers, J. (2017). Systematic review of universal resilience-focused interventions targeting child and adolescent mental health

in the school setting. *Journal of the American Academy of Child & Adolescent Psychiatry*, *56*(10), 813-824. https://doi.org/10.1016/j.jaac.2017.07.780

Duval, S., & Tweedie, R. (2000). Trim and fill: A simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics*, *56*(2), 455-463. https://doi:10.1111/j.0006-341X.2000.00455.x

Edwards, K., Alschuler, K., Ehde, D., Battalio, S., & Jensen, M. (2017). Changes in resilience predict function in adults with physical disabilities: A longitudinal study. *Archives of Physical Medicine and Rehabilitation*, *98*(2), 329–336. https://doi:10.1016/j.apmr.2016.09.123

Ehman, A. C., & Gross, A. M. (2019). Acceptance and commitment therapy and motivational interviewing in the treatment of alcohol use disorder in a college woman: A case study. *Clinical Case Studies*, *18*(1), 36-53. https://doi.org/10.1177/1534650118804886

Erogul, M., Singer, G., McIntyre, T., & Stefanov, D. G. (2014). Abridged mindfulness intervention to support wellness in first-year medical students. *Teach Learn Med*, *26*(4), 350-356. https://doi.org/10.1080/10401334.2014.945025

Farkas, D., & Orosz, G. (2015). Ego-resiliency reloaded: A three-component model of general resiliency. *PLoS One*, *10*(3), e0120883. https://doi.org/10.1371/journal.pone.0120883

Felver, J. C., Clawson, A. J., Morton, M. L., Brier-Kennedy, E., Janack, P., & DiFlorio, R. A. (2018). School-based mindfulness intervention supports adolescent resiliency: A randomized controlled pilot study. *International Journal of School & Educational Psychology*, *7*(sup1), 111-122. https://doi.org/10.1080/21683603.2018.1461722

Fenwick-Smith, A., Dahlberg, E. E., & Thompson, S. C. (2018). Systematic review of resilience-enhancing, universal, primary school-based mental health promotion programs. *BMC Psychol*, *6*(1), 30. https://doi.org/10.1186/s40359-018-0242-3

Fernández-Portero, C., Alarcon, D., Gallardo-Flores, A., Amian, J. G., & Sanchez-Medina, J. A. (2021). Effectiveness of a mindfulness-based intervention program for women family caregivers of older adults. *Healthcare (Basel)*, *9*(9). https://doi.org/10.3390/healthcare9091216

Ferreira, M., Marques, A., & Gomes, P. V. (2021). Individual resilience interventions: A systematic review in adult population samples over the last decade. *Int J Environ Res Public Health*, *18*(14). https://doi.org/10.3390/ijerph18147564

Field, A. P., & Gillett, R. (2010). How to do a meta-analysis. *British Journal of Mathematical and Statistical Psychology*, *63*(3), 665-694. https://doi:10.1348/000711010X502733

Flett, J. A. M., Conner, T. S., Riordan, B. C., Patterson, T., & Hayne, H. (2020). App-based mindfulness meditation for psychological distress and adjustment to college in incoming university students: A pragmatic, randomised, waitlist-controlled trial. *Psychol Health*, *35*(9), 1049-1074. https://doi.org/10.1080/08870446.2019.1711089

Flett, J. A. M., Hayne, H., Riordan, B. C., Thompson, L. M., & Conner, T. S. (2019). Mobile mindfulness meditation: A randomised controlled trial of the effect of two popular apps on mental health. *Mindfulness*, *10*(5), 863-876. https://doi.org/10.1007/s12671-018-1050-9

Fox, S., Lydon, S., Byrne, D., Madden, C., Connolly, F., & O'Connor, P. (2018). A systematic review of interventions to foster physician resilience. *Postgraduate*

Medical Journal, *94*(1109), 162-170. https://doi.org/10.1136/postgradmedj-2017-135212

Franco, C., Amutio, A., Mañas, I., Sánchez-Sánchez, L. C., & Mateos-Pérez, E. (2020). Improving psychosocial functioning in mastectomized women through a mindfulness-based program: Flow meditation. *International Journal of Stress Management*, *27*(1), 74-81. https://doi.org/10.1037/str0000120

Friborg, O., Hjemdal, O., Rosenvinge, J. H., & Martinussen, M. (2003). A new rating scale for adult resilience: What are the central protective resources behind healthy adjustment? *Int J Methods Psychiatr Res*, *12*(2), 65-76. https://doi.org/10.1002/mpr.143

Fusar-Poli, P., Correll, C. U., Arango, C., Berk, M., Patel, V., & Ioannidis, J. P. (2021). Preventive psychiatry: A blueprint for improving the mental health of young people. *World Psychiatry*, *20*(2), 200-221. https://doi.org/10.1002/wps.20869

Gilbert, P., & Choden, P. (2013). *Mindful compassion: Using the power of mindfulness and compassion to transform our lives* (1st ed.). Robinson.

Gordon, J. L., Halleran, M., Beshai, S., Eisenlohr-Moul, T. A., Frederick, J., & Campbell, T. S. (2021). Endocrine and psychosocial moderators of mindfulness-based stress reduction for the prevention of perimenopausal depressive symptoms: A randomized controlled trial. *Psychoneuroendocrinology*, *130*, 105277. https://doi.org/10.1016/j.psyneuen.2021.105277

Greeson, J., Garland, E. L., & Black, D. (2014). Mindfulness: A transtherapeutic approach for transdiagnostic mental processes. In A. Ie, C. T. Ngnoumen, &

E. J. Langer (Eds.), *The Wiley Blackwell handbook of mindfulness* (pp. 533-562). John Wiley & Sons.

Grist, R., & Cavanagh, K. (2013). Computerised cognitive behavioural therapy for common mental health disorders, what works, for whom under what circumstances? A systematic review and meta-analysis. *Journal of Contemporary Psychotherapy*, 43(4), 243–251. http://dx.doi.org/10.1007/s10879-013-9243-y

Grossman, P. (2019). On the porosity of subject and object in "mindfulness" scientific study: Challenges to "scientific" construction, operationalization and measurement of mindfulness. *Current Opinion in Psychology*, 28, 102–107. https://doi.org/10.1016/j.copsyc.2018.11.008

Hanna, A., & M. Pidgeon, A. (2018). Leveraging mindfulness to build resilience and professional quality of life in human service professionals. *OBM Integrative and Complementary Medicine*, *3*(2), 1-1. https://doi.org/10.21926/obm.icm.1802007

Hart, A., Gagnon, E., Eryigit-Madzwamuse, S., Cameron, J., Aranda, K., Rathbone, A., & Heaver, B. (2016). Uniting resilience research and practice with an inequalities approach. *SAGE Open*, *6*(4), 215824401668247. https://doi:10.1177/2158244016682477

Hermida, M., Segretin, M., Prats, L., Fracchia, C., Colombo, J., & Lipina, S. (2015). Cognitive neuroscience, developmental psychology, and education: Interdisciplinary development of an intervention for low socioeconomic status kindergarten children. *Trends in Neuroscience and Education*, *4*(1-2), 15-25. https://doi.org/10.1016/j.tine.2015.03.003

Higgins, J. P., Altman, D. G., & Sterne, J. A. (2011). Assessing risk of bias in included studies. In J. P. Higgins & S. Green (Eds.), *Cochrane handbook for systematic reviews of interventions version 5.1.0*. Retrieved from www.cochrane-handbook.org

Ho, A. H. Y., Tan-Ho, G., Ngo, T. A., Ong, G., Chong, P. H., Dignadice, D., & Potash, J. (2021). A novel mindful-compassion art-based therapy for reducing burnout and promoting resilience among healthcare workers: Findings from a waitlist randomized control trial. *Front Psychol*, *12*, 744443. https://doi.org/10.3389/fpsyg.2021.744443

Hofmann, S., Sawyer, A., Witt, A., & Oh, D. (2010). The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of Consulting and Clinical Psychology, 78*(2), 169–183. https://doi:10.1037/a0018555

Hosseinian, S., & Nooripour, R. (2019). Effectiveness of mindfulness-based intervention on risky behaviors, resilience, and distress tolerance in adolescents. *International Journal of High Risk Behaviors and Addiction*, *8*(4). https://doi.org/10.5812/ijhrba.93481

Hourani, L., Bender, R., Weimer, B., Peeler, R., Bradshaw, M., Lane, M., & Larson, G. (2012). Longitudinal study of resilience and mental health in marines leaving military service. *Journal of Affective Disorders*, *139*(2), 154–165. https://doi:10.1016/j.jad.2012.01.008

Hwang, W. J., Lee, T. Y., Lim, K. O., Bae, D., Kwak, S., Park, H. Y., & Kwon, J. S. (2017). The effects of four days of intensive mindfulness meditation training (Templestay program) on resilience to stress: A randomized controlled trial. *Psychol Health Med*, *23*(5), 497-504.

https://doi.org/10.1080/13548506.2017.1363400

Janas, M. (2002). Build resiliency. *Intervention in School and Clinic*, *38*(2), 117-121. https://doi.org/10.1177/105345120203800208010

Joyce, S., Shand, F., Lal, T. J., Mott, B., Bryant, R. A., & Harvey, S. B. (2019). Resilience@Work mindfulness program: Results from a cluster randomized controlled trial with first responders. *J Med Internet Res*, *21*(2), e12894. https://doi.org/10.2196/12894

Joyce, S., Shand, F., Tighe, J., Laurent, S. J., Bryant, R. A., & Harvey, S. B. (2018). Road to resilience: A systematic review and meta-analysis of resilience training programmes and interventions. *BMJ Open*, *8*(6), e017858. https://doi.org/10.1136/bmjopen-2017-017858

Juul, L., Brorsen, E., Gotzsche, K., Nielsen, B. L., & Fjorback, L. O. (2021). The effects of a mindfulness program on mental health in students at an undergraduate program for teacher education: A randomized controlled trial in real-life. *Front Psychol*, *12*, 722771. https://doi.org/10.3389/fpsyg.2021.722771

Juul, L., Pallesen, K. J., Bjerggaard, M., Nielsen, C., & Fjorback, L. O. (2020). A pilot randomised trial comparing a mindfulness-based stress reduction course, a locally-developed stress reduction intervention and a waiting list control group in a real-life municipal health care setting. *BMC Public Health*, *20*(1), 409. https://doi.org/10.1186/s12889-020-08470-6

Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain and illness*. Random House Publishing Group.

Karbasizadeh, F. (2018). The effectiveness of mindfulness-based cognitive therapy on increasing the resilience dimensions of women aged 20–40 in Isfahan City in

2016. *Asian Journal of Pharmaceutics*, *12*(2), S766. https://www.asiapharmaceutics.info/index.php/ajp/article/viewFile/2490/960

Keye, M. D., & Pidgeon, A. M. (2013). Investigation of the relationship between resilience, mindfulness, and academic self-efficacy. *Open Journal of Social Sciences*, 01(06), 1–4. https://doi.org/10.4236/jss.2013.16001

Kim, E., Jackman, M. M., Jo, S.-H., Oh, J., Ko, S.-Y., McPherson, C. L., & Singh, N. N. (2020). Effectiveness of the mindfulness-based OpenMind-Korea (OM-K) preschool program. *Mindfulness*, *11*(4), 1062-1072. https://doi.org/10.1007/s12671-020-01337-2

Klatt, M., Steinberg, B., & Duchemin, A. M. (2015). Mindfulness in motion (MIM): An onsite mindfulness based intervention (MBI) for chronically high stress work environments to increase resiliency and work engagement. *J Vis Exp,* (101), e52359. https://doi.org/10.3791/52359

Kor, P. P. K., Liu, J. Y. W., & Chien, W. T. (2019). Effects of a modified mindfulness-based cognitive therapy for family caregivers of people with dementia: A pilot randomized controlled trial. *Int J Nurs Stud*, *98*, 107-117. https://doi.org/10.1016/j.ijnurstu.2019.02.020

Kosugi, T., Ninomiya, A., Nagaoka, M., Hashimoto, Z., Sawada, K., Park, S., Fujisawa, D., Mimura, M., & Sado, M. (2021). Effectiveness of mindfulness-based cognitive therapy for improving subjective and eudaimonic well-being in healthy individuals: A randomized controlled trial. *Front Psychol*, *12*, 700916. https://doi.org/10.3389/fpsyg.2021.700916

Kukihara, H., Yamawaki, N., Uchiyama, K., Arai, S., & Horikawa, E. (2014). Trauma, depression, and resilience of earthquake/tsunami/nuclear disaster

survivors of Hirono, Fukushima, Japan. *Psychiatry and Clinical Neurosciences*, *68*(7), 524–533. https://doi:10.1111/pcn.12159

Kuyken, W., Warren, F., Taylor, R., Whalley, B., Crane, C., Bondolfi, G., Hayes, R., Huijbers, M., Ma, H., Schweizer, S., Segal, Z., Speckens, A., Teasdale, J. D., Van Heeringen, K., Williams, M., Byford, S., Byng, R., & Dalgleish, T. (2016). Efficacy of mindfulness-based cognitive therapy in prevention of depressive relapse: An individual patient data meta-analysis from randomized trials. *JAMA Psychiatry, 73*(6), 565. https://doi:10.1001/jamapsychiatry.2016.0076

Laundy, K., Friberg, P., Osika, W., & Chen, Y. (2021). Mindfulness-based intervention for children with mental health problems: A 2-Year follow-up randomized controlled study. *Mindfulness*, *12*(12), 3073-3085. https://doi.org/10.1007/s12671-021-01771-w

Lebares, C. C., Guvva, E. V., Olaru, M., Sugrue, L. P., Staffaroni, A. M., Delucchi, K. L., Kramer, J. H., Ascher, N. L., & Harris, H. W. (2019). Efficacy of mindfulness-based cognitive training in surgery: Additional analysis of the mindful surgeon pilot randomized clinical trial. *JAMA Netw Open*, *2*(5), e194108. https://doi.org/10.1001/jamanetworkopen.2019.4108

Lee, E. B., An, W., Levin, M. E., & Twohig, M. P. (2015). An initial meta-analysis of acceptance and commitment therapy for treating substance use disorders. *Drug Alcohol Depend*, *155*, 1-7. https://doi.org/10.1016/j.drugalcdep.2015.08.004

Lee, H.-S., Brown, S., Mitchell, M., & Schiraldi, G. (2008). Correlates of resilience in the face of adversity for Korean women immigrating to the US. *Journal of Immigrant and Minority Health*, *10*(5), 415–422. https://doi:10.1007/s10903-007-9104-4

Lemos, I. S., Carvalho, J. V. S. d., Mendes, M. T. G., & Brys, I. (2021). Mindfulness and relaxation: The effects of a program with university hospital workers. *Estudos de Psicologia (Campinas)*, *38*. https://doi.org/10.1590/1982-0275202138e190128

Lenz, A., Hall, J., & Smith, L. (2016). Meta-analysis of group mindfulness-based cognitive therapy for decreasing symptoms of acute depression. *The Journal for Specialists in Group Work, 41*(1), 44–70. https://doi:10.1080/01933922.2015.1111488

Leppin, A. L., Bora, P. R., Tilburt, J. C., Gionfriddo, M. R., Zeballos-Palacios, C., Dulohery, M. M., Sood, A., Erwin, P. J., Brito, J. P., Boehmer, K. R., & Montori, V. M. (2014). The efficacy of resiliency training programs: A systematic review and meta-analysis of randomized trials. *PLoS One*, *9*(10), e111420. https://doi.org/10.1371/journal.pone.0111420

Liebenberg, L., Ungar, M., & LeBlanc, J. C. (2013). The CYRM-12: A brief measure of resilience. *Can J Public Health*, *104*(2), e131-135. https://www.ncbi.nlm.nih.gov/pubmed/23618205

Lin, L., He, G., Yan, J., Gu, C., & Xie, J. (2019). The effects of a modified mindfulness-based stress reduction program for nurses: A randomized controlled trial. *Workplace Health Saf*, *67*(3), 111-122. https://doi.org/10.1177/2165079918801633

Liu, F., Zhang, Z., Liu, S., & Zhang, N. (2021). Examining the effects of brief mindfulness training on athletes' flow: The mediating role of resilience. *Evid Based Complement Alternat Med*, *2021*, 6633658. https://doi.org/10.1155/2021/6633658

Liu, J.-C., Chang, L.-Y., Wu, S.-Y., & Tsai, P.-S. (2015). Resilience mediates the

relationship between depression and psychological health status in patients with heart failure: A cross-sectional study. *International Journal of Nursing Studies*, *52*(12), 1846–1853. https://doi:10.1016/j.ijnurstu.2015.07.005

Liu, J. J. W., Ein, N., Gervasio, J., Battaion, M., & Fung, K. (2021). The pursuit of resilience: A meta-analysis and systematic review of resilience-promoting interventions. *Journal of Happiness Studies*. https://doi.org/10.1007/s10902-021-00452-8

Lomas, T., Medina, J., Ivtzan, I., Rupprecht, S., & Eiroa-Orosa, F. (2018). Mindfulness-based interventions in the workplace: An inclusive systematic review and meta-analysis of their impact upon wellbeing. *The Journal of Positive Psychology, 14*(5), 1–16. https://doi:10.1080/17439760.2018.1519588

Lomas, T., Medina, J., Ivtzan, I., Rupprecht, S., & Eiroa-Orosa, F. (2019). A systematic review and meta-analysis of the impact of mindfulness-based interventions on the well-being of healthcare professionals. *Mindfulness, 10*(7), 1193–1216. https://doi:10.1007/s12671-018-1062- 5

Low, R., King, S., & Foster-Boucher, C. (2019). Learning to bounce back: A scoping review about resiliency education. *Journal of Nursing Education*, *58*(6), 321-329. https://doi.org/10.3928/01484834-20190521-02

Luthans, F., Luthans, K. W., & Luthans, B. C. (2004). Positive psychological capital: Beyond human and social capital. *Business Horizons*, *47*(1), 45-50. https://doi.org/10.1016/j.bushor.2003.11.007

McConville, J., McAleer, R., & Hahne, A. (2017). Mindfulness training for health profession students—The effect of mindfulness training on psychological well-being, learning and clinical performance of health professional students:

A systematic review of randomized and non-randomized controlled trials. *EXPLORE: The Journal of Science and Healing*, *13*(1), 26–45. https://doi:10.1016/j.explore.2016.10.002

Merrell, K. W. (2011). *Social emotional assets and resilience scales (SEARS): Professional manual*. Psychological Assessment Resources.

Moir, F., Henning, M., Hassed, C., Moyes, S. A., & Elley, C. R. (2016). A peer-support and mindfulness program to improve the mental health of medical students. *Teach Learn Med*, *28*(3), 293-302. https://doi.org/10.1080/10401334.2016.1153475

Movassagh, M. T., Arshadi, N., Bassaknejad, S., & Beshlideh, K. (2019). The effect of mindfulness in motion-based trainings on resiliency, emotion regulation, and job stress. *Journal of Occupational Health and Epidemiology*, *8*(1), 49-55. https://doi.org/10.29252/johe.8.1.49

Nadler, R., Carswell, J. J., & Minda, J. P. (2020). Online mindfulness training increases well-being, trait emotional intelligence, and workplace competency ratings: A randomized waitlist-controlled trial. *Front Psychol*, *11*, 255. https://doi.org/10.3389/fpsyg.2020.00255

Nielsen, E. G., & Minda, J. P. (2021). The mindful lawyer: Investigating the effects of two online mindfulness programs on self-reported well-being in the legal profession. *J Occup Environ Med*, *63*(12), e871-e882. https://doi.org/10.1097/JOM.0000000000002393

Nilsson, H., & Kazemi, A. (2016). Reconciling and thematizing definitions of mindfulness: The big five of mindfulness. *Review of general psychology*, *20*(2), 183-193. https://doi.org/10.1037/gpr0000074

O’Connor, M., Munnelly, A., Whelan, R., & McHugh, L. (2018). The Efficacy and acceptability of third-wave behavioral and cognitive ehealth treatments: A systematic review and meta-analysis of randomized controlled trials. *Behavior therapy*, *49*(3), 459–475. https://doi:10.1016/j.beth.2017.07.007

O'Connor, M., O'Reilly, G., Murphy, E., Connaughton, L., Hoctor, E., & McHugh, L. (2021). Resilience mediates the cross-sectional relationship between mindfulness and positive mental health in early adolescence. *Journal of Contextual Behavioral Science*, *21*, 171-175. https://doi.org/10.1016/j.jcbs.2021.07.003

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, *372*, n71. https://doi.org/10.1136/bmj.n71

Perez-Blasco, J., Sales, A., Meléndez, J. C., & Mayordomo, T. (2016). The effects of mindfulness and self-compassion on improving the capacity to adapt to stress situations in elderly people living in the community. *Clinical Gerontologist*, *39*(2), 90-103. https://doi.org/10.1080/07317115.2015.1120253

Pidgeon, A. M., Ford, L., & Klaassen, F. (2013). Evaluating the effectiveness of enhancing resilience in human service professionals using a retreat-based Mindfulness with Metta Training Program: A randomised control trial. *Psychol Health Med*, *19*(3), 355-364. https://doi.org/10.1080/13548506.2013.806815

Polizzi, C. P., Baltman, J., & Lynn, S. J. (2019). Brief meditation interventions:

Mindfulness, implementation instructions, and lovingkindness. *Psychology of Consciousness: Theory, Research, and Practice*. https://doi.org/10.1037/cns0000194

Prince-Embury, S. (2006). *Resiliency scales manual for children & adolescents: A profile of personal strengths*. Pearson.

Proudman, D., Greenberg, P., & Nellesen, D. (2021). The growing burden of major depressive disorders (MDD): Implications for researchers and policy makers. *Pharmacoeconomics*, *39*(6), 619-625. https://doi.org/10.1007/s40273-021-01040-7

Racine, N., McArthur, B. A., Cooke, J. E., Eirich, R., Zhu, J., & Madigan, S. (2021). Global prevalence of depressive and anxiety symptoms in children and adolescents during COVID-19: A meta-analysis. *JAMA Pediatr*, *175*(11), 1142-1150. https://doi.org/10.1001/jamapediatrics.2021.2482

Reivich, K., & Shatté, A. (2002). *The resilience factor: 7 essential skills for overcoming life's inevitable obstacles*. Broadway.

Robertson, I. T., Cooper, C. L., Sarkar, M., & Curran, T. (2015). Resilience training in the workplace from 2003 to 2014: A systematic review. *Journal of Occupational and Organizational Psychology*, *88*(3), 533-562. https://doi.org/10.1111/joop.12120

Roche, A. I., Kroska, E. B., & Denburg, N. L. (2019). Acceptance- and mindfulness-based interventions for health behavior change: Systematic reviews and meta-analyses. *J Contextual Behav Sci*, *13*, 74-93. https://doi.org/10.1016/j.jcbs.2019.06.002

Rodrigues de Oliveira, D., Wilson, D., Palace-Berl, F., de Mello Ponteciano, B., Fungaro Rissatti, L., Sardela de Miranda, F., Piassa Pollizi, V., Fuscella, J. C.,

Mourão Terzi, A., Lepique, A. P., D'Almeida, V., & Demarzo, M. (2021). Mindfulness meditation training effects on quality of life, immune function and glutathione metabolism in service healthy female teachers: A randomized pilot clinical trial. *Brain Behav Immun Health*, *18*, 100372. https://doi.org/10.1016/j.bbih.2021.100372

Rogers, D. (2016). Which educational interventions improve healthcare professionals' resilience? *Med Teach*, *38*(12), 1236-1241. https://doi.org/10.1080/0142159X.2016.1210111

Rullo, J. E., Sood, R., Fokken, S. C., Sood, A., Frohmader, K. S., Croghan, I. T., Schroeder, D. R., & Faubion, S. S. (2021). Couples' use of online stress management and resiliency training for sexual health concerns: A randomized controlled trial. *Sex Med*, *9*(4), 100404. https://doi.org/10.1016/j.esxm.2021.100404

Schroeder, D. A., Stephens, E., Colgan, D., Hunsinger, M., Rubin, D., & Christopher, M. S. (2018). A brief mindfulness-based intervention for primary care physicians: A pilot randomized controlled trial. *Am J Lifestyle Med*, *12*(1), 83-91. https://doi.org/10.1177/1559827616629121

Segal, Z. V., Williams, J. M., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse*. The Guilford Press.

Senders, A., Hanes, D., Bourdette, D., Carson, K., Marshall, L. M., & Shinto, L. (2019). Impact of mindfulness-based stress reduction for people with multiple sclerosis at 8 weeks and 12 months: A randomized clinical trial. *Mult Scler*, *25*(8), 1178-1188. https://doi.org/10.1177/1352458518786650

Sinclair, V. G., & Wallston, K. A. (2004). The development and psychometric

evaluation of the brief resilient coping scale. *Assessment*, *11*(1), 94-101. https://doi.org/10.1177/1073191103258144

Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: Assessing the ability to bounce back. *Int J Behav Med*, *15*(3), 194-200. https://doi.org/10.1080/10705500802222972

Smith, B. W., Shelley, B. M., Sloan, A. L., Colleran, K., & Erickson, K. (2018). A preliminary randomized controlled trial of a mindful eating intervention for post-menopausal obese women. *Mindfulness*, *9*(3), 836-849. https://doi.org/10.1007/s12671-017-0824-9

Solati, K. (2017). The efficacy of mindfulness-based cognitive therapy on resilience among the wives of patients with schizophrenia. *J Clin Diagn Res*, *11*(4), VC01-VC03. https://doi.org/10.7860/JCDR/2017/23101.9514

Spijkerman, M. P., Pots, W. T., & Bohlmeijer, E. T. (2016). Effectiveness of online mindfulness-based interventions in improving mental health: A review and meta-analysis of randomised controlled trials. *Clinical Psychology Review*, *45*, 102-114. https://doi:10.1016/j.cpr.2016.03.009

Steinebach, C., & Langer, Á. I. (Eds.). (2019). *Enhancing resilience in youth: Mindfulness-based interventions in positive environments*. Springer Nature.

Sterne, J. A., Egger, M., & Moher, D. (2011). Addressing reporting biases. In J. P. Higgins & S. Green (Eds.), *Cochrane handbook for systematic reviews of interventions version 5.1.0*. Retrieved from www.cochrane-handbook.org

Sterne, J. A., Savović, J., Page, M. J., Elbers, R. G., Blencowe, N. S., Boutron, I., Cates, C. J., Cheng, H., Corbett, M. S., Eldridge, S. M., Emberson, J. R., Hernán, M. A., Hopewell, S., Hróbjartsson, A., Junqueira, D. R., Jüni, P., Kirkham, J. J., Lasserson, T., Li, T., … Higgins, J. P. (2019). RoB 2: A

revised tool for assessing risk of bias in randomised trials. *BMJ*, *366*, l4898. https://doi.org/10.1136/bmj.l4898

Tan, L., & Martin, G. (2015). Taming the adolescent mind: A randomised controlled trial examining clinical efficacy of an adolescent mindfulness-based group programme. *Child Adolesc Ment Health*, *20*(1), 49-55. https://doi.org/10.1111/camh.12057

Turow, R. G. (2017). *Mindfulness skills for trauma and ptsd: Practices for recovery and resilience*. W. W. Norton & Company.

Vanhove, A. J., Herian, M. N., Perez, A. L. U., Harms, P. D., & Lester, P. B. (2016). Can resilience be developed at work? A meta-analytic review of resilience-building programme effectiveness. *Journal of Occupational and Organizational Psychology*, *89*(2), 278-307. https://doi.org/10.1111/joop.12123

Volanen, S., Lassander, M., Hankonen, N., Santalahti, P., Hintsanen, M., Simonsen, N., Raevuori, A., Mullola, S., Vahlberg, T., But, A., & Suominen, S. (2020). Healthy learning mind - Effectiveness of a mindfulness program on mental health compared to a relaxation program and teaching as usual in schools: A cluster-randomised controlled trial. *J Affect Disord*, *260*, 660-669. https://doi.org/10.1016/j.jad.2019.08.087

Vonderlin, R., Biermann, M., Bohus, M., & Lyssenko, L. (2020). Mindfulness-based programs in the workplace: A meta-analysis of randomized controlled trials. *Mindfulness*, *11*(7), 1579-1598. https://doi.org/10.1007/s12671-020-01328-3

Wagnild, G. M., & Young, H. M. (1993). Development and psychometric evaluation of the Resilience Scale. *J Nurs Meas*, *1*(2), 165-178.

https://www.ncbi.nlm.nih.gov/pubmed/7850498

Wahbeh, H. (2018). Internet mindfulness meditation intervention (IMMI) improves depression symptoms in older adults. *Medicines (Basel)*, *5*(4). https://doi.org/10.3390/medicines5040119

Wang, L., & Zhang, Y. (2020). The factors influencing psychological resilience in breast cancer patients undergoing mastectomy and the effects of mindfulness-based stress reduction on the patients' psychological resilience and anxiety. *International Journal of Clinical and Experimental Medicine*, *13*(11), 8924-8932. https://e-century.us/files/ijcem/13/11/ijcem0119310.pdf

Wang, Y., Tian, J., & Yang, Q. (2021). On mindfulness training for promoting mental toughness of female college students in endurance exercise. *Evid Based Complement Alternat Med*, *2021*, 5596111. https://doi.org/10.1155/2021/5596111

Wang, Y., Xu, W., & Luo, F. (2016). Emotional resilience mediates the relationship between mindfulness and emotion. *Psychological Reports*, 118(3), 725–736. https://doi.org/10.1177/0033294116649707

Wells, R. E., Kerr, C. E., Wolkin, J., Dossett, M., Davis, R. B., Walsh, J., Wall, R. B., Kong, J., Kaptchuk, T., Press, D., Phillips, R. S., & Yeh, G. (2013). Meditation for adults with mild cognitive impairment: A pilot randomized trial. *J Am Geriatr Soc*, *61*(4), 642-645. https://doi.org/10.1111/jgs.12179

Wright, K. M., Roberts, R., & Proeve, M. J. (2019). Mindfulness-based cognitive therapy for children (MBCT-C) for prevention of internalizing difficulties: A small randomized controlled trial with Australian primary school children. *Mindfulness*, *10*(11), 2277-2293. https://doi.org/10.1007/s12671-019-01193-9

Youssef, N. A., Green, K. T., Beckham, J. C., & Elbogen, E. B. (2013). A 3-year longitudinal study examining the effect of resilience on suicidality in veterans. *Annals of clinical psychiatry : official journal of the American Academy of Clinical Psychiatrists*, *25*(1), 59–66. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3622865/

Yuan, Y. (2021). Mindfulness training on the resilience of adolescents under the COVID-19 epidemic: A latent growth curve analysis. *Pers Individ Dif*, *172*, 110560. https://doi.org/10.1016/j.paid.2020.110560

Zelazo, P. D., Forston, J. L., Masten, A. S., & Carlson, S. M. (2018). Mindfulness plus reflection training: Effects on executive function in early childhood. *Front Psychol*, *9*, 208. https://doi.org/10.3389/fpsyg.2018.00208

Chapter 4: Study 3

The following study, 'Universal Process-based CBT for Positive Mental Health in Early Adolescence: A Cluster Randomized Controlled Trial', is currently under review for publication in the journal *Behaviour Research and Therapy*. The co-authors are Prof. Gary O'Reilly, Dr. Eddie Murphy, Ms. Leda Connaughton, Ms. Emma Hoctor, and Prof. Louise McHugh.

Abstract

Early adolescence is a key developmental phase for promoting positive mental health and preventing psychological difficulties. Despite calls to develop the evidence base for universal interventions in early adolescence and the promise of process-based CBT, the literature is devoid of empirical investigations of the efficacy of universal process-based CBT in this cohort. This cluster randomized controlled trial aimed to extend the empirical literature by evaluating the efficacy of a six-session universal process-based CBT intervention in primary schools. Twenty-nine schools were randomly allocated to intervention or waiting list control groups. Six hundred four participants completed measures of positive mental health, resilience, emotional literacy, and mindfulness at baseline, post-intervention, and six-week follow-up. Although participants reported that the intervention was satisfactory, it did not yield significantly superior growth rates on the outcome measures than the control condition at post-intervention or follow-up. Implications of the findings and directions for future research are discussed.

Early adolescence is an important period for public health. During this developmental phase, the opportunities for mental health promotion are great and the foundations are laid for adult well-being, resilience and positive psychological functioning (Langford et al., 2015; Sawyer et al., 2012). Many psychological difficulties begin in early adolescence, rendering it the highest risk period for developing mental health problems (Jones, 2013; Kessler et al., 2005; Merikangas et al., 2010; Sawyer et al., 2012). The mental health of early adolescents is further threatened by unprecedented worldwide forces, including the COVID-19 pandemic, unsustainable ecosystems, and climate change (Christensen et al., 2017; Fusar-Poli et al., 2021). Mental health difficulties in early adolescents confer risk for lower levels of educational attainment and higher rates of health risk behaviours (Dray et al., 2017; Fergusson & Woodward, 2002; Patel et al., 2007). Indeed, mental health problems are the largest contributor to the global burden of disease in this cohort and account for forty-five percent of years lost because of disability (Gore et al., 2011; Sawyer et al., 2012). The magnitude of suffering associated with mental health difficulties in early adolescents is compounded by a great economic cost for society (Fatori et al., 2018; Salazar de Pablo et al., 2020). The prevention of these difficulties and promotion of positive mental health in early adolescence is a major public health need and central to many public health agendas (Sawyer et al., 2012; Stockings et al., 2016; WHO, 2008). Calls have consequently been made to develop the evidence base for such interventions (Fusar-Poli et al., 2021).

A number of systematic reviews and meta-analyses have evaluated the efficacy of interventions for improving mental health difficulties in adolescents. Salazar de Pablo et al. (2021) conducted a systematic review and meta-analysis which identified 295 studies comparing universal and selective interventions to control

conditions and found small statistically significant effects on poor mental health outcomes in children and adolescents. Similarly, a systematic review and meta-analysis by Dray et al. (2017) identified 57 eligible randomized controlled trials and found small statistically significant effects relative to control conditions in reducing psychological distress, internalizing and externalizing problems. Universal interventions were also found to be more efficacious in reducing internalizing problems in children and adolescents than selective or indicated interventions in a systematic review and meta-analysis of 146 randomized controlled trials (Stockings et al., 2016). Conversely, a systematic review and meta-analysis of nine randomized controlled trials by Bastounis et al. (2016) yielded no empirical support for a universal, schools-based intervention (Penn Resiliency Programme) in reducing anxious or depressive symptoms.

The promotion of positive mental health in adolescents has received much less empirical investigation than the prevention of mental health difficulties (Dray et al., 2017; Salazar de Pablo et al., 2020). It is posited that this disparity is due to the dominance of the deficit- and disease-centered approach to mental health (Arango et al., 2018; Fusar-Poli et al., 2021). Positive mental health refers to a state of well-being that empowers adolescents to cope with normal life stress and function productively (Fusar-Poli et al., 2021). Although interrelated with mental disorder, positive mental health represents a distinct continuum. In accordance, positive mental health can be promoted across all clinical stages (Fusar-Poli et al., 2021). A systematic review and meta-analysis of universal and selective interventions for young people identified 276 eligible studies and detected small to medium statistically significant effects relative to control conditions on positive mental health outcomes, including quality of life and mental health literacy (Salazar de Pablo et al., 2020). Suggestions have been made to

extend this evidence base by evaluating intervention models that focus on processes that traverse clinically meaningful outcomes (Fusar-Poli et al., 2021; Hayes & Hofmann, 2017).

Process-based cognitive behaviour therapy (CBT) provides a promising framework to promote psychological functioning in early adolescence. Process-based CBT refers to the contextually specific use of theoretically-derived processes that are responsible for positive treatment change to help promote the prosperity of people and solve their problems (Hofmann & Hayes, 2019). Thus, the specific goal of process-based CBT aligns with the promotion of positive mental health. Process-based CBT is a single organizing framework that bridges gaps across distinct models by integrating the full range of biopsychosocial processes that are evoked by evidence-based procedures to produce meaningful outcomes (Hayes et al., 2020; Ong et al., 2020). Such processes include, for example, cognitive reappraisal, mindfulness, interpersonal skills, exposure, and arousal reduction. The framework is underpinned by the extended evolutionary meta-model (EEMM); a model that is posited to apply to virtually all empirically supported processes of change (Hayes et al., 2020). In the model, the key evolutionary concepts of variation, selection, and retention in context are applied to biopsychosocial dimensions (e.g., cognition, affect, motivation, attention, self, and public behaviour) and levels (e.g., psychological, physiological, social, and cultural; Ong et al., 2020). For example, cognitive reappraisal may be conceptualized as a cognitive variation process at the psychological level (Ong et al., 2020). Similarly, mindful awareness could be conceived as an attentional process that promotes context sensitivity and is retained by increasing contact with positive reinforcers. Process-based CBT also places an emphasis on empiricism and is amenable to investigations at an individual- and group-level (Ong et al., 2020).

Universal interventions are particularly suited to promoting well-being and positive mental health (Arango et al., 2018; Fusar-Poli et al., 2021; Salazar de Pablo et al., 2020). Such interventions target whole groups of early adolescents regardless of their predisposition or risk for psychological difficulties (Bastounis et al., 2016; WHO, 2004). They offer many advantages, including a reduction in the risk of stigma, an increase in recruitment rates, and greater societal-level benefits than selective or indicated interventions (Corrieri et al., 2013; Fusar-Poli et al., 2021). Schools have been recommended as the optimal location for universal interventions in early adolescence, as they provide an efficient and sustained means of reaching this population with the potential to reduce health inequities (Bastounis et al., 2016; Fazel et al., 2014; Garmy et al., 2015; Langford et al., 2015). Moreover, schools have existing infrastructure, resources, and values that are conducive to promoting well-being and positive mental health (Dray et al., 2017). Given the existing pressure on healthcare budgets, the administration of such interventions by schoolteachers may represent a cost-effective method of implementing a universal process-based CBT initiative (Bastounis et al., 2016; Fusar-Poli et al., 2021; Knapp & Wong, 2020). In line with the core tenets of process-based CBT, the inclusion of early adolescents in the development of this initiative could guide the intervention to account for their current situation, history, and culture.

Despite calls to develop the evidence base for universal interventions in early adolescence and the promise of process-based CBT for promoting well-being and positive mental health, no study to-date has evaluated the efficacy of a universal process-based CBT intervention in this cohort. The opportunity for mental health promotion in school during this key developmental phase through the contextually specific use of theoretically-derived processes necessitates the development and

evaluation of such initiatives. In accordance, this cluster randomized controlled trial evaluated the efficacy of a universal process-based CBT intervention for early adolescents. The primary aim was to determine if the intervention would yield improvements in positive mental health relative to a waiting list control condition from baseline to post-intervention and six-week follow-up. A secondary aim was to elucidate the comparative effects of the intervention on resilience, emotional literacy, and mindfulness. All of the aforementioned outcomes were pre-registered on a public trials registry (ClinicalTrials.gov ID NCT04231604). In line with Salazar de Pablo et al. (2020), it was hypothesized that the intervention group would demonstrate statistically significant improvements in positive mental health relative to the waiting list control group. Similarly, it was expected that participants in the process-based CBT group would display significantly greater resilience, emotional literacy, and mindfulness growth rates than those in the control group.

Method

Design

A two-arm parallel-group cluster randomized controlled trial was conducted in University College Dublin, Ireland. Assessments were completed by participants prior to the intervention, immediately after the intervention, and at six-week follow-up. The randomized trial is reported in accordance with the CONSORT guidelines (Schulz et al., 2010). Ethical approval for the randomized trial was obtained from the University College Dublin Human Research Ethics Committee – Humanities (see Appendix A for approval letter). All persons provided written assent and their parents/guardians provided written informed consent prior to enrolment in the randomized trial.

Participants

Eligible participants were (a) early adolescents, (b) enrolled in primary school in Ireland, (c) willing to provide written assent and (d) obtain written informed consent from parents/guardians. An a priori power analysis was conducted in G*Power (Faul et al., 2009) which revealed that a total sample size of 600 would provide 95% statistical power at $\alpha = .05$ to detect a small-sized ($F = 0.06$) time × condition interaction on the outcome measures. This estimated sample size was pre-registered on a public registry (ClinicalTrials.gov ID NCT04231604). Participating schools were recruited from the community by self-selection between December 2019 and August 2020. Students were enrolled in fifth (n = 33.84%) or sixth class (n = 66.16%) and their ages ranged from 10 to 13 years. Participant flow through the trial is shown in Figure 4.1.

Procedure

Online advertisements were used to recruit schools interested in participating in an empirical evaluation of a "wellbeing and resilience programme for children." Schools that expressed an interest in enrolling in the trial were directed to a study website to complete a screening survey. Twenty-nine Irish primary schools were randomly allocated to intervention or waiting list control groups by an online randomization tool. Stratified block randomization was conducted to achieve balance with respect to gender (mixed school, all-boys school, all-girls school) and socioeconomic status (*Delivering Equality of Opportunity in Schools* programme or not). Eligible students in the enrolled schools then provided written assent and their parents/guardians and teachers provided written informed consent to participate in the randomized trial. Of 1356 eligible students, 44.54% (n = 604) provided assent and received consent to participate. Study measures were administered to participants via Qualtrics Survey Software. The process-based CBT intervention was delivered to the

intervention group, while those in the control group were placed on a 12-week waiting list. After completing six-week follow-up measures, the process-based CBT intervention was delivered to the control group.

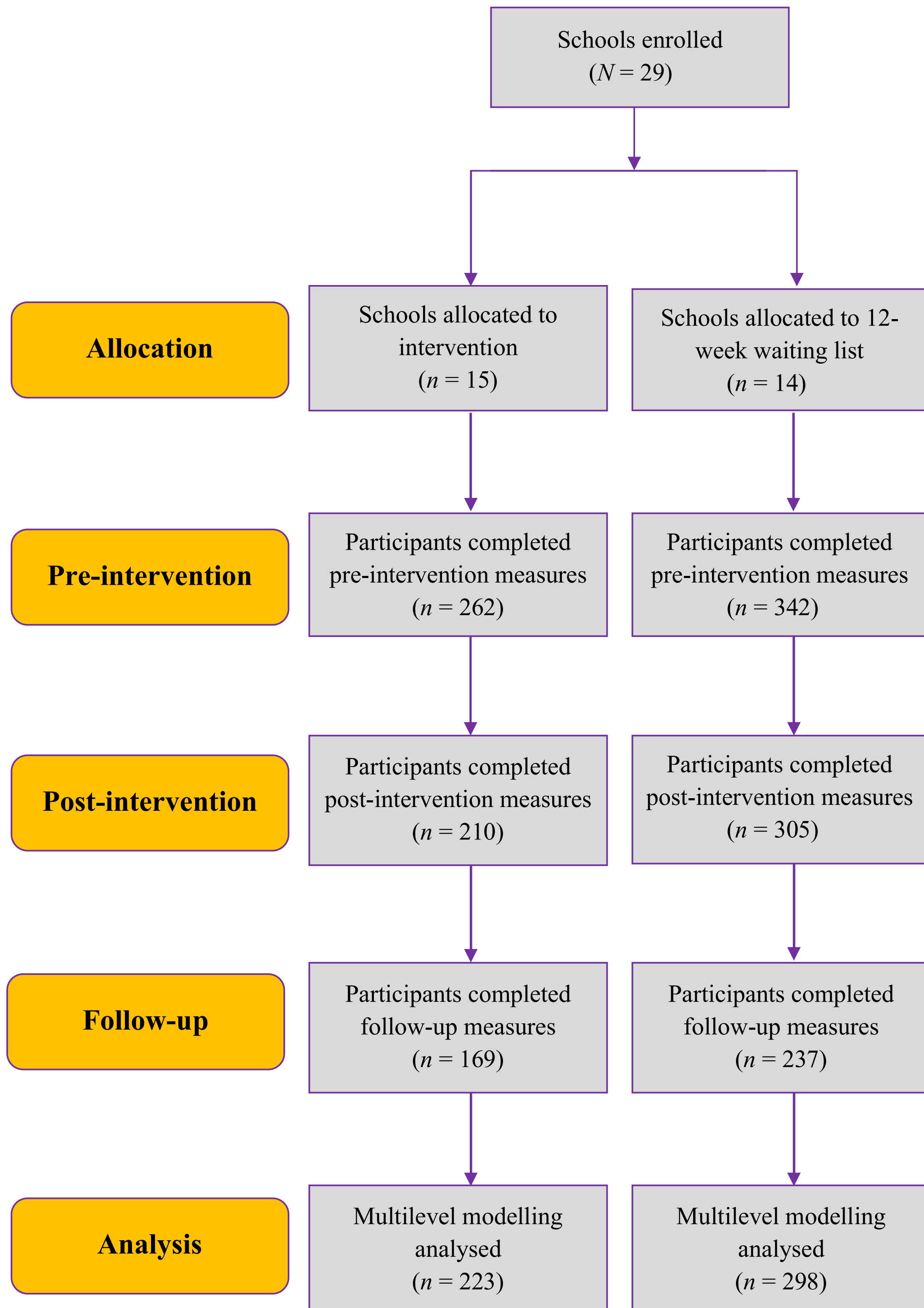


Figure 4.1. Participant flow through the randomized trial.

Intervention

The process-based CBT intervention (A Lust for Life, 2019) was delivered by schoolteachers across six 40-minute weekly sessions. The intervention was designed by a doctoral-level chartered clinical psychologist with expert training in child and adolescent mental health and a specialist educational agency with experience developing and implementing nationwide school-based programmes. Participating teachers were invited to a three-hour training event in which therapeutic content was introduced and experiential exercises were practiced. A training video and guide provided further psychoeducation, intervention targets, and signposting for additional resources. For each of the six lessons, teachers were supplied with lesson slides, support sheet, and detailed lesson plan with printable student handouts. The intervention focused on the culturally-sensitive promotion of core mindfulness, cognitive reappraisal, interpersonal skills, exposure, and arousal reduction processes by employing Irish primary schoolchildren, teachers and parents in developing the therapeutic content and establishing strong links with the Irish primary school curriculum. As shown in Table 4.1, each session included an experiential exercise, psychoeducational video, individual and group-based activities, and between-session assignment.

Measures

Positive mental health was measured with the Adolescent Mental Health Continuum-Short Form (Keyes, 2002). Participants rated its 14 items on a 6-point scale from 1 (*every day*) to 6 (*never*); lower scores indicated higher levels of positive mental health. Sample items include: "in the past month, how often did you feel happy?" and "how often did you feel that you had warm and trusting relationships with others?" Previous research supported the measure's discriminant and convergent

Table 4.1

Process-based CBT Intervention Sessions

Session	Experiential exercise (Process)	Video	Activities	Between-session assignment
One	Square Breathing. (Arousal reduction.)	My Phone and Me: The detrimental impact of excessive screen-time on wellbeing.	Discussion and psychoeducation on factors that impact wellbeing.	Practice square breathing.
Two	Body scan. (Mindfulness.)	Four Big Feelings: Anger, fear, sadness, happiness.	Psychoeducation on CBT ‘interacting systems’ principle. Feelings thermometer.	Practice body scan.
Three	Progressive muscle relaxation. (Arousal reduction.)	Adults and Their Feelings: Normalizing feeling states.	Identifying cognitions. Cognitive reappraisal.	Creating an exposure hierarchy. Engaging in graded exposure.
Four	Self-statement training. (Self-management.)	The Fallout: A disagreement between friends.	Role-play elucidating the cognitive principle. Self-compassion.	Cognitive rehearsal of positive self-statements.
Five	Mindful moment. (Mindfulness.)	360° of a problem: Perspective taking in interpersonal conflict.	Psychoeducation on interpersonal skills and modelling of skills in role-play.	Practice mindful moment.
Six	My thoughtful words. (Compassion-focused.)	Tricky world on social media: The thoughts and feelings elicited by social media.	Psychoeducation and discussion on common cognitive biases.	My resilience app: Review skills learned throughout intervention.

validity in adolescent and child samples (de Carvalho et al., 2016; Luijten et al., 2019; Matos et al., 2010). The measure displayed good internal consistency in the present study (α = .89).

Resilience was assessed with the Connor-Davidson Resilience Scale–10 (Campbell-Sills & Stein, 2007). The measure's 10 items were rated on a 5-point scale from 0 (*not true at all*) to 4 (*true nearly all the time*); higher scores indicated greater levels of ability to thrive despite adversity. Sample items include: "I am not easily discouraged by failure" and "I think of myself as a strong person when dealing with life's challenges and difficulties." A psychometric evaluation by She et al. (2020) supported its criterion-related validity and unidimensional factor structure. In addition, a review by Salisu and Hashim (2017) found it possessed the best psychometric properties of measures used in resilience research. In the present study, the measure displayed good internal consistency (α = .86).

Mindfulness was measured with the Mindful Attention Awareness Scale for Children (Lawlor et al., 2014). Participants rated its 15 items on a 6-point scale from 1 (*almost never*) to 6 (*almost always*); higher scores indicated higher levels of mindfulness. Sample items include: "I find it hard to stay focused on what's happening in the present moment" and "it seems that I am doing things automatically without really being aware of what I am doing." Previous research by Lawlor et al. (2014) supported its unidimensional factor structure, discriminant and convergent validity. The measure displayed good internal consistency in the present study (α = .87).

Emotional literacy was assessed with the Emotional Literacy Student Checklist (Faupel, Southampton Psychology Service, 2003). The measure's 25 items were rated on a 4-point scale from 1 (*not like me at all*) to 4 (*very like me*); higher

scores indicated greater levels of emotional literacy. Sample items include: “when I’m sad, I usually know the reason why” and “I know when people are starting to get upset.” The Emotional Literacy Student Checklist demonstrated acceptable internal consistency in a nationally representative sample of primary schools in England (α = .75) and good internal consistency in the present study (α = .81).

Treatment satisfaction was measured at post-intervention with a Brief Satisfaction Scale. The measure’s 8 items were rated on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree); higher scores indicated higher levels of treatment satisfaction. Sample items include: “overall, I am satisfied with the programme” and “I would recommend the programme to a family member or friend.”

Intervention Fidelity

A random sample of 15% of audio-recorded intervention sessions were assessed for implementation fidelity by two raters using standardized forms. The raters independently evaluated the extent to which the content delivered across each successive 10-minute segment of the sessions was consistent with the lesson plans. Cohen’s Kappa coefficient provided an index of inter-rater reliability.

Data Analyses

The IBM SPSS Statistics 26 mixed-effects program (MIXED) was employed for repeated measures analysis of primary and secondary outcome measures. The MIXED programme facilitates modified intention-to-treat (mITT) analyses by incorporating all available participant data and multilevel analysis in which time-points (Level 1) are nested within participants (Level 2) who are located in randomized trial conditions (Level 3; Heck et al., 2014). The multilevel models were built to include fixed effects for time (baseline, post-intervention, and six-week follow-up), trial condition (process-based CBT, and control) and their interaction

(*time* × *condition*) as well as random effects for time. To ensure model convergence, participants with data at any two or more time-points were included in analyses. Optimal model fit was confirmed by testing covariance structures and retaining those with the smallest Akaike information criterion (AIC; Heck et al., 2014).

The chi-square test for independence was used to investigate differences between the trial groups in attrition at post-intervention and follow-up. In line with the CONSORT Explanation and Elaboration document (Moher et al., 2010), null hypothesis significance testing of baseline differences between the randomized trial groups was not performed. Although prevalent in the empirical literature, such testing is philosophically unsound and has the potential to mislead readers (de Boer et al., 2015; Senn, 1994). Following randomization, the groups in a controlled trial are, by definition, samples drawn from the same population and any statistically significant p-values should be interpreted as statistical artefacts (de Boer et al., 2015).

Results

Participant Characteristics

Sociodemographic characteristics and outcome measures at baseline, post-intervention, and follow-up are shown in Table 4.2. Data were provided by 515 participants at post-intervention (attrition rate 14.73%) and 406 participants at follow-up (attrition rate 32.78%). A chi-square analysis revealed that the intervention group had significantly greater attrition than the control group at post-intervention, χ^2 (1, 604) = 9.62, p = .002. The proportion of participants who provided data did not differ significantly between the groups at follow-up, χ^2 (1, 604) = 1.55, p = .213. There were also no statistically significant baseline differences between completers and those lost to attrition in positive mental health (t (594) = -0.40, p = .687), resilience (t (105.169)

Table 4.2

Characteristics of Participants Randomized to Each Group

	Baseline		Post-intervention		Follow-up	
	Intervention	Control	Intervention	Control	Intervention	Control
Gender (female)	59.54% (156/262)	59.94% (205/342)	—	—	—	—
Age	11.04 (0.68)	11.09 (0.67)	—	—	—	—
DEIS school	37.79% (99/262)	14.62% (50/342)	—	—	—	—
Mental health	31.34 (11.89)	30.71 (11.21)	33.04 (12.66)	31.79 (11.30)	35.54 (13.24)	31.54 (11.99)
Resilience	25.90 (7.24)	26.15 (7.46)	25.36 (7.48)	26.86 (7.01)	24.50 (7.14)	27.32 (6.84)
Mindfulness	57.26 (14.75)	58.47 (13.28)	54.21 (14.23)	57.43 (14.28)	55.61 (12.80)	55.34 (15.65)
Emotional literacy	70.45 (11.06)	71.99 (9.61)	70.25 (9.96)	72.35 (10.09)	69.32 (9.67)	71.82 (10.17)

Note. DEIS = Delivering equality of opportunity in schools.

= 1.84, *p* = .068), mindfulness (*t* (592) = -0.94, *p* = .348), or emotional literacy (*t* (588) = 1.82, *p* = .069).

Participant Satisfaction

Ratings in the treatment group indicated that the participants *agreed* (*M* = 5.57, *SD* = 1.21) that they were satisfied with the intervention, *agreed* that it was of high quality (*M* = 5.56, *SD* = 1.30), and *slightly agreed* that it was fun (*M* = 5.38, *SD* = 1.53), helpful (*M* = 5.35, *SD* = 1.44) and that they would recommend it to a family member or friend (*M* = 5.34, *SD* = 1.54). Participants also *slightly agreed* that they learned something new (*M* = 5.44, *SD* = 1.61) and that the intervention was suited to their needs (*M* = 4.73, *SD* = 1.70), and a*greed* that they understood most of the information in the programme (*M* = 5.67, *SD* = 1.27).

Table 4.3

Estimates of between- and within group differences on study variables

	Mental health	Resilience	Mindfulness	Emotional literacy
	F	*F*	*F*	*F*
Baseline - Post				
Intervention	4.75	0.17	8.16^{**}	0.05
Control	18.53^{***}	0.24	7.36^{**}	0.54
Between-groups	0.35	0.20	0.41	0.05
Baseline - FU				
Intervention	9.44^{**}	1.51	0.21	1.58
Control	6.67	0.25	13.55^{***}	2.83
Between-groups	1.18	1.87	3.50	0.00
Post - FU				
Intervention	3.63	0.27	1.74	3.30
Control	0.17	0.06	5.00^{*}	1.13
Between-groups	2.82	0.42	5.46^{*}	1.05

Note. FU = follow-up. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Intervention Fidelity

Two independent raters assessed the implementation fidelity of the intervention based on 52 segments. The raters reported that the implementation of the intervention was 86.49% consistent with the lesson plans. Cohen's Kappa Measure of Agreement was statistically significant, $\kappa = .940$, $p < .001$. According to Peat (2001), this represents very good agreement.

Primary Outcome Measure

The multilevel model investigating variability in positive mental health growth rates between the treatment and control groups revealed no statistically significant *time* × *condition* interaction, $\beta = 0.60$, $p = .202$, 95% CI [-0.32, 1.52].

Secondary Outcome Measures

The variability in resilience growth rates between the treatment and control groups was investigated with a multilevel model which evidenced no statistically significant *time* × *condition* interaction, $\beta = -0.53$, $p = .086$, 95% CI [-1.15, 0.08]. Similarly, no statistically significant *time* × *condition* interaction in mindfulness growth rates was detected, $\beta = 0.85$, $p = .144$, 95% CI [-0.29, 1.99]. A multilevel model investigating variability in emotional literacy growth rates between the treatment and control groups also revealed no statistically significant *time* × *condition* interaction, $\beta = -0.15$, $p = .667$, 95% CI [-0.83, 0.53].

Subgroup Analyses

In the subgroup of study participants with languishing-to-moderate positive mental health, a multilevel model detected no statistically significant *time* × *condition* interaction in positive mental health growth rates, $\beta = 0.03$, $p = .971$, 95% CI [-1.81, 1.88]. Likewise, no statistically significant *time* × *condition* interaction in resilience growth rates was detected, $\beta = -0.84$, $p = .115$, 95% CI [-1.88, 0.21]. A statistically

significant *time* × *condition* interaction in mindfulness growth rates among participants with languishing-to-moderate positive mental health was observed, β = 2.17, p = .031, 95% CI [0.20, 4.14]. This finding suggests that participants in the treatment group had a higher growth rate over time compared to their peers in the control group. In contrast, no statistically significant *time* × *condition* interaction in emotional literacy growth rates was detected, β = 0.63, p = .304, 95% CI [-0.58, 1.85].

Discussion

This cluster randomized controlled trial was the first study to evaluate the efficacy of a universal process-based CBT intervention for early adolescents. The primary comparison between the process-based CBT and waiting list control conditions revealed no statistically significant difference in positive mental health growth rates across time. Contrary to hypotheses, the process-based CBT intervention did not yield significantly superior resilience, emotional literacy, or mindfulness growth rates than the control condition. In terms of satisfaction with services, participants in the process-based CBT condition *agreed* that the intervention was high quality, satisfactory and that they understood most of its information and *slightly agreed* that it was fun, helpful, suited to their needs and that they learned something new and would recommend it to a family member or friend.

Overall, the comparisons between the process-based CBT and waiting list control conditions did not support the efficacy of the intervention in promoting mental health in early adolescents. Recent literature has emphasized the importance of preventing psychological difficulties and fostering positive mental health during this key developmental phase (Langford et al., 2015; Stockings et al., 2016). There have, therefore, been calls to develop the evidence base for such interventions (Fusar-Poli et al., 2021). The sample in this cluster randomized controlled trial, however, exhibited

relatively high levels of psychological functioning at baseline. Indeed, seventy-two percent of the sample reached the criteria for flourishing mental health, while twenty-six percent fulfilled the criteria for moderate mental health. Only two percent of participants were categorized as experiencing languishing mental health. The levels of positive mental health reported in this study are also higher than those of early adolescents in previous research (de Carvalho et al., 2016; O'Connor et al., 2021). Thus, the inefficacy of the process-based CBT intervention may be explained by a ceiling effect: early adolescents with high baseline scores had little scope for improvement. In line with this, recent research evaluating the impact of school-based interventions on positive mental health outcomes attributed attenuated intervention efficacy to ceiling effects (Higgen & Mösko, 2021; Liu et al., 2020). On the contrary, although limited, the included outcome and process measures did provide some scope for improvement (i.e., positive mental health $M = 30.98$, $Min = 14$; resilience $M = 26.04$, $Max = 40$; mindfulness $M = 57.94$, $Max = 90$; emotional literacy $M = 71.33$, $Max = 100$), but this was not actualized by the intervention.

A core tenet of process-based CBT is an emphasis on the biopsychosocial processes that are evoked by behavioural and cognitive therapies to produce meaningful outcomes (Hayes et al., 2020; Ong et al., 2020). In accordance, the assessment of mindfulness and emotional literacy as two such theory-based (Baer, 2018; Leahy, 2015), contextually bound, dynamic, progressive and multilevel variables facilitated a process-level investigation in this trial. However, findings did not support the efficacy of the intervention in changing either process. It is possible that the intervention may have affected other theoretically-derived processes that were not measured (e.g., arousal reduction, cognitive reappraisal, interpersonal skills, or self-management) and did not produce change in the primary or secondary outcome.

The inclusion of measures of such alternative processes in future research could facilitate testing of this hypothesis.

The current findings are in contrast with those of a recent systematic review and meta-analysis of universal and selective interventions for young people in which small to medium statistically significant effects on positive mental health outcomes were found relative to control conditions (Salazar de Pablo et al., 2020). The small statistically significant effects on poor mental health outcomes detected in a recent systematic review and meta-analysis of universal and selective interventions for children and adolescents also diverge from the findings of the current study (Salazar de Pablo et al., 2021). These anomalous findings may be accounted for by the greater precision and statistical power afforded to large-scale meta-analytic reviews relative to individual trials (Higgins & Green, 2011). Conversely, the current findings are somewhat consistent with those of a systematic review and meta-analysis by Bastounis et al. (2016) which yielded no empirical support for a universal, schools-based intervention in reducing anxious or depressive symptoms. Moreover, evidence of publication bias was detected on a number of outcomes (e.g., self-management, internalizing problems, behaviour) in the aforementioned reviews by Salazar de Pablo et al. (2020, 2021) which, when adjusted for bias, rendered their respective effects non-significant. This finding indicates that results similar to the non-significant effects found in the current trial remain unpublished. Accordingly, an earlier study found evidence of publication bias in child and adolescent clinical trials and inferred that published research may overestimate the effects of such interventions to a substantial degree (McLeod & Weisz, 2004).

The limitations of this trial should be carefully considered when making inferences from its findings. Firstly, the cluster randomized controlled trial design of

this study decreased precision and increased the risk of selection bias and imbalance between trial arms relative to an individually randomized trial (Dron et al., 2021). To mitigate this risk of imbalance, randomization was stratified based on gender and socioeconomic status. Secondly, missing outcome data (post-intervention, 14.73%; 6-week follow-up, 32.78%) introduced a risk of attrition bias into the trial. To minimize the effects of this missing data on analyses, multilevel models were fitted that incorporated all available participant data. Multilevel models, however, do not estimate missing data. Thirdly, the completion of between-session assignments in the process-based CBT intervention group was not monitored. Given that home practice has been found to predict the mental health outcomes of interventions for adolescents (Gaynor et al., 2006; Jungbluth & Shirk, 2013), future research could address this limitation by monitoring participant engagement in between-session assignments. Fourthly, this trial relied on self-report inventories to measure primary and secondary outcomes that have the potential to be affected by social desirability response bias. The administration of more objective assays, such as breath counting as a measure of mindfulness (Levinson et al., 2014; Wong et al., 2018), could prevent such risk of bias in future trials.

With the aforementioned sources of potential bias in mind, the findings of this cluster randomized controlled trial have implications for future research. Given the potential ceiling effect in the current study due to participants' high level of psychological functioning at baseline, future research could evaluate the efficacy of the process-based CBT intervention in selective (i.e., individuals with an elevated risk of developing mental health problems) or indicated populations (i.e., individuals with minimal but detectable symptoms of mental health problems; Salazar de Pablo et al., 2020). The finding that mindfulness growth rates in the intervention group were

superior to those in the control group among participants with languishing-to-moderate positive mental health lends support to this direction for further study. Similarly, future research could extend this trial by evaluating the efficacy of the process-based CBT intervention in improving poor mental health outcomes (e.g., Revised Child Anxiety and Depression Scale; Chorpita et al., 2000) in early adolescents. Another avenue for future research is to take a more nuanced approach to the applied impact of process-based CBT by exploring individual differences as potential moderators of the effects of such interventions (Szabo et al., 2015).

In conclusion, the findings of this cluster randomized controlled trial did not support the efficacy of the universal process-based CBT intervention in promoting mental health in early adolescence. However, sources of potential bias and limitations of this trial should be considered when extrapolating these findings. Future interventional studies could advance this programme of research by evaluating the efficacy of the intervention for selective or indicated populations, in ameliorating poor mental health outcomes, and elucidating moderators of such effects. This research may have the potential to help solve problems and promote prosperity in early adolescence.

References

Arango, C., Díaz-Caneja, C. M., McGorry, P. D., Rapoport, J., Sommer, I. E., Vorstman, J. A., McDaid, D., Marín, O., Serrano-Drozdowskyj, E., Freedman, R., & Carpenter, W. (2018). Preventive strategies for mental health. *The Lancet Psychiatry*, *5*(7), 591-604. https://doi.org/10.1016/s2215-0366(18)30057-9

Baer, R. (2018). Mindfulness practice. In S. C. Hayes & S. G. Hofmann (Eds.), *Process-based CBT: The science and core clinical competencies of cognitive behavioral therapy* (pp. 389-402). Context Press.

Bastounis, A., Callaghan, P., Banerjee, A., & Michail, M. (2016). The effectiveness of the Penn resiliency programme (PRP) and its adapted versions in reducing depression and anxiety and improving explanatory style: A systematic review and meta-analysis. *Journal of Adolescence*, *52*, 37-48. https://doi.org/10.1016/j.adolescence.2016.07.004

Campbell-Sills, L., & Stein, M. B. (2007). Psychometric analysis and refinement of the Connor–Davidson resilience scale (CD-RISC): Validation of a 10-item measure of resilience. *Journal of Traumatic Stress*, *20*(6), 1019-1028. https://doi.org/10.1002/jts.20271

Chorpita, B. F., Yim, L., Moffitt, C., Umemoto, L. A., & Francis, S. E. (2000). Assessment of symptoms of DSM-IV anxiety and depression in children: A revised child anxiety and depression scale. *Behaviour Research and Therapy*, *38*(8), 835-855. https://doi.org/10.1016/s0005-7967(99)00130-8

Christensen, H., Reynolds, C. F., & Cuijpers, P. (2017). Protecting youth mental health, protecting our future. *World Psychiatry*, *16*(3), 327-328. https://doi.org/10.1002/wps.20437

Corrieri, S., Heider, D., Conrad, I., Blume, A., Konig, H., & Riedel-Heller, S. G. (2013). School-based prevention programs for depression and anxiety in adolescence: A systematic review. *Health Promotion International*, *29*(3), 427-441. https://doi.org/10.1093/heapro/dat001

de Boer, M. R., Waterlander, W. E., Kuijper, L. D., Steenhuis, I. H., & Twisk, J. W. (2015). Testing for baseline differences in randomized controlled trials: An unhealthy research behavior that is hard to eradicate. *International Journal of Behavioral Nutrition and Physical Activity*, *12*(1). https://doi.org/10.1186/s12966-015-0162-z

de Carvalho, J. S., Pereira, N. S., Pinto, A. M., & Marôco, J. (2016). Psychometric properties of the mental health continuum-short form: A study of Portuguese speaking children/Youths. *Journal of Child and Family Studies*, *25*(7), 2141-2154. https://doi.org/10.1007/s10826-016-0396-7

Dray, J., Bowman, J., Campbell, E., Freund, M., Wolfenden, L., Hodder, R. K., McElwaine, K., Tremain, D., Bartlem, K., Bailey, J., Small, T., Palazzi, K., Oldmeadow, C., & Wiggers, J. (2017). Systematic review of universal resilience-focused interventions targeting child and adolescent mental health in the school setting. *Journal of the American Academy of Child & Adolescent Psychiatry*, *56*(10), 813-824. https://doi.org/10.1016/j.jaac.2017.07.780

Dron, L., Taljaard, M., Cheung, Y. B., Grais, R., Ford, N., Thorlund, K., Jahan, F., Nakimuli-Mpungu, E., Xavier, D., Bhutta, Z. A., Park, J. J., & Mills, E. J. (2021). The role and challenges of cluster randomised trials for global health. *The Lancet Global Health*, *9*(5), e701-e710. https://doi.org/10.1016/s2214-109x(20)30541-6

Fatori, D., Salum, G., Itria, A., Pan, P., Alvarenga, P., Rohde, L. A., Bressan, R., Gadelha, A., De Jesus Mari, J., Conceição do Rosário, M., Manfro, G., Polanczyk, G., Miguel, E. C., & Graeff-Martins, A. S. (2018). The economic impact of subthreshold and clinical childhood mental disorders. *Journal of Mental Health*, *27*(6), 588-594. https://doi.org/10.1080/09638237.2018.1466041

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*(4), 1149–1160. https://doi:10.3758/BRM.41.4.1149

Faupel, A., & Southampton Psychology Service (Eds.). (2003). *Emotional literacy: Assessment and intervention*. GL Assessment.

Fazel, M., Patel, V., Thomas, S., & Tol, W. (2014). Mental health interventions in schools in low-income and middle-income countries. *The Lancet Psychiatry*, *1*(5), 388-398. https://doi.org/10.1016/s2215-0366(14)70357-8

Fergusson, D. M., & Woodward, L. J. (2002). Mental health, educational, and social role outcomes of adolescents with depression. *Archives of General Psychiatry*, *59*(3), 225. https://doi.org/10.1001/archpsyc.59.3.225

Fusar-Poli, P., Correll, C. U., Arango, C., Berk, M., Patel, V., & Ioannidis, J. P. (2021). Preventive psychiatry: A blueprint for improving the mental health of young people. *World Psychiatry*, *20*(2), 200-221. https://doi.org/10.1002/wps.20869

Garmy, P., Jakobsson, U., Carlsson, K. S., Berg, A., & Clausson, E. K. (2015). Evaluation of a school-based program aimed at preventing depressive symptoms in adolescents. *The Journal of School Nursing*, *31*(2), 117-125. https://doi.org/10.1177/1059840514523296

Gaynor, S. T., Lawrence, P. S., & Nelson-Gray, R. O. (2006). Measuring homework compliance in cognitive-behavioral therapy for adolescent depression. *Behavior Modification*, *30*(5), 647-672. https://doi.org/10.1177/0145445504272979

Gore, F. M., Bloem, P. J., Patton, G. C., Ferguson, J., Joseph, V., Coffey, C., Sawyer, S. M., & Mathers, C. D. (2011). Global burden of disease in young people aged 10–24 years: A systematic analysis. *The Lancet*, *377*(9783), 2093-2102. https://doi.org/10.1016/s0140-6736(11)60512-6

Hayes, S. C., & Hofmann, S. G. (2017). The third wave of cognitive behavioral therapy and the rise of process-based care. *World Psychiatry*, *16*(3), 245-246. https://doi.org/10.1002/wps.20442

Hayes, S. C., Hofmann, S. G., & Ciarrochi, J. (2020). A process-based approach to psychological diagnosis and treatment: The conceptual and treatment utility of an extended evolutionary meta model. *Clinical Psychology Review*, *82*, 101908. https://doi.org/10.1016/j.cpr.2020.101908

Heck, R. H., Thomas, S. L., & Tabata, L. N. (2014). *Multilevel and longitudinal modeling with IBM SPSS* (2nd ed.). New York, NY: Routledge.

Higgen, S., & Mösko, M. (2021). Development and pilot evaluation of a universal intervention – Enhancing resilience in culturally and linguistically diverse primary school classrooms. *International Journal of Educational Research*, *108*, 101757. https://doi.org/10.1016/j.ijer.2021.101757

Higgins, J. P., & Green, S. (Eds.). (2011). *Cochrane handbook for systematic reviews of interventions*. John Wiley & Sons.

Hofmann, S. G., & Hayes, S. C. (2019). The future of intervention science: Process-based therapy. *Clinical Psychological Science*, *7*(1), 37-50. https://doi.org/10.1177/2167702618772296

Jones, P. B. (2013). Adult mental health disorders and their age at onset. *British Journal of Psychiatry*, *202*(s54), s5-s10. https://doi.org/10.1192/bjp.bp.112.119164

Jungbluth, N. J., & Shirk, S. R. (2013). Promoting homework adherence in cognitive-behavioral therapy for adolescent depression. *Journal of Clinical Child & Adolescent Psychology*, *42*(4), 545-553. https://doi.org/10.1080/15374416.2012.743105

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the national comorbidity survey replication. *Archives of General Psychiatry*, *62*(6), 593. https://doi.org/10.1001/archpsyc.62.6.593

Keyes, C. L. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behavior*, *43*(2), 207. https://doi.org/10.2307/3090197

Knapp, M., & Wong, G. (2020). Economics and mental health: The current scenario. *World Psychiatry*, *19*(1), 3-14. https://doi.org/10.1002/wps.20692

Langford, R., Bonell, C., Jones, H., Pouliou, T., Murphy, S., Waters, E., Komro, K., Gibbs, L., Magnus, D., & Campbell, R. (2015). The World Health Organization's health promoting schools framework: A Cochrane systematic review and meta-analysis. *BMC Public Health*, *15*(1). https://doi.org/10.1186/s12889-015-1360-y

Lawlor, M. S., Schonert-Reichl, K. A., Gadermann, A. M., & Zumbo, B. D. (2014). A validation study of the mindful attention awareness scale adapted for children. *Mindfulness*, 5(6), 730–741. https://doi.org/10.1007/s12671-013-0228-4

Leahy, R. L. (2015). *Emotional schema therapy*. Guilford Publications.

Levinson, D. B., Stoll, E. L., Kindy, S. D., Merry, H. L., & Davidson, R. J. (2014). A mind you can count on: Validating breath counting as a behavioral measure of mindfulness. *Frontiers in Psychology*, *5*. https://doi.org/10.3389/fpsyg.2014.01202

Liu, J. J., Ein, N., Gervasio, J., Battaion, M., Reed, M., & Vickers, K. (2020). Comprehensive meta-analysis of resilience interventions. *Clinical Psychology Review*, *82*, 101919. https://doi.org/10.1016/j.cpr.2020.101919

A Lust for Life. (2019). *Schools programme*. https://alflschools.com/

Luijten, C. C., Kuppens, S., van de Bongardt, D., & Nieboer, A. P. (2019). Evaluating the psychometric properties of the mental health continuum-short form (MHC-SF) in Dutch adolescents. *Health and Quality of Life Outcomes*, 17(1), 157. https://doi.org/10.1186/s12955-019-1221-y

Matos, A. P., André, R. S., Cherpe, S., Rodrigues, D., Figueira, C., & Pinto, A. M. (2010). Preliminary psychometric study of the mental health continuum – short form – for youth, in a sample of Portuguese adolescents. *Psychologica*, (53), 131–156. https://doi.org/10.14195/1647-8606_53_7

McLeod, B. D., & Weisz, J. R. (2004). Using dissertations to examine potential bias in child and adolescent clinical trials. *Journal of Consulting and Clinical Psychology*, *72*(2), 235-251. https://doi.org/10.1037/0022-006x.72.2.235

Merikangas, K. R., He, J., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., Benjet, C., Georgiades, K., & Swendsen, J. (2010). Lifetime prevalence of mental disorders in U.S. adolescents: Results from the national comorbidity survey replication–adolescent supplement (NCS-A). *Journal of the American Academy of Child & Adolescent Psychiatry*, *49*(10), 980-989. https://doi.org/10.1016/j.jaac.2010.05.017

Moher, D., Hopewell, S., Schulz, K. F., Montori, V., Gotzsche, P. C., Devereaux, P. J., Elbourne, D., Egger, M., & Altman, D. G. (2010). Consort 2010 explanation and elaboration: Updated guidelines for reporting parallel group randomised trials. *BMJ*, *340*(mar23 1), c869-c869. https://doi.org/10.1136/bmj.c869

O'Connor, M., O'Reilly, G., Murphy, E., Connaughton, L., Hoctor, E., & McHugh, L. (2021). Resilience mediates the cross-sectional relationship between mindfulness and positive mental health in early adolescence. *Journal of Contextual Behavioral Science*, *21*, 171-175. https://doi.org/10.1016/j.jcbs.2021.07.003

Ong, C. W., Levin, M. E., & Twohig, M. P. (2020). Beyond acceptance and commitment therapy: Process-based therapy. *The Psychological Record*, *70*(4), 637-648. https://doi.org/10.1007/s40732-020-00397-z

Patel, V., Flisher, A. J., Hetrick, S., & McGorry, P. (2007). Mental health of young people: A global public-health challenge. *The Lancet*, *369*(9569), 1302-1313. https://doi.org/10.1016/s0140-6736(07)60368-7

Peat, J. (2001). *Health science research: A handbook of quantitative methods*. Sidney, Australia: Allen & Unwin.

Salazar de Pablo, G., De Micheli, A., Nieman, D. H., Correll, C. U., Kessing, L. V., Pfennig, A., Bechdolf, A., Borgwardt, S., Arango, C., Van Amelsvoort, T., Vieta, E., Solmi, M., Oliver, D., Catalan, A., Verdino, V., Di Maggio, L., Bonoldi, I., Vaquerizo-Serrano, J., Baccaredda Boy, O., … Fusar-Poli, P. (2020). Universal and selective interventions to promote good mental health in young people: Systematic review and meta-analysis. *European Neuropsychopharmacology*, *41*, 28-39. https://doi.org/10.1016/j.euroneuro.2020.10.007

Salazar de Pablo, G., De Micheli, A., Solmi, M., Oliver, D., Catalan, A., Verdino, V., Di Maggio, L., Bonoldi, I., Radua, J., Baccaredda Boy, O., Provenzani, U., Ruzzi, F., Calorio, F., Nosari, G., Di Marco, B., Famularo, I., Montealegre, I., Signorini, L., Molteni, S., … Fusar-Poli, P. (2021). Universal and selective interventions to prevent poor mental health outcomes in young people: Systematic review and meta-analysis. *Harvard Review of Psychiatry*, *29*(3), 196-215. https://doi.org/10.1097/hrp.0000000000000294

Salisu, I., & Hashim, N. (2017). A critical review of scales used in resilience research. *IOSR Journal of Business and Management*, *19*(04), 23-33. https://doi.org/10.9790/487x-1904032333

Sawyer, S. M., Afifi, R. A., Bearinger, L. H., Blakemore, S., Dick, B., Ezeh, A. C., & Patton, G. C. (2012). Adolescence: A foundation for future health. *The Lancet*, *379*(9826), 1630-1640. https://doi.org/10.1016/s0140-6736(12)60072-5

Schulz, K. F., Altman, D. G., & Moher, D. (2010). CONSORT 2010 statement: Updated guidelines for reporting parallel group randomised trials. *BMJ*, *340*, c332. https://doi:10.1136/bmj.c332

Senn, S. (1994). Testing for baseline balance in clinical trials. *Statistics in Medicine*, *13*(17), 1715-1726. https://doi.org/10.1002/sim.4780131703

She, R., Yang, X., Lau, M. M. C., & Lau, J. T. F. (2020). Psychometric properties and normative data of the 10-item Connor–Davidson resilience scale among Chinese adolescent students in Hong Kong. *Child Psychiatry & Human Development*, 51(6), 925–933. https://doi.org/10.1007/s10578-020-00970-1

Stockings, E. A., Degenhardt, L., Dobbins, T., Lee, Y. Y., Erskine, H. E., Whiteford, H. A., & Patton, G. (2016). Preventing depression and anxiety in young people: A review of the joint efficacy of universal, selective and indicated prevention. *Psychological Medicine*, *46*(1), 11-26. https://doi.org/10.1017/s0033291715001725

Szabo, T. G., Long, D. M., Villatte, M., & Hayes, S. C. (2015). Mindfulness in contextual cognitive-behavioral models. In K. W. Brown, J. D. Creswell, & R. M. Ryan (Eds.), *Handbook of mindfulness: Theory, research, and practice* (pp. 130-147). The Guilford Press.

WHO. (2004). *Prevention of mental disorders: Effective interventions and policy options*. Department of Mental Health and Substance Abuse.

WHO. (2008). *Mental health gap action programme: Scaling up care for mental, neurological, and substance use disorders*. WHO Press.

Wong, K. F., Massar, S. A. A., Chee, M. W. L., & Lim, J. (2018). Towards an objective measure of mindfulness: Replicating and extending the features of the breath-counting task. *Mindfulness*, *9*(5), 1402-1410. https://doi.org/10.1007/s12671-017-0880-1

Chapter 5: General Discussion

Overview of Chapter

The first section of this chapter describes the aims and findings of the research programme. Following this, the contribution of this body of work to the scientific literature and implications for clinical practice are presented. Next, the limitations of the research programme are outlined. A discussion of directions for future research to extend the scientific knowledge in the field of process-based CBT concludes the chapter.

Main Findings

The promotion of positive psychological functioning is a key objective of clinical psychology and public health agendas (Sawyer et al., 2012; Stockings et al., 2016; World Health Organization, 2008). Rather than persist in focusing on disorder-specific protocols that adopt a disease centred approach to mental health, recent calls have attempted to orient the field of clinical psychology toward isolating and understanding the therapeutic processes of change that represent common threads in the tapestry of psychological interventions (Hofmann & Hayes, 2018). As process-based CBT provides a coherent system for integrating the aforementioned processes with the explicit goal of facilitating the prosperity of people, the current research programme focused on investigating the promotion of positive psychological functioning through such processes. Accordingly, three studies were reported in this thesis, and each explored the promotion of adaptive functioning through transtherapeutic processes.

The first study focused on facilitating the application of processes to conceptualise cases in process-based CBT by evaluating a conceptual model. This model proposed resilience as a pathway through which transtherapeutic mindfulness

processes promote positive mental health (Greeson et al., 2014). The second study aligned with the explicit objective of process-based CBT to distil the literature on processes that promote positive psychological functioning. This study built on its predecessor by synthesising the evidence for the efficacy of such processes in promoting resilience. The third study focused on the development and evaluation of a novel process-based CBT intervention for promoting positive mental health. This intervention explicitly targeted all of the processes explored in the two preceding studies and was evaluated in a cluster randomised controlled trial. Collectively, Studies 1, 2, and 3 help advance the scientific agenda of promoting the positive psychological functioning and prosperity of people.

Study 1

Process-based CBT aims to provide a set of processes that can be applied to conceptualise cases with a view to informing intervention strategies (Ong et al., 2020). To that end, evidence based conceptual models are necessary to delineate the pathways through which such processes promote positive psychological functioning. Prior to the publication of Study 1, however, the empirical literature on the pathways through which mindfulness processes promote positive mental health in young people was sparse. Accordingly, Study 1 investigated a conceptual model of a putative pathway through which this therapeutic process effects change in primary school students. The study aimed to elucidate the relationships between mindfulness, resilience, and positive mental health in this cohort. It was hypothesised that statistically significant positive correlations would be found between mindfulness, resilience, and positive mental health. Moreover, it was predicted that the relationship between mindfulness and positive mental health would be mediated by resilience.

One hundred and twenty-nine early adolescents participated in the cross-sectional study. In line with hypotheses, statistically significant positive correlations were found between mindfulness, resilience and positive mental health. In further support for the aforementioned conceptual model, resilience was observed to be a statistically significant mediator of the relationship between mindfulness and positive mental health. This set of findings augment the process-based CBT evidence base and help provide a conceptual foundation for Studies 2 and 3.

Study 2

Prior to the completion of Study 2, mindfulness processes were among the most common mechanisms utilised in resilience promotion interventions (Ferreira et al., 2021) and cited by clinical texts as a means to this end (e.g., Greeson et al., 2014; Steinebach & Langer, 2019; Turow, 2017). Despite this, the evidence for the efficacy of these initiatives had never been systematically synthesised. Accordingly, a systematic review of this literature had the potential to yield more robust evidence for the efficacy of these initiatives. The primary aim of Study 2 was to elucidate the efficacy of mindfulness in promoting resilience by completing a systematic review and meta-analysis of randomised controlled trials. The secondary aims were to shed light on the maintenance of the aforementioned effects at the longest available follow-up measurement and to explicate moderators of the effects of mindfulness on resilience.

Fifty-seven randomised controlled trials met the criteria for inclusion in the systematic review. Meta-analytic findings revealed that mindfulness outperformed inactive control conditions in promoting resilience at post-intervention and follow-up with medium effect sizes. Mindfulness was also found to be superior to active control conditions with a small effect size at follow-up, but not at post-intervention. No

statistically significant differences were detected relative to comparison interventions. The intervention effects that were observed were not moderated by delivery mode (i.e., in-person or self-help), type of intervention (i.e., universal, indicated, or treatment), population (child and adolescent or adult), duration of intervention, or risk of bias. Taken together, the findings of this study help extend the evidence base for mindfulness processes and provide an empirical foundation for Study 3.

Study 3

Process-based CBT offers a novel framework for integrating therapeutic processes such as those investigated in Studies 1 and 2. Given the nascent state of the empirical literature on this model prior to Study 3, interventional research was needed to evaluate its efficacy in fulfilling its explicit goal of promoting the prosperity of people. Moreover, calls for initiatives to promote positive mental health in early adolescence necessitated the development and evaluation of such an intervention at this key psychosocial stage (Fusar-Poli et al., 2021). In accordance, the primary aim of Study 3 was to determine if a process-based CBT intervention would yield improvements in early adolescents' positive mental health relative to an inactive control condition from baseline to post-intervention and follow-up. The secondary aims were to demonstrate the comparative effects of the intervention on mindfulness, emotional literacy, and resilience.

Six hundred and four early adolescents participated in the cluster randomised controlled trial. Contrary to the primary hypothesis, the process-based CBT and waiting list control groups exhibited no statistically significant difference in positive mental health across time. Despite participant reports that the process-based CBT intervention was satisfactory, it also did not yield statistically significant improvements across time on the secondary outcomes of mindfulness, emotional

literacy, and resilience relative to the control condition. Although disappointing, these negative findings contribute to the nascent empirical literature on process-based CBT and initiatives to promote positive mental health in early adolescence. This contribution to the empirical literature on process-based CBT will be detailed in the next section.

Contribution to the Scientific Literature

A unique contribution to the scientific literature was made by each of the three studies in this thesis. To maximise the reach of their findings, each study was submitted for publication in a peer-reviewed academic journal. Study 1 was recently published in the *Journal of Contextual Behavioral Science* (JCBS). This peer-reviewed journal was selected as it emphasises core behavioural processes that bridge different theoretical models (e.g., evolutionary science, behavioural approaches, and cognitive perspectives) and is ranked 88th out of 227 journals in the field of applied psychology (Scopus, 2022). The *impact factor* of this journal or mean number of times an article published therein is referenced over the previous two years is 3.092. Study 2 is currently under peer-review for publication in the journal *Mindfulness*. Mindfulness was selected as a publication outlet as it places a focus on mechanisms of action in interventional research, is ranked 41st out of 227 journals in the field of applied psychology, and has an impact factor of 4.684 (five year impact factor: 5.899; Scopus, 2022). Similarly, Study 3 is currently under peer-review for publication in the journal *Behaviour Research and Therapy* (BRAT). BRAT was selected as a publication outlet as it emphasises evaluations of novel psychological interventions that target the underlying mechanisms of cognitive and behavioural models, is ranked 11th out of 238 journals in the field of clinical psychology, and has an impact factor of 4.473 (Scopus, 2022). As scholarly communication in the field of clinical psychology

moves toward an open access model, the aforementioned impact factors of journals become less relevant (Antelman, 2004; Smith, 2015). In this context, *altmetrics* or alternative metrics for research have emerged as key indices of activity concerning scholarly content (Piwowar, 2013). Moreover, studies have found positive associations between research altmetrics and citations (Costas et al., 2014; Smith, 2015). The altmetrics associated with the publication of Study 1 were retrieved form PlumX and are presented in Table 5.1.

Table 5.1

Alternative Metrics for the Publication of Study 1

Altmetric	
Mendeley Captures	11
Social Media (Twitter Tweets)	7

Study 1 provided a unique contribution to the empirical literature as the first investigation of resilience as a pathway through which mindfulness processes promote positive mental health in early adolescents. This study strengthens the evidence base for conceptual models of the mechanisms of mindfulness. The findings augment studies that evaluated this conceptual model in older cohorts (Bajaj & Pande, 2016; Cheung et al., 2020). The study also complements research that has demonstrated additional mediational pathways through which mindfulness processes exert their effects on positive mental health outcomes (Howell et al., 2008; Pepping et al., 2013; Schutte & Malouff, 2011).

The new information supplied by Study 1 on the link between mindfulness and resilience directly influenced the subject matter of Study 2. Accordingly, Study 2 represents a contribution to the empirical literature as the first meta-analytic review of

the efficacy of mindfulness processes in promoting resilience. This study advances the literature by providing a concise synthesis of the data that has been collected on the topic to date as well as highlighting areas under this rubric that require additional research. A further output of Study 2 is its contribution to the debate in the literature on the efficacy of mindfulness processes cultivated in alternative formats relative to traditional face-to-face approaches, as no evidence of superiority was observed in the study. Study 2 also has the potential to advance research in the field by highlighting the most common sources of potential bias in the existing evidence base.

In light of recent calls to focus interventional research on transtherapeutic processes of change (Hofmann & Hayes, 2018), Study 3 represented a unique contribution to the evidence base by adding to the nascent empirical work on process-based CBT interventions. In accordance, Study 3 constitutes the first cluster randomised controlled trial to evaluate an explicit process-based CBT intervention for promoting positive mental health in early adolescence. Prior to this study, there was also a gap in the empirical literature on the efficacy of this interventional approach in promoting resilience, mindfulness, and emotional literacy among this cohort. A further contribution of Study 3 is found in the subsequent body of research that it has given rise to. More specifically, an ongoing randomised controlled trial is evaluating the efficacy of this interventional approach in improving poor mental health outcomes among early adolescents.

In summary, this research programme has provided an important contribution to the empirical literature on process-based CBT. Study 1 has been published in a peer-reviewed academic journal and Studies 2 and 3 are currently under peer-review for publication. The three studies have offered original and novel outcomes, supported and extended existing empirical work, and served as the impetus for ongoing research.

As well as contributing to the empirical literature in the field, this research programme has implications for clinical practice.

Implications for Clinical Practice

This research programme offers a range of practical implications for the field of clinical psychology. Given the beneficial effects of mindfulness on a host of mental health outcomes (Chi et al., 2018; Hofmann et al., 2010; Kuyken et al., 2016; Lenz et al., 2016; Lomas et al., 2019; McConville et al., 2017), these processes serve as a key component of many group-based programmes and one-to-one psychological interventions provided by clinical psychology services. Consequently, the findings of Study 1 have the potential to contribute to clinical practice by informing clinical psychologists of how mindfulness exerts its beneficial effects on mental health. These findings support the account proposed by Creswell and Lindsay (2014) which posits that cultivating mindfulness processes in the clinic or attending to stressors as they arise with a non-judgemental attitude buffers clients' stress reactivity and promotes their adaptive responding or resilience, thus promoting mental health. A further implication of Study 1 for clinical practice concerns the relatively low levels of mindfulness found in the sample of Irish primary school students and simultaneously highlights a potential avenue for clinical psychology services to improve psychological functioning in this cohort.

The steep increase in the quantity of empirical research available to practitioners at present has made it extremely difficult to stay abreast of the literature in the field of clinical psychology (Dickson et al., 2014). The comprehensive synthesis of the literature provided in Study 2 presents a solution to this difficulty. Its positive findings may reinforce the ongoing efforts of clinicians in the field to promote psychological resilience with mindfulness processes or alert others to an

approach that they can apply to this end. Indeed, Study 2 provides clinicians with robust evidence that mindfulness processes can be utilised in universal, indicated, and treatment interventions and delivered in-person or via alternative modes to produce small to medium improvements in psychological resilience. In line with the welcomed emphasis on evidence based practice in the field of clinical psychology, wherein public health services, insurance companies, and client advocacy groups demand that psychological services be based on empirical evidence (Hofmann & Hayes, 2018), this set of findings make a valuable contribution to clinical practice.

Another practical implication of this programme of research is its failure to endorse the process-based CBT intervention in Study 3 as an efficacious initiative. Consequently, the findings do not support the use of this specific intervention in clinical practice to foster resilience in clients. The extended evolutionary meta model underpinning this approach, however, may provide practitioners with a helpful means of coherently integrating the gamut of therapeutic processes that they evoke in their clinical work. A further practical implication of Study 3 concerns the discrepancy between participants' reported satisfaction with the intervention and its inefficacy in effecting change on outcome measures. This finding may caution clinicians not to interpret clients' reported satisfaction as a proxy measure of intervention efficacy and highlights the importance of employing valid and reliable outcome measures to evaluate psychological services.

In summary, this research programme presents a host of practical implications for the field of clinical psychology. The research helps clinicians to understand how therapeutic processes promote positive functioning, facilitates efforts to stay abreast of literature in the field, and elucidates avenues to improve positive mental health. The aforementioned inferences and implications for clinical practice are tempered by

a number of research limitations. The limitations associated with this research programme will be discussed in the next section.

Overarching Limitations

Despite exhibiting numerous strengths, this research programme also features a number of shortcomings. The current section will outline the limitations that overshadow the overall research programme, as the shortcomings specific to each of the three studies are presented in their respective chapters. The superordinate limitations of this programme of research include sampling strategies, precision of terminology, and reliance on published research.

Sampling strategies. The first subordinate limitation of this research programme regards the representativeness of the study samples that were recruited. Similar to a vast array of psychological studies (Brough, 2019), the individuals sampled in the constituent studies in this research programme were recruited through self-selection and in accordance with study inclusion criteria. The individuals in Study 1, for example, were recruited through self-selection and were predominantly Caucasian and identified as female. Similarly, the individuals in Study 3 were also self-selected and mostly identified as female. Such convenience sampling poses a risk that the study samples in the research programme were not fully representative of the cohorts from which they were recruited, hence potentially reducing the external validity of their results (Thomas & Hersen, 2011). As 55% of eligible individuals did not participate in Study 3, for example, individuals' levels of motivation may have influenced their willingness to participate and thus introduced selection bias into the research. Moreover, the samples recruited for this research programme were quite homogenous: participants all resided in Ireland and most had relatively high levels of positive psychological functioning. The external validity of this research programme

could be augmented by replicating the findings of its constituent studies in randomly selected, heterogeneous samples.

Precision of terminology. A further superordinate limitation of this research programme concerns the precision of the terminology used throughout its constituent studies. In each study, mid-level adaptive process terms are utilised, that is, non-technical terms that are situated between basic scientific principles, such as punishment, reinforcement, and stimulus discrimination, and high-level psychological terms, such as perception, attention, and metacognition (Barnes-Holmes et al., 2016). The mid-level adaptive process terms utilised in the current research programme included cognitive reappraisal, arousal reduction, and mindfulness processes. Barnes-Holmes et al. (2016) have argued that the use of such terms is problematic in a research context, as they have less precision, scope, and depth in predicting and influencing behaviour than basic scientific or low-level terms. Conversely, Ong et al. (2020) have posited that mid-level adaptive process terms have a central role in process-based CBT due to their utility in translational work and relevance to practitioners in the clinic. Nonetheless, future research could address this potential limitation of employing such terms by using more precise, basic scientific terms in intervention development and evaluation (e.g., Kohlenberg & Tsai, 1991).

Reliance on published research. A final superordinate limitation of this research programme concerns its reliance on research published in peer-reviewed journals. The research hypotheses, outcome measures, and descriptions of the scientific background and context around each of the three studies were informed by research published in peer-reviewed journals. Although an element of quality control is inherent in such research relative to unpublished or grey literature, it is not without its shortcomings. Published studies are more likely to report statistically significant

findings as well as greater effect size estimates than studies disseminated in other outlets (Boutron et al., 2021; Dechartres et al., 2018; Rising et al., 2008; Schmucker et al., 2014). Indeed, Coronado-Montoya et al. (2016) observed this pattern in the literature on mindfulness processes. Similarly, given that studies with unfavourable results that are published are delayed by approximately one year relative to those with favourable results (Boutron et al., 2021; Hopewell et al., 2007; Urrútia et al., 2016), the exclusion of unpublished or grey literature in this research programme had the potential to omit a portion of the most up-to-date evidence. In accordance, future research could address this potential limitation by including data from theses, government reports, and conference abstracts.

Directions for Future Research

Further to recommendations to address the superordinate limitations of this body of work, the research programme indicates a number of directions for future empirical research. The sleeper effect observed in chapter 3 showed that scores on outcome measures markedly increased in the period after intervention cessation. Based on this finding, therapeutic processes promoted in intervention sessions may require cultivation through independent practice, generalisation, and consolidation in order to yield maximal effects on outcome measures (Hermida et al., 2015). Notably, the aforementioned sleeper effect was detected at the longest available follow-up measurement in trials. It is possible that the inefficacy of the intervention evaluated in chapter 4 may be partially due to the brevity of its follow-up period – just six weeks after intervention cessation. Indeed, models such as the Mindfulness Stress Buffering Account (Creswell & Lindsay, 2014) posit that many of the beneficial effects of such therapeutic processes on mental health manifest over time in contexts where one is confronted with personal challenges or stressors. In accordance, future research could

test this hypothesis by evaluating the efficacy of process-based CBT interventions, such as that trialled in chapter 4, at longer follow-up periods, such as six or twelve months. For example, this research avenue could be explored by incorporating a twelve-month follow-up measurement into the trial in chapter 4 so as to assess participants in the context of the challenging transition to secondary school.

Another direction for future research concerns the psychological processes or client characteristics that moderate intervention outcomes. Hayes and Hofmann (2018) state that identifying outcome moderators is a key objective of process-based CBT, as few processes are exclusively positive irrespective of context. Such variables influence the outcomes of process-based CBT and their identification moves the field of clinical psychology closer to answering Paul's (1969) seminal question: what works for whom under what circumstances? Consequently, future research should elucidate moderators of the outcomes reported in this research programme. For example, future research could investigate the extent to which the effect of mindfulness on positive mental health through resilience in chapter 2 is moderated by a fourth variable (e.g., perceived stress). Similarly, given the inefficacy of the intervention among individuals with relatively high pre-intervention positive mental health in chapter 4, future research could evaluate baseline levels of this variable as an outcome moderator. The moderation analysis in chapter 3 could also be extended by future research to investigate additional putative outcome moderators such as gender (e.g., Rojiani et al., 2017) or age (e.g., Galvez Tan & Alampay, 2021). The identification of such moderators has the potential to move the scientific literature forward and inform clinical decision making and case management planning.

A final direction for future research concerns the nascent evidence base for explicit process-based CBT interventions. In order to promote the adoption of this

approach in clinical practice, a body of empirical support is needed. In accordance, empiricism is a core tenet of process-based CBT (Ong et al., 2020). To this end, trialists should design studies with a view to fulfilling the National Institute for Health and Care Excellence (2012) and American Psychological Association Division of Clinical Psychology (Chambless & Hollon, 1998; Tolin et al., 2015) criteria for research-supported psychological treatments. For categorisation as an intervention with *strong research support*, for example, the latter require trials from at least two different research teams that demonstrate superiority relative to another intervention, drug, or placebo. This agenda for future research should be advanced in a manner that is congruent with the principles of process-based CBT (e.g., with a focus on cultivating positive mental health, not solely an absence of disorder). Moreover, such trials should be designed, where possible, to rectify the sources of potential bias noted in this research programme. In line with this suggestion, the field is active with recruitment ongoing for such a trial of process-based CBT (ClinicalTrials.gov ID: NCT04198597).

Conclusion

In conclusion, this research programme focused on investigating the promotion of positive psychological functioning through cognitive and behavioural processes. As process-based CBT offers a model for integrating such processes with the explicit goal of promoting the prosperity of people, it provided an ideal framework for this body of work. The first study focused on evaluating a conceptual model that proposed resilience as a pathway through which mindfulness processes promote positive mental health. Findings from Study 1 provided support for this model in a sample of early adolescents. Conversely, the interventional research in Studies 2 and 3 yielded less empirical support for the efficacy of such processes in promoting positive

psychological functioning. Findings from the meta-analysis in Study 2 revealed that, although superior to less rigorous control conditions, mindfulness processes were not more efficacious in promoting resilience than comparison interventions. This finding is consistent with syntheses of studies that investigated the relative efficacy of different psychotherapeutic approaches. Indeed, a meta-review that included 17 meta-analyses of trials comparing different psychotherapeutic approaches in improving mental health outcomes revealed non-significant differences in the efficacy of the approaches (Luborsky et al., 2002). This phenomena of equivalence in the efficacy of different psychotherapies has been labelled the *dodo bird's verdict* and has fuelled debate in the field for nearly a century (Elliott et al., 2015; Rosenzweig, 1936; Wampold & Imel, 2015). In Study 3, a novel intervention that integrated all of the processes explored in the two preceding studies was evaluated, but findings from this cluster randomised controlled trial did not support its efficacy in promoting positive mental health in a sample of early adolescents. Similarly, the intervention was not efficacious in cultivating resilience, mindfulness, or emotional literacy. Collectively, the findings from the three studies contribute to the empirical literature on process-based CBT and have a number of practical implications for clinical psychologists. Although this field is currently active with research, further studies are needed to aid the continued empirical development of process-based CBT and the promotion of positive psychological functioning in people.

References

Antelman, K. (2004). Do open-access articles have a greater research impact? *College and Research Libraries*, *65*(5), 372-382. https://doi:10.5860/crl.65.5.372

Bajaj, B., & Pande, N. (2016). Mediating role of resilience in the impact of mindfulness on life satisfaction and affect as indices of subjective well-being. *Personality and Individual Differences*, 93, 63–67. https://doi.org/10.1016/j.paid.2015.09.005

Barnes-Holmes, Y., Hussey, I., McEnteggart, C., Barnes-Holmes, D., & Foody, M. (2016). Scientific ambition: The relationship between relational frame theory and middle-level terms in acceptance and commitment therapy. In R. D. Zettle, S. C. Hayes, D. Barnes-Holmes, & A. Biglan (Eds.), *The Wiley handbook of contextual behavioral science* (pp. 452-473). Hoboken, NJ: John Wiley & Sons.

Boutron, I., Page, M. J., Higgins, J. P., Altman, D. G., Lundh, A., & Hróbjartsson, A. (2021). Considering bias and conflicts of interest among the included studies. In J. P. Higgins, J. Thomas, J. Chandler, M. Cumpston, T. Li, M. Page, & V. Welch (Eds.), *Cochrane handbook for systematic reviews of interventions* (6th ed.). https://training.cochrane.org/handbook/archive/v6.2

Brough, P. (2019). *Advanced research methods for applied psychology: Design, analysis and reporting* (1st ed.). New York, NY: Routledge.

Chambless, D. L., & Hollon, S. D. (1998). Defining empirically supported therapies. *Journal of consulting and clinical psychology*, *66*(1), 7-18. https://doi.org/10.1037//0022-006x.66.1.7

Cheung, S., Xie, X., & Huang, C. (2020). Mind over matter: Mindfulness, income, resilience, and life quality of vocational high school students in China. *International Journal of Environmental Research and Public Health*, 17(16), 5701. https://doi.org/10.3390/ijerph17165701

Chi, X., Bo, A., Liu, T., Zhang, P., & Chi, I. (2018). Effects of mindfulness-based stress reduction on depression in adolescents and young adults: A systematic review and meta-analysis. *Frontiers in Psychology, 9*, 1034. https://doi:10.3389/fpsyg.2018.01034

Coronado-Montoya, S., Levis, A. W., Kwakkenbos, L., Steele, R. J., Turner, E. H., & Thombs, B. D. (2016). Reporting of positive results in randomized controlled trials of mindfulness-based mental health interventions. *PLOS ONE*, *11*(4), e0153220. https://doi.org/10.1371/journal.pone.0153220

Costas, R., Zahedi, Z., & Wouters, P. (2014). Do altmetrics correlate with citations? Extensive comparison of altmetric indicators with citations from a multidisciplinary perspective. *Journal of the Association for Information Science and Technology*, *66*(10), 2003-2019. https://doi:10.1002/asi.23309

Creswell, J. D., & Lindsay, E. K. (2014). How does mindfulness training affect health? A mindfulness stress buffering account. *Current Directions in Psychological Science*, 23(6), 401–407. https://doi.org/10.1177/0963721414547415

Dechartres, A., Atal, L., Riveros, C., Meerpohl, J., & Ravaud, P. (2018). Association between publication characteristics and treatment effect estimates: A meta-epidemiologic study. *Annals of Internal Medicine*, *169*(6), 385-393. https://doi.org/10.7326/M18-1517

Dickson, R., Cherry, M. G., & Boland, A. (2014). Carrying out a systematic review as

a master's thesis. In A. Boland, M. G. Cherry, & R. Dickson (Eds.), *Doing a systematic review: A student's guide* (pp. 1-16). London, England: Sage.

Elliott, K., Barker, K. K., & Hunsley, J. (2015). Dodo Bird Verdict in Psychotherapy. In R. L. Cautin & S. O. Lilienfeld (Eds.), *The Encyclopedia of Clinical Psychology*. Wiley Blackwell. doi.org/10.1002/9781118625392.wbecp053

Ferreira, M., Marques, A., & Gomes, P. V. (2021). Individual resilience interventions: A systematic review in adult population samples over the last decade. *Int J Environ Res Public Health*, *18*(14). https://doi.org/10.3390/ijerph18147564

Fusar-Poli, P., Correll, C. U., Arango, C., Berk, M., Patel, V., & Ioannidis, J. P. (2021). Preventive psychiatry: A blueprint for improving the mental health of young people. *World Psychiatry*, *20*(2), 200-221. https://doi.org/10.1002/wps.20869

Galvez Tan, L. J., & Alampay, L. P. (2021). Exploring moderators of intervention effects of a mindfulness program for Filipino children. *International Journal of School & Educational Psychology*, 1-15. https://doi.org/10.1080/21683603.2020.1856741

Greeson, J., Garland, E. L., & Black, D. (2014). Mindfulness: A transtherapeutic approach for transdiagnostic mental processes. In A. Ie, C. T. Ngnoumen, & E. J. Langer (Eds.), *The Wiley Blackwell handbook of mindfulness* (pp. 533-562). John Wiley & Sons.

Hayes, S. C., & Hofmann, S. G. (2018). Future directions in CBT and evidence-based therapy. In S. C. Hayes & S. G. Hofmann (Eds.), *Process-based CBT: The science and core clinical competencies of cognitive behavioral therapy* (pp. 427-440). New Harbinger Publications.

Hermida, M., Segretin, M., Prats, L., Fracchia, C., Colombo, J., & Lipina, S. (2015). Cognitive neuroscience, developmental psychology, and education: Interdisciplinary development of an intervention for low socioeconomic status kindergarten children. *Trends in Neuroscience and Education*, *4*(1-2), 15-25. https://doi.org/10.1016/j.tine.2015.03.003

Hofmann, S. G., & Hayes, S. C. (2018). The history and current status of CBT as an evidence-based therapy. In S. C. Hayes & S. G. Hofmann (Eds.), *Process-based CBT: The science and core clinical competencies of cognitive behavioral therapy* (pp. 7-22). New Harbinger Publications.

Hofmann, S. G., Sawyer, A., Witt, A., & Oh, D. (2010). The Effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of Consulting and Clinical Psychology, 78*(2), 169–183. https://doi:10.1037/a0018555

Hopewell, S., Clarke, M., Stewart, L., & Tierney, J. (2007). Time to publication for results of clinical trials. *Cochrane Database of Systematic Reviews*, *2007*(2), MR000011. https://doi.org/10.1002/14651858.MR000011.pub2

Howell, A. J., Digdon, N. L., Buro, K., & Sheptycki, A. R. (2008). Relations among mindfulness, well-being, and sleep. *Personality and Individual Differences*, 45(8), 773–777. https://doi.org/10.1016/j.paid.2008.08.005

Kohlenberg, R. J., & Tsai, M. (1991). *Functional analytic psychotherapy: Creating intense and curative therapeutic relationships*. New York, NY: Plenum.

Kuyken, W., Warren, F., Taylor, R., Whalley, B., Crane, C., Bondolfi, G., Hayes, R., Huijbers, M., Ma, H., Schweizer, S., Segal, Z., Speckens, A., Teasdale, J. D., Van Heeringen, K., Williams, M., Byford, S., Byng, R., & Dalgleish, T. (2016). Efficacy of mindfulness-based cognitive therapy in prevention of

depressive relapse: An individual patient data meta-analysis from randomized trials. *JAMA Psychiatry, 73*(6), 565. https://doi:10.1001/jamapsychiatry.2016.0076

Lenz, A., Hall, J., & Smith, L. (2016). Meta-analysis of group mindfulness-based cognitive therapy for decreasing symptoms of acute depression. *The Journal for Specialists in Group Work, 41*(1), 44–70. https://doi:10.1080/01933922.2015.1111488

Lomas, T., Medina, J., Ivtzan, I., Rupprecht, S., & Eiroa-Orosa, F. (2019). A systematic review and meta-analysis of the impact of mindfulness-based interventions on the well-being of healthcare professionals. *Mindfulness, 10*(7), 1193–1216. https://doi:10.1007/s12671-018-1062- 5

Luborsky, L., Rosenthal, R., Diguer, L., Andrusyna, T. P., Berman, J. S., Levitt, J. T., Seligman, D. A., & Krause, E. D. (2002). The dodo bird verdict is alive and well-mostly. *Clinical Psychology: Science and Practice*, *9*(1), 2-12. https://doi.org/10.1093/clipsy.9.1.2

McConville, J., McAleer, R., & Hahne, A. (2017). Mindfulness training for health profession students—the effect of mindfulness training on psychological well-being, learning and clinical performance of health professional students: A systematic review of randomized and non-randomized controlled trials. *EXPLORE: The Journal of Science and Healing*, *13*(1), 26–45. https://doi:10.1016/j.explore.2016.10.002

National Institute for Health and Care Excellence. (2012). *The guidelines manual*. https://www.nice.org.uk/process/pmg6/resources/the-guidelines-manual-pdf-2007970804933

Ong, C. W., Levin, M. E., & Twohig, M. P. (2020). Beyond acceptance and commitment therapy: Process-based therapy. *The Psychological Record*, *70*(4), 637-648. https://doi.org/10.1007/s40732-020-00397-z

Paul, G. L. (1969). Behavior modification research: Design and tactics. In C. M. Franks (Ed.), *Behavior therapy: appraisal and status* (pp. 29-62). McGraw-Hill.

Pepping, C. A., O'Donovan, A., & Davis, P. J. (2013). The positive effects of mindfulness on self-esteem. *The Journal of Positive Psychology*, 8(5), 376–386. https://doi.org/10.1080/17439760.2013.807353

Piwowar, H. (2013). Introduction altmetrics: What, why and where? *Bulletin of the American Society for Information Science and Technology*, *39*(4), 8-9. https://doi:10.1002/bult.2013.1720390404

Rising, K., Bacchetti, P., & Bero, L. (2008). Reporting bias in drug trials submitted to the Food and Drug Administration: Review of publication and presentation. *PLoS Medicine*, *5*(11), e217. https://doi.org/10.1371/journal.pmed.0050217

Rojiani, R., Santoyo, J. F., Rahrig, H., Roth, H. D., & Britton, W. B. (2017). Women benefit more than men in response to college-based meditation training. *Frontiers in Psychology*, *8*. https://doi.org/10.3389/fpsyg.2017.00551

Rosenzweig, S. (1936). Some implicit common factors in diverse methods of psychotherapy. *American Journal of Orthopsychiatry*, *6*(3), 412-415. https://doi.org/10.1111/j.1939-0025.1936.tb05248.x

Sawyer, S. M., Afifi, R. A., Bearinger, L. H., Blakemore, S., Dick, B., Ezeh, A. C., & Patton, G. C. (2012). Adolescence: A foundation for future health. *The*

Lancet, *379*(9826), 1630-1640. https://doi.org/10.1016/s0140-6736(12)60072-5

Schmucker, C., Schell, L. K., Portalupi, S., Oeller, P., Cabrera, L., Bassler, D., Schwarzer, G., Scherer, R. W., Antes, G., Von Elm, E., & Meerpohl, J. J. (2014). Extent of non-publication in cohorts of studies approved by research ethics committees or included in trial registries. *PLoS ONE*, *9*(12), e114023. https://doi.org/10.1371/journal.pone.0114023

Schutte, N. S., & Malouff, J. M. (2011). Emotional intelligence mediates the relationship between mindfulness and subjective well-being. *Personality and Individual Differences*, 50(7), 1116–1119. https://doi.org/10.1016/j.paid.2011.01.037

Scopus. (2022, March 22). *Scopus sources*. https://www.scopus.com/sources

Smith, S. (2015). *PhD by published work: A practical guide for success*. London, United Kingdom: Palgrave.

Steinebach, C., & Langer, Á. I. (Eds.). (2019). *Enhancing resilience in youth: Mindfulness-based interventions in positive environments*. Springer Nature.

Stockings, E. A., Degenhardt, L., Dobbins, T., Lee, Y. Y., Erskine, H. E., Whiteford, H. A., & Patton, G. (2016). Preventing depression and anxiety in young people: A review of the joint efficacy of universal, selective and indicated prevention. *Psychological Medicine*, *46*(1), 11-26. https://doi.org/10.1017/s0033291715001725

Thomas, J., & Hersen, M. (2011). *Understanding research in clinical and counseling psychology* (2nd ed.). New York, NY: Routledge.

Tolin, D. F., McKay, D., Forman, E. M., Klonsky, E. D., & Thombs, B. D. (2015). Empirically supported treatment: Recommendations for a new model. *Clinical*

psychology: Science and practice, *22*(4), 317-338. https://doi.org/10.1037/h0101729

Turow, R. G. (2017). *Mindfulness skills for trauma and ptsd: Practices for recovery and resilience*. W. W. Norton & Company.

Urrútia, G., Ballesteros, M., Djulbegovic, B., Gich, I., Roqué, M., & Bonfill, X. (2016). Cancer randomized trials showed that dissemination bias is still a problem to be solved. *J Clin Epidemiol*, *77*, 84-90. https://doi.org/10.1016/j.jclinepi.2016.04.011

Wampold, B. E., & Imel, Z. E. (2015). *The great psychotherapy debate: The evidence for what makes psychotherapy work*. Routledge.

World Health Organization. (2008). *Mental health gap action programme: Scaling up care for mental, neurological, and substance use disorders*. WHO Press.

Appendix A

UCD Office of Research Ethics

Roebuck Castle
University College Dublin
Belfield, Dublin 4, Ireland

T +353 1 716 8767

An Oifig Eitic Thaighde UCD

Caisleán Roebuck
An Coláiste Ollscoile, Baile Átha Cliath
Belfield, Baile Átha Cliath 4, Éire

hrec@ucd.ie
www.ucd.ie/researchethics

January 7th, 2020

Mr Martin O'Connor
c/o Dr Louise McHugh
UCD School of Psychology
Belfield
Dublin 4

Re: HS-19-75-OConnor-McHugh: *Pilot evaluation of a school-based programme aimed at promoting well-being in adolescents*

Dear Mr Martin

Thank you for your response to the Human Research Ethics Committee – Humanities (03/01/20). The Decision of the Committee is that **approval is granted** for this application which is subject to the conditions set out below.

Please note that **public liability insurance for this study has been confirmed** in accordance with our guidelines.[i]

Please note that approval is for the work and the time period specified in the above protocol and is subject to the following:

- Any amendments or requests to extend the original approved study will need to be approved by the Committee. Therefore you will need to submit by email the *Request to Amend/Extend Form* (HR4);
- Any unexpected adverse events that occur during the conduct of your research should be notified to the Committee. Therefore you will need to Submit, by email, an *Unexpected Adverse Events Report* (HR5);
- You or your supervisor (if applicable) are required to submit a signed *End of Study Report Form* (HR6) to the Committee upon the completion of your study;
- This approval is granted on condition that you ensure that, in compliance with the Data Protection Acts 1988 and 2003, all data will be managed in accordance with your application and that you will confirm this in your *End of Study Report* (HR6);
- Please note that further **new** submissions from you may not be reviewed until any **End of Study Reports due** have been submitted to the Office of Research Ethics. That is, any earlier study that you received ethical approval for from the UCD HRECs;
- You may require copies of submitted documentation relating to this approved application and therefore we advise that you retain copies for your own records;
- Please note that the granting of this ethical approval is premised on the assumption that the research will be carried out within the limits of the law;
- Please also note that approved applications and any subsequent amendments are subject to a Research Ethics Compliance Review.

The Committee wishes you well with your research and look forward to receiving your End of Study Report. All forms are available on the website www.ucd.ie/researchethics please ensure that you submit the latest version of the relevant form. If you have any queries regarding the above please contact the Office of Research Ethics and please quote your reference in all correspondence.

Yours sincerely,

Dr Joan Tiernan
Chair Human Research Ethics Committee - Humanities

[i] http://www.ucd.ie/researchethics/information_for_researchers/insurance/

Appendix B

PsycINFO

(mainsubject(Mindfulness) OR mainsubject(Mindfulness-Based Interventions) OR mainsubject(Meditation) OR mindful* OR meditat* OR mbi* OR mbsr OR mbct OR mbrp OR mbrt) AND (mainsubject(Resilience (Psychological)) OR mainsubject(Psychological Endurance) OR resilien*)

Interface: ProQuest.

Timespan: All years.

Filters: English language, humans.

MEDLINE

(mesh(Mindfulness) OR mesh(Meditation) OR mindful* OR meditat* OR mbi* OR mbsr OR mbct OR mbrp OR mbrt) AND (mesh(Resilience, Psychological) OR resilien*)

Interface: ProQuest.

Timespan: All years.

Filters: English language, humans.

CINAHL

S1. MH Mindfulness OR MH Meditation OR TX mindful* OR TX meditat* OR TX mbi* OR TX mbsr OR TX mbct OR TX mbrp OR TX mbrt

S2. MH Hardiness OR TX resilien*

S3. S1 AND S2

Interface: EBSCO host.

Timespan: All years.

Filters: English language, humans.

CENTRAL

#1. MeSH descriptor: [Mindfulness] explode all trees

#2. MeSH descriptor: [Meditation] explode all trees

#3. MeSH descriptor: [Resilience, Psychological] explode all trees

#4. (mindful*)

#5. (meditat*)

#6. (mbi*)

#7. (mbsr)

#8. (mbct)

#9. (mbrp)

#10. (mbrt)

#11. (resilien*)

#12. #1 OR #2 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10

#13. #3 OR #11

#14. #12 AND #13

Interface: Cochrane.

Timespan: All years.