Testing the validity of a novel, conceptual, strength-based model in predicting resilient functioning in an UK-based, adolescent, student population:

A prospective evaluation

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ABSTRACT

Introduction: Mental health problems in adolescence can be precursors of psychosocial problems in adulthood, increasing the likelihood for engaging in health-risk behaviours. Given that most of mental health problems remain untreated for years with subsequent repercussions for society and economy, governments have stressed the need to implement universal, resilience interventions early in adolescence. Adolescence is a pivotal developmental period, favouring the large-scale roll-out of universal, resilience interventions. Due to the inconsistent effects of these interventions in decreasing mental health problems and promoting resilience, their content and structure should be reconsidered. As such, it is vital to investigate the underpinning pathways between stress and resilient functioning.

Aim: This study aims to test the validity of a novel, conceptual, strength-based model in predicting resilient functioning in an UK-based, adolescent population.

Methods: A prospective, questionnaire-based, cohort study with a baseline and 6-month follow-up assessments was conducted. Overall, 561 adolescents aged 11-16 were enrolled and participated in this study.

Measures: Seven validated questionnaires were used, namely: i) the Perceived Stress Scale (PSS), ii) the Self-Efficacy Questionnaire for Children (SEQ-C), iii) Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA), iv) the Warwick-Edinburgh Mental Well-being Scale (WEMWBS), v) the Revised Children's Manifest Anxiety Scale (RCMAS), vi) Positive & Negative Affect Scale (PANAS), and viii) the Strengths and Difficulties Questionnaire (SDQ).

Analysis: A panel, moderated-mediation, path model was analysed. The proposed model consisted of a predictor variable (PSS), a mediator variable (SEQ-C), a moderator variable (ERQ-CA), and four outcome variables (WEMWBS, RCMAS, PANAS, & SDQ).

Results: Perceived self-efficacy was found to be a significant mediator between: stress perceptions and anxiety symptoms (0.13, 95%CI = 0.06, 0.21, $p \leq 0.001$), stress perceptions and socio-emotional disturbances (0.18, 95%CI = 0.14, 0.24, $p \leq 0.001$), stress perceptions and positive emotions (-0.42, 95%CI = -0.52, -0.32, $p \leq 0.001$), and stress perceptions and mental well-being (-0.49, 95%CI = -0.59, -0.39, $p \leq 0.001$) while emotion regulation was

found to significantly moderate the relationship between stress perceptions and perceived self-efficacy.

Discussion: Perceived self-efficacy and emotion regulation were found to counterbalance stress levels and increase resilient functioning. Future interventions will benefit from following a strength-based approach.

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LIST OF ABBREVIATIONS

AC	Active control
AIC	Akaike Information Criterion
AOP	Aussie Optimism Programme
AOP-PTS	Aussie Optimism Programme-Positive Thinking Skills
BCI	Behaviour Change Interventions
BIC	Bayesian Information Criterion
CASQ	Children's Attributional Style Questionnaire
CBT	Cognitive Behavioural Therapy
CI	Confidence Intervals
CDI	Children’s Depression Inventory
CENTRAL	Cochrane Central Register of Controlled Trials
CFI	Comparative fit index
CINAHL	Cumulative Index to Nursing and Allied Health Literature
CLT	Central Limit Theorem
CMD	Covariate-dependent missingness assumption test
ConQual	Confidence in the output of qualitative research synthesis
CRF	Case Report Form
DALYs	Disability-adjusted life-years
df	Degrees of Freedom
DG	Delayed Gratification
DISA	Din Inre Styrka Aktiveras (Depression in Swedish Adolescents, translated from Swedish)
ENTREQ	Enhancing transparency in reporting the synthesis of qualitative research
EPOC	Effective Practice and Organization of Care Review Group
ERQ-CA	Emotion Regulation Questionnaire for Children and Adolescents
FIML	Full information maximum likelihood
FMI	Fraction of missing information
GCP	Good Clinical Practice
GRADE	Grading of Recommendations Assessment, Development and Evaluation

IPT	Interpersonal Therapy
k	Number of studies
MANOVA	Multivariate Analysis of Variance
MAR	Missing at Random Data
MCAR	Missing Completely at Random Data
MCMC	Markov Chain Monte Carlo
M	Mean
MD	Mean Difference
MESSY	Matson Evaluation of Social Skills with Youngsters
MHP	Mental health professionals
ML	Maximum likelihood
MLMV	Maximum likelihood missing values
MNAR	Missing Not At Random
n	Number of participants
NI	Non-intervention
NR	Non-reported
OLP	Optimism Lifeskills Programme
OTS	Optimistic Thinking Skills
OVK	Op Volle Kracht (At Full Power, translated from Dutch)
PANAS	Positive & Negative Affect Scale
PANAS-C	Positive & Negative Affect Scale for Children
PBIS	Positive Behavioural Intervention and Support
PCLOSE	p of Close Fit
PPP	Penn Prevention Programme
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PRP	Penn Resiliency Programme
PS	Problem-Solving
PSS	Global Measure of Perceived Stress Scale
PTP	Positive Thinking Programme
RAP	Resourceful Adolescent Programme
RCMAS	Reynolds Children's Manifest Anxiety Scale
RCTs	Randomised Controlled Trials

R&D	Research and Development Department
RE	Relative efficiency
REC	Research Ethics Committee
RET	Reason and Emotion Psychotherapy Theory
RMSEA	Steiger–Lind Root Mean Square Error of Approximation
ROB	Risk of Bias
RVI	Relative increase in variance
SB	Social-Behavioural
SCAS	Spence Children's Anxiety Scale
SD	Standard deviation
SDQ	Strengths and Difficulties Questionnaire
SEL	Social-emotional Learning
SEM	Structural Equation Modelling
SEQ-C	Self-Efficacy Questionnaire for Children
SLS	Social Life Skills
SMD	Standardised mean difference
SMRM	Standardized Root Mean Square Residual
STAIC	State-Trait Anxiety Inventory for Children
S-W	Shapiro-Wilk’s test
TLI	Tucker Lewis Index
VIF	Variance inflation factor
WEMWBS	Warwick-Edinburgh Mental Well-being Scale
WHO	World Health Organisation
WL	Waiting-list
YLD	Years-lived with disability

INTRODUCTION

Adolescence is a critical developmental period where psychological, neurobiological, and structural brain changes take place (Blakemore & Mills, 2014). Adolescence is also the riskiest period for developing mental health problems, increasing the risk of mental health disorders to emerge in adulthood (Jones, 2013; Patton et al., 2014). Mental health disorders affect nearly 20% of adolescents worldwide (Kieling et al., 2011) and half of mental disorders in adults have emerged by the age of 14 (Kessler et al., 2005; Merikangas et al., 2010). The lifetime prevalence of anxiety, mood, and substance use disorders are 28.8%, 20.8%, and 14.6% respectively (Kessler et al., 2005), with the mood disorders being the leading cause of years-lived with disability (YLD) (Vos et al., 2015). Mental health problems are associated with marginalization, later psychosocial impairments, poor educational outcomes, chronic diseases, increased likelihood for engaging in health-risk behaviours (Kessler, Avenevoli, & Ries Merikangas, 2001; Woodward & Fergusson, 2001), and tend to be more persistent in adolescence (Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen, 2012; Patton et al., 2014). Health-risk behaviours, such as alcohol, substance use, and unsafe sex, are the main risk factor for incident disability-adjusted life-years (DALYs) in adolescents and young adults aged 10-24 (Gore et al., 2011). Depressive and anxiety disorders related to substances' use account for 40.5% and 14.6% DALYs respectively (Whiteford et al., 2013). The treatment of mental health disorders results in enormous, direct (e.g. hospitalization, medication and therapy) and indirect (e.g. loss of productivity and earnings) costs and it is expected to reach £19 billion by 2026 in the UK (McCrone, Dhanasiri, Patel, Knapp, & Lawton-Smith, 2008). The burden of mental health disorders in adolescents and young people is enormous whilst the existing psychological treatments have shown limited effects in reducing the disease burden (Holmes et al., 2018). Given that the treatment of mental health disorders has serious fiscal and societal repercussions, it is vital for public health policies to focus on prevention (Green Paper, 2017).

Subclinical mental health problems, which remain untreated for long, contribute to the development of mental health disorders during adolescence. Negative appraisals of external stimuli following by unresolved responses to stress increase the occurrence of subclinical mental health problems (Lazarus & Folkman, 1984). It is vital therefore for prevention programmes to target the links between stress perceptions and mental health,

preparing adolescents to withstand and deal effectively with a range of stressors. Mental health can be described as: "*a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community*" (World Health Organisation, 2014). Optimal mental health presupposes individuals' ability to flourish and experience well-being amid stress alongside the absence of mental health problems, such as anxiety or dysphoria (Keyes, 2007). As such, prevention efforts should adopt a holistic approach, targeting mental health problems, subjective well-being, and interpersonal relationships (Patton et al., 2016; WHO, 2017). The action plan of World Health Organisation (WHO) for 2013-2020 has set the promotion of adolescents' mental health at the forefront of the public health interest, stressing the need for national governments to prioritise the implementation of mental health promotion interventions in schools (WHO, 2013). Schools can provide a resourceful environment for implementing mental health promotion and prevention interventions, offering the space to target adolescents' social, emotional, and cognitive skills (Keyes, 2013; WHO, 2017).

Given the need to expedite the dissemination of evidence-based, mental health promotion interventions in schools, the aim of this PhD was to provide the evidence base for developing a novel, theoretically-driven, intervention which will promote resilient functioning in adolescents. In this thesis, I tested whether a novel, conceptual, strength-based model can predict resilient functioning in adolescents aged 12 to 16. A prospective, questionnaire-based, cohort study with a baseline and 6-month, follow-up, was carried out. Chapter 1 provides a narrative literature review regarding the theoretical frameworks and statistical models which have been used across the resilience literature, elucidating the controversies related to the conceptualisation and operationalisation of the resilience construct. Chapter 1 also provides a critique on the content and structure of the resilience interventions, highlighting the importance of schools as a vital context where resilience interventions can be rolled-out. Chapter 2 presents the findings of the meta-analytic review which assessed the effectiveness of the Penn Resiliency Programme (PRP), one of the most widely-implemented, resilience interventions. This meta-analytic review followed the Cochrane methodology for conducting systematic reviews and meta-analyses while it conformed to PRISMA statement for evaluating and reporting systematic reviews and meta-analyses. Chapter 3 presents a qualitative synthesis of evidence regarding the facilitators and barriers related to the content, structure, and implementation of universal,

school-based, resilience interventions. This qualitative evidence synthesis followed a meta-aggregative approach, conforming to the Joanna-Briggs Institute's (JBI) guidelines. The reporting of the meta-aggregation conformed to the ENTREQ statement for enhancing transparency in reporting the synthesis of qualitative research. The ENTREQ statement is a reporting quality checklist. consisting of 21 items and targeting five domains (i.e. introduction, methods and methodology, literature search and selection, appraisal, and synthesis of findings) of qualitative evidence synthesis studies (Tong, Flemming, McInnes, Oliver, & Craig, 2012). Chapter 4 presents the conceptual basis and operationalisation of the conceptual model, describing the mechanism under which individual protective factors predict resilient functioning in adolescents. Chapter 5 presents the methodology, the aims, the research objectives and hypotheses of the study, the study design, the characteristics of study's sample, the questionnaires used in this cohort study, and the statistical analysis plan. Chapter 6 presents the results of the study, including post-hoc analyses which facilitate the interpretation of the findings. In Chapter 7, study's implications on research and practice are discussed while study's strengths and limitations are reported.

CHAPTER 1

Resilience and mental health in adolescents: A narrative, literature review

1. The resilience construct: definition, operationalisation, and measurement

Most of the mental health interventions in schools have focused on improving adolescents' resilience in dealing with stressors effectively and withstand adversity. Research in resilience has focused on the processes underpinning individuals' development within the context of significant adversity and high-risk environments, targeting multi-level, developmental and contextual systems (Masten, 2014a). Research in resilience has spanned the last forty years and this can be encapsulated in four waves (Masten, 2014b; Wright & Masten, 2015; Wright, Masten, & Narayan, 2013). The first wave pertained to defining and conceptualising the construct of resilience whilst most of the research assessed children's mental health and behavioural outcomes within high-risk contexts (e.g. parental psychopathology). In the second wave, most of the studies in the field of resilience explored how different developmental stages and ecological systems affect individuals' adaptation within adversity, making use of multi-variate, modelling approaches. During the third wave, which is concurrently run with the fourth, the multiplicative processes underpinning resilient functioning have been tested within the context of randomised controlled trials (RCTs). Randomised designs are well-suited for identifying interventions' effective components, promoting the dissemination of multi-level interventions into practice. In the fourth wave, research has been exploring the role that neuro-biological agents and epigenetic processes have on resilient functioning.

The progress in the research of resilience has been impeded and this has been accounted for by the high variability in defining and conceptualising resilience and resilient functioning respectively (Chmitorz et al., 2017; Kalisch et al., 2017; Hart & Heaver, 2013; Luthar, Sawyer, & Brown, 2006). The high variability in defining the construct of resilience has contributed to the inconsistency in reporting empirical findings while the different conceptualisations of resilient functioning has inhibited the transferability of research findings into practice. Resilience has been defined either as an outcome, process, cause of an outcome, or trait while a plethora of different outcome variables have been used as indicators of resilient functioning (Glantz & Sloboda, 2002; Kaplan, 2002). The

high heterogeneity in defining and conceptualising resilient functioning can be attributed to the fact that resilience, as a construct itself, is contextually and time dependent. As such, the resilient functioning is dependent on the type of stressors occurred each time and the different developmental stages within which the resilient functioning is achieved. The high variability in conceptualising resilient functioning has led researchers to use different statistical models for testing different research hypotheses, constraining the reproducibility and repeatability of research findings. National policies have urged to develop and disseminate evidence-based, resilience interventions which will be large-scale rolled out in schools. Evidence-based, universal interventions, which will be practical and achievable, could be smoothly disseminated in schools, providing a cost-effective, primary line of prevention. It is pivotal therefore for empirical research to produce evidence-based findings which in turn will be incorporated into clinical practice. To do so, research in resilience should be guided by well-demarcated theoretical frameworks, adopting a concrete definition and conceptualisation of the resilience construct (Luthar et al., 2000b; Luthar et al., 2006). This will lend the findings easier to interpretation, promoting the transferability of research evidence into practice. The next sections outline the sources for the variability in defining and conceptualising resilience, highlighting how the heterogeneity in conceptualising resilience has driven the use of different statistical models.

1.1.1 Defining the construct of resilience

Resilience has been defined as "the process of adapting well in the face of adversity, trauma, tragedy, threats, or even significant sources of stress" (APA, 2014) or "as a haemostatic return to a condition prior the occurrence of the stressor", indicating individuals' ability to thrive and regulate cognitive-emotional resources in the presence of significant stressors (Carver, 1998; Waugh et al., 2008). Resilience has been defined as a multi-dimensional construct which explores the individual patterns of adaptation, highlighting individuals' capacity to achieve positive psychological outcomes within adversity (Masten & Wright, 2010; Rutter, 2006, 2013; Southwick et al., 2014). Within developmental psychology, resilience has been described either as a dynamic process, capacity of a dynamic system, manifested competence, stable trajectory, set of adaptive capacities, conceptual umbrella, or class of phenomena, which enable adolescents to thrive within significant adversity, facilitating normative functioning and positive adjustment (Bonanno, 2004; Masten, Best, & Garmezy, 1990; Masten, 2001; Masten, 2011, 2014a;

Masten & Coatsworth, 1998; Masten & Obradovic, 2006; Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008). Within the resilience literature, the term "adversity" refers to negative life circumstances (e.g. chronically or acute) which threaten positive adjustment, whereas the term "positive adjustment" refers to individual's capacity to manifest behavioural and social competence within adversity in age-appropriate, salient tasks (Luthar, et al., 2000; Luthar & Cicchetti, 2000). A further distinction has also been made between adolescents who achieve positive outcomes within chronically aversive states (i.e. emergent resilience functioning) and those who thrive in front of acute negative life events (i.e. minimal-impact resilience functioning) (Bonanno & Diminich, 2013). Contrary to the definitions which underscore the dynamic, malleable nature of the resilience construct, resilience has been also defined as a stable personality trait (i.e. ego-resiliency) which predisposes the individual to maintain its adaptive capacity within changing landscape (Block & Block, 1980).

Despite the lack of consensus among the definitions of resilience, most of the definitions share some common elements. Resilient presupposes: i) the presence of significant risk or adversity which threatens adolescents' mental equilibrium, ii) adolescents' capacity not only to thrive amid adversity but also to function in a competent way, and iii) adolescents' ability to achieve positive outcomes within adversity or shortly afterwards. Most of the definitions underscore the multi-dimensional nature of the resilience construct, which presupposes individuals' capacity to "bounce back" and flourish in the face of adversity and not just to be free of mental health problems (Luthar, et al., 2000; Luthar & Cicchetti, 2000; Masten, 2014a; Masten, 2014b). Adolescents' capacity to flourish within adversity has been highlighted as a key element of resilience in a sense that individuals with high resilient functioning are capable not only to thrive within adversity but also to experience high subjective well-being (Keyes, 2013). Within resilience literature, adolescents' subjective well-being consists of hedonic and eudemonic outcomes, with the former measuring emotional well-being and the latter measuring psychological and social well-being (e.g. self-acceptance, positive relations with significant others, autonomy, mastery, purpose in life, and personal growth) (Michalos, 2017). Another source of ambiguity regarding the definition of resilience stems from the fact that similar terms have been used interchangeably to resilience throughout the literature for describing individuals' ability to withstand adversity, such as resistance and recovery. The term "resistance" refers to individuals' capacity to return to languishing states after adversity occurs (Norris et al.,

2008) and the term "recovery" refers to individual's delayed return to normal functioning (Bonanno, 2004). As such, the term "resilience" differentiates itself from the terms "recovery" and "resistance" in terms of the quality of achieved outcomes (e.g. flourishing and high functioning for resilience versus languishing and low to moderate mental health for resistance) and the time required for returning to an optimal, mental health condition (resilience presupposes the immediate return, whereas the other terms indicate a delayed return to previous states).

The changes in conceptualising full mental health have also contributed to the heterogeneity in defining resilience. In previous decades, full mental health was justified only in terms of absence of symptoms; however, the assessment of mental health has nowadays adopted a more holistic approach. According to the dual continua mental hypothesis (Keyes, 2013), individuals' mental health is categorised along in a continuum, ranging from high mental illness to low mental illness and from low mental health to high mental health. As such, a high level of mental health presupposes not only the absence of mental health problems but also the high functioning and experience of subjective well-being (Keyes, 2013). According to this hypothesis, individuals free of mental health problems can be classified in low, moderate, or high mental health, given that a classification of full mental health presupposes not only the absence of mental health problems but also the increased experience of subjective well-being and evidence of competent functioning in salient tasks. Mental health is therefore being assessed as a continuous and dynamic outcome. In line with the above classification for mental health, resilience can therefore be defined as a continuous, multi-dimensional, outcome construct which indicates individuals' capacity to sustain full mental health within significant adversity.

1.1.2 Conceptualising resilience: the role of person-environmental variables

Resilient functioning presupposes the interaction between person-environment variables. These person-environment variables can be encompassed in six categories: i) stressors (e.g. chronic or acute negative events) or risk factors, which are external stimuli perceived as threatening by individuals for their psychological haemostasis, ii) external environmental context, which refers to the interactions between risk factors and promotive factors (e.g. environment resources and individuals assets which assist the individual to thrive, such intelligence), iii) internal self-characteristics, including cognitive, behavioural,

and emotional competencies and strengths, which counterbalance the effects of risk factors, iv) protective or vulnerability processes, referring to specific stress-coping processes which facilitate or inhibit individuals' attempts to recover, thrive, and flourish within adversity, and v) positive developmental outcomes, indicating individuals' ability to thrive, flourish, and being competent on developmentally and culturally appropriate, salient tasks (Krumpfer, 2002). The heterogeneity in conceptualising resilience stems from the fact that resilience is usually defined on the basis of perceived threats and risk factors (Masten & Obradovic, 2008). In the context where resilience is viewed as an outcome or cause of an outcome, there is a distinction between individuals who have positive adaptation and benign outcomes in the face of adversity and individuals who are vulnerable under the same circumstances (Kaplan, 2002). In the context where resilience is conceptualised as a process, resilience represents a mechanism which permeates the relationship between risk and protective factors (Kaplan, 2002). Briefly, much of the variability in the conceptualisation of resilience has been accounted for by: i) the wide range of outcomes which have been tested as indicators of resilience, ii) the different risk/stress contexts within which resilient functioning has been tested, iii) the large number of person-environmental variables which underpin the process of resilient functioning, and iv) the different contextual parameters within which the resilient functioning has been tested (e.g. different contexts and populations).

Given that resilient functioning represents a multiplicative phaenomenon in the presence of person-environmental variables, research in resilience could not exclude the study of the relationships among risk, promotive, protective, and vulnerability factors (Rutter, 2013). Risk refers to the exposure of individuals to a negative outcome. A wide range of stressors have been studied within the resilience literature, such as poverty and parenting maltreatment (Masten & Wright, 2010). Risk factors can be categorised in distal and proximal. Distal risk factors are variables which are not represented as direct influences on individual's adaptation (e.g. socio-economic status) but are mediated by proximal variables (e.g. parental conflict), which in turn have a direct effect on individual's adaptive outcomes (Luthar et al., 1993). Within resilience literature, risk has been measured either in the presence of a single -indicator, risk factor (e.g. parental psychopathology) or as cumulative risk indicator (i.e. risk indices and/or cumulative stress scores) (Masten & Reed, 2002). Promotive factors include individual's assets (e.g. intelligence) and environmental resources (e.g. family cohesion and neighbourhood welfare) and exert

beneficial effects on individuals' development independently on the presence or level of risk factors. Protective and vulnerability factors are individual characteristics, which exert interactive effects (i.e. moderating and mediating) on the relationship between risk and resilient functioning (Masten et al., 2013). Protective and vulnerability processes pertain to how the protective or vulnerability factors act in relation to a given outcome in the context of a specific stressor (Masten & Reed, 2002).

1.1.3 The role of measurement models in assessing resilient functioning

The high variability in conceptualising resilience has led the adoption of different statistical models for testing the processes between risk and protective factors. Statistical models represent hypothetical forms of the relationships between individual and environmental variables. (Masten, 2011). Two major families of statistical models have been used: i) variable-based models and ii) person-based models (Masten & Reed, 2002). Within variable-based models, a single outcome and the protective process under which resilient functioning is achieved, are targeted. This approach includes simple additive comparisons between risk and promotive factors in relation to the positive outcome each time. In the more complex approaches, the multiplicative interactions among different protective and vulnerability factors have been tested (for an overview, see Masten, 2013). The different variable-focused models, which have been tested within the resilience literature, can be summarised in: a) protective-stabilizing models, which portray how the risk effects are eliminated in the presence of specific protective factor, allowing individual to languish, b) protective-enhancing models, which portray how the presence of a protective factor increases resilient functioning, c) protective-reactive models, which portray the ameliorative effects of a protective factor on outcomes when risk occurs, d) challenge models, which portray a curvilinear relationship between risk and outcome, indicating that moderate levels of a risk factor leads to less negative outcome than low or high dosages of the same risk factor, e) inoculation models, which portray the snowballing, cascading effects of risk factors on adaptation outcomes at later developmental stages, f) compensatory models, which show how compensatory factors neutralize the effects of risk factors, h) vulnerable-stable models, which represent how the individual, vulnerability attributes remain stable despite the changing levels of risk (Luthar, 1993; Luthar et al., 2000b), and i, j, k) sensitivity-to-context models, which portray how the moderating effects of protective factors are dependent on the different levels of risk (for an overview see Luthar et al., 2000b; Masten, 2013). The second family of statistical models, which

have been broadly used in the resilience literature, is the person-based models. Person-based models can be categorised in: a) individual-case studies that fulfil heuristic purposes, b) comparison-based models, which compare individuals of high and low resilient functioning, serving for diagnostic purposes, and c) the pathway models, which explore the longitudinal trajectories of adaptive functioning (Masten, 2002; Masten & Powell, 2003).

1.2. Research in adolescents' resilience: a narrative, literature review

The different conceptualisations of resilient functioning have constrained research progress (Luthar, et al., 2000a). The scarcity of theoretically-driven, empirical studies, which would be embedded in cogent frameworks, has obscured the investigation of causal pathways under which resilient functioning is achieved (Luthar, et al., 2006). The limited understanding of the causal pathways underpinning resilient functioning has contributed to the poor evidence base of resilience interventions. The poor evidence base of resilience interventions has limited the dissemination of such interventions into practice. This section reviews the evidence base of resilience interventions, providing a critique on their content and theoretical underpinnings. This section highlights the need to develop the evidence base which in turn will inform the development of strongly-theoretical, resilience interventions.

1.2.1 Theoretical frameworks guiding resilience research

Research in the resilience of adolescence has been guided by: i) the Triarchic framework, which underscores the importance of the context (e.g. community, family, and person) in building adolescents' emotional resources (Garmezy, 1985), ii) the social-ecological frameworks, which emphasise the importance of nested contexts (e.g. exosystemic, macrosystemic, mesosystemic, and microsystemic) on adolescents' development (Bronfenbrenner, 1979; Cicchetti & Lynch, 1993; Ungar, 2012), and iii) the structural-organizational frameworks, which highlight the importance of individual choices in achieving a healthy development (Cicchetti & Schneider-Rosen, 1986). The above frameworks, however, have some limitations. First, these frameworks do not take into account the recent advances in the field of adolescents' mental health. Different social dynamics have been developed within schools while new stressors have emerged in adolescents' life as an outcome of the upsurge in the use of online technologies. Second, although these frameworks have focused on the adolescents' healthy development, in most

of the cases, their scope has been disease-oriented. As such, these frameworks have guided the development of interventions which focus on decreasing mental health problems rather than increasing individual protective factors and emotional resources. Third, these frameworks focus on the role that context and significant others (e.g. family and school teachers) have on the development of adolescents, undermining the central role that adolescents have in the development and dissemination of mental health interventions.

There are, however, more recent frameworks which can better accommodate the advances in the field of adolescence resilience. Some of these frameworks are: i) the Salutogenesis theory (Antonovsky, 1996), which stresses the need to abandon the pathogenic-oriented, disease-focused model for studying health, obtaining a health-promotion-oriented perspective instead, ii) the Health Promotion Framework (Bradshaw, Bottiani, Osher, & Sugai, 2014), which views mental health as a dynamic, multi-factorial, micro-systemic process where positive mental health decreases the likelihood for developing mental health problems (i.e. mental health promotion hypothesis) and negative mental health increases the likelihood for mental health problems to emerge (i.e. prevention hypothesis) (Keyes, 2013), iii) the Positive Behavioural Interventions and Supports (PBIS) framework and the Social Emotional learning (SEL) theory, which target adolescents' social, emotional, and learning competencies through the implementation of multi-tiered, school-based interventions (Bradshaw et al., 2014; Daly, Nicholls, Aggrarwal, & Sander, 2014; Elias et al., 1997), iv) the positive youth development framework (Moore, Lippman, & Brown, 2004), and v) the flourishing and subjective well-being framework (Huppert & So, 2013). Within these frameworks, three main approaches have been followed for testing resilient functioning (Davydov et al., 2010): i) the harm-reduction approach, which highlights adolescents' ability to bounce back to the normative mental, cognitive, and emotional functioning within a short time frame after the adversity occurs, ii) the protection approach, which highlights resilience as individual's ability to preserve high standards of mental health within the face of adversity (Patel & Goodman, 2007), analogous to the immune barriers, where minor dosages of stress loads act as "antigens" and lead to resilient functioning (Lewitus & Schwartz, 2009) and iii) the promotion approach, which focuses on the development of additional resources, such as positive emotions (Fredrickson, 2004; Fredrickson & Joiner, 2002), which in turn activate adolescents' cognitive resources, preparing them to retain a competent functioning when adversity will emerge.

Most of the resilience-based interventions delivered in schools have followed either the protection or the promotion approach (Macklem, 2014). There are three main reasons why these approaches are most appropriate for developing and delivering school-based resilience interventions. First, resilience is a strength-based concept, testing how individual assets and environmental resources assist the individual to flourish within adversity (Masten & Narayan, 2012). As such, resilience-based interventions can serve promotion and protection purposes in two ways: i) conferring immediate benefits to adolescents' mental health (i.e. protection approach), and decreasing the likelihood for subthreshold symptoms to turn into clinical disorders, and ii) boosting resilience-oriented protective factors, rendering individuals capable to flourish within adversity (i.e. promotion approach) (Masten, 2014). Resilience-based interventions have therefore a good fit in schools, given that they can target whole populations of students with a wide range of needs. Second, in the field of human ecology, resilience has been conceptualised as the adaptive capacity of ecological systems, ranging from individual to wider societal systems (e.g. neighbourhood, school, city, and state), to withstand adversity and function properly (Ungar, 2012). This practically means that any change at individual level can trigger multiplicative effects to wider exo-systems (e.g. neighbourhood), which in turn add to society's social capital (Ungar, 2012). The large-scale rollout of resilience interventions can therefore enhance the social capital of wider exo-systems (e.g. classes/schools, neighbourhoods and cities), contributing to the development of nurturing environments for people to live and flourish (i.e. protection & promotion approach) (Ungar, 2013). Third, the scope of school-based resilience interventions aligns with the governmental policies that have stressed the need to provide holistic mental health services with the greatest of coverage early in adolescence (Green Paper, 2007). The current neo-liberal governmental practices worldwide view the world as comprising individuals with their own life-pursuits, highlighting subjectivity, adaptability, and individualised decision-making as key factors of individuals' adaptation in a demanding world (Joseph, 2013). As such, resilience-based interventions implemented in schools can significantly contribute to individuals' political emancipation and social configuration, by teaching them how to better allocate their resources and use their assets within highly-individualised materialistic societies (i.e. protection & promotion approaches) (Joseph, 2013; Schmidt, 2016).

1.2.2 The evidence base of universal, resilience interventions in adolescents

Most of the resilience interventions in adolescents have been implemented in schools. Mental health interventions in schools have covered primary and secondary prevention needs (Macklem, 2014), including interventions which range from mental illness prevention to mental health promotion, social skills' configuration, prevention of health-risk behaviours, promotion of healthy lifestyles, and play, entertaining, and leisure activities (Arbesman, Bazyk, & Nochajski, 2013; Enns et al., 2016). School-based, resilience interventions are broadly divided in three categories (Offord, Kraemer, Kazdin, Jensen, & Harrington, 1998): i) universal interventions, which target whole groups of adolescents regardless of their predisposition or risk to mental problems, ii) indicated interventions which target high-risk individuals or groups with subthreshold but detectable, signs or symptoms of mental health disorders and iii) selective interventions, which target individuals who are free of symptoms but are coming from a high-risk background for developing mental health problems (e.g. maltreated children or children with a parental history of psychopathology). The last two approaches are labelled as targeted approaches.

School-based, mental health interventions, which follows a universal approach, have followed a protection or promotion approach. Most of them, they have been based on Positive Behavioural Interventions and Supports (PBIS) framework, the Social Emotional learning (SEL) theory, and the prevention framework (Bradshaw et al., 2014; Daly et al., 2014). Universal interventions have a proactive scope and they are based on a positive approach of mental health. The implementation of universal interventions is associated with the elimination of stigma and greater population coverage (Macklem, 2014). Universal interventions have assessed a variety of outcomes, such as stress management, social-emotional-learning and coping skills (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Kraag, Zeegers, Kok, Hosman, & Abu-Saad, 2006), academic competence and mental health functioning (Hoagwood et al., 2007), anxiety (Fisak, Richard, & Mann, 2011; Neil & Christensen, 2009), depression (Calear & Christensen, 2010; Horowitz & Garber, 2006; Merry et al., 2012; Stice, Shaw, Bohon, Marti, & Rohde, 2009), depression literacy and help-seeking behaviours (Beaudry et al., 2019). Various implementation types (school-based, multi-site and ecological) have been adopted regarding the implementation of universal interventions, while different stakeholders (mental health professionals and school personnel) have led their administration. Most of

the universal interventions are directed to students with an age range from four to nineteen years, with their duration ranging from two to five months. Universal interventions based on SEL framework have been found effective in promoting adolescents' social emotional competencies and decreasing emotional distress (Durlak et al., 2011; Jones et al., 2011); however, a significant portion of the resilience literature in school has focused on preventing mental health difficulties (i.e. protection-prevention approach). Prevention interventions aim to diminish risk factors which predispose adolescents for developing symptoms of depression and anxiety and they have been largely based on Cognitive Behavioural Therapy (CBT) (Hetrick et al., 2015; Hetrick et al., 2016), with only a few having incorporated elements from Interpersonal Therapy (IPT) (Young et al., 2012). The next section provides the evidence base regarding the effectiveness of universal, resilience-based interventions which have been implemented in adolescents within the protection-prevention framework.

1.2.3 The evidence base of universal, preventative, resilience interventions

Universal, resilience interventions following a prevention approach have shown inconsistent effects in reducing depressive scores, internalising symptoms, and externalising symptoms, such as conduct problems, in adolescents (Dray et al., 2017; Horowitz, Garber, Ciesla, Young, & Mufson, 2007; Garmy, Clausson, Berg, Carlsson, & Jakobsson, 2018; Ialongo, Poduska, Werthamer, & Kellam, 2001; Sawyer et al., 2010; Sheffield et al., 2006; Shochet et al., 2001; Spence, Sheffield, & Donovan, 2003; Tomyn, Fuller-Tyszkiewicz, Richardson, & Colla, 2016). Most of the meta-analytic reviews have shown small but significant effects of these interventions in reducing depressive symptoms with effects remaining until nine months (Ahlen et al. 2015; Merry et al., 2012; Stockings et al. 2016). However, these effects are small, weaken over time (Hetrick et al. 2015b), and high heterogeneity is evident (Ahlen et al. 2015; Stockings et al. 2016). A recent meta-analytic review of these interventions failed to detect a significant effect in reducing depressive symptoms at post-intervention (Werner-Seidler et al. 2017). A recent update of a Cochrane review (Hetrick et al. 2016) reported no evidence for the effectiveness of these interventions in decreasing the risk of depression, with a small reduction of depressive symptoms at post-intervention that diminish at follow-up.

One reason for the non-significant effects of these interventions stems from the fact that these interventions are implemented in adolescents which have not been selected on the

basis of elevated depressive symptoms. As such, the scope of these interventions cannot capture the needs and characteristics of the populations in which they have been implemented. Second, the assessment of the effectiveness of such interventions have been relied on measures of depression. As such, these outcome measures cannot capture any beneficial effects that these interventions may have on adolescents' mental health. Findings regarding the effects of these interventions in reducing the risk of developing anxiety disorders are more promising, albeit these effects appear to diminish over time (Stockings et al., 2016). Universal prevention interventions have been found effective in reducing anxiety symptoms at post-intervention (Fisak et al., 2011; Teubert and Pinquart 2011; Werner-Seidler et al., 2017; Stockings et al., 2016) with these effects being present at medium-term follow-up (Fisak et al., 2011; Hetrick et al., 2016b; Stallard et al., 2014). Universal prevention interventions, which primarily target anxiety, have been found effective in exerting cross-over preventive effects by inhibiting the course of depressive symptoms (Garber et al. 2016). One reason why universal resilience interventions, which have targeted anxiety as their primary outcome, have been found more effective is because anxiety symptoms are more prevalent than depressive symptoms in adolescents (Fink et al., 2015). As such, the content of these interventions meets the needs of universal populations while anxiety measures may capture better the effectiveness of such interventions.

Due to the insufficient evidence, none of universal, prevention, resilience interventions, which have been proposed for large scale roll-out, can be widely disseminated yet (Bastounis, Callaghan, Banerjee, & Michail, 2016; Brunwasser & Garber, 2016). On the contrary, targeted prevention interventions implemented at schools, have been found more effective in decreasing symptoms of depression than their universal counterparts (Cuijpers et al., 2008; Merry et al., 2012; Hetrick et al., 2015b; Hetrick et al., 2016; Horowitz et al., 2006; Stice et al., 2009). This can be attributed to the fact that the recruitment of participants in targeted interventions have been has been made on the basis of elevated depressive symptoms. As such, the content and scope of targeted interventions meet the needs of these populations while outcome measures of depression capture the effectiveness of such interventions. In the light of these superior effects of targeted prevention interventions compared to universal ones, it has been suggested that further research on universal interventions may not be warranted (Stice et al., 2009; Tak et al., 2015). It should be noted, however, that the universal prevention interventions differ from the targeted ones

in terms of scope, structure, and population of interest. Universal, prevention interventions seek to serve as a primary prevention line within schools. Their focus should therefore be to minimise the effects of stressors commonly identified in schools, boosting individual, protective factors. In addition, universal prevention interventions have a greater coverage than the targeted ones, fulfilling the governmental guidelines for providing adolescents with the best mental health services where this is possible. Moreover, universal interventions have a broader scope than the targeted ones and they could target several aspects of mental health than the targeted interventions. Finally, the non-stigmatising character of universal interventions promotes the inclusion of significant others (e.g. parents, teachers), facilitating the implementation of multi-tiered interventions within whole-school approaches.

The poor evidence base of universal interventions has been accounted for by the lack of theoretical clarity of such interventions. I therefore argue that it would be premature to abandon the concept of universal, prevention, interventions at this stage. Given the advantages of the universal prevention interventions over the targeted ones in terms of scope, coverage, and feasibility, I suggest that the theoretical content, structure, and implementation mode of the universal, prevention, resilience interventions should be re-visited. A description of the theoretical basis of universal, prevention interventions will allow the more careful assessment of what works, under what circumstances, and to which populations. In addition, a systematic assessment of the theoretical basis of universal prevention interventions will permit to disentangle these theoretical components which render an intervention effective. Given that most of the universal prevention interventions share the same theoretical basis with the targeted, prevention interventions (Gillham, Reivich, Jaycox, & Seligman, 1995; Stallard et al., 2007), a critique of their theoretical content could illuminate the most fruitful approaches for universal prevention in schools.

1.2.4 Critique on the theoretical underpinnings of the preventative, resilience interventions

Most of the universal, prevention, resilience interventions have been based on CBT (Beck, 1979), the ABC model of cognition (Ellis, 1962), and the learned-hopelessness, attribution theory (Abramson et al., 1979) (for an overview, see Araya et al., 2015; Calear et al., 2009; Chaplin et al., 2006; Gillham et al., 2007; Lowry-Webster et al., 2001; Pattison & Lynd-Stevenson, 2001; Possel et al., 2004; Quayle et al., 2001; Rooney et al., 2006; Sawyer et al., 2010; Sheffield et al., 2006; Stallard et al., 2001; Stallard et al., 2013;

Spence et al., 2003; Spence et al., 2005). Most of them have assessed levels of depression, internalising or externalising symptoms, and/or symptoms of general dysfunction as primary outcomes (Calear et al., 2010; Dray et al., 2017; Merry et al., 2012; Hetrick et al., 2015; Hetrick et al., 2016); only a few have assessed anxiety as their main outcome (Calear et al., 2009; Stallard et al., 2008). A few have incorporated elements of IPT, additionally to their CBT-oriented content (Horowitz et al., 2007; Shochet & Ham, 2004), and only a few have targeted positive indicators of mental health (Dray et al., 2017). Most of the programmes have mainly targeted negative dysfunctional cognitions, problem-based solving skills, cognitive restructuring, coping, and self-management skills.

Briefly, CBT (Beck, 1979) posits the role of cognitive schemas as negative cognitive representations of the perceived external stimuli. The repetitive experience of these negative cognitive representations formulates negative cognitive patterns which in turn lead to individuals' negatively-biased assessments regarding the outcomes of their actions, their relationships with significant others, and important life objectives. The repetitive experience of negative cognitive representations contributes to the development of a vicious circle of negative cognitive patterns of thought, increasing the likelihood for depressive symptoms to emerge. CBT treatment works in a way of breaking down the components of this vicious circle in a 3-level way by: i) targeting the abnormal behaviour and the depressive symptoms, ii) identifying the underlying motivational disturbances, and iii) targeting the established patterns of negative cognitions which prevent the individual to make a cognitive switch. Within the ABC model (Ellis, 1962), individuals' attitudes and interpretations of the external stimuli drive their emotions. "A" stands for individuals' interpretation of an event, "B" represents individual's evaluative judgement for this event, and "C" stands for the emotional and behavioural consequences for adopting this belief (Ellis, 1962). Negative evaluations lead to emotional disturbances, whereas inferential and behavioural strategies can be used for challenging these negative evaluative judgements. The learned-helplessness attribution theory (Abramson et al., 1978) posits that events perceived as uncontrollable lead to three major deficits: motivational, cognitive and emotional. The repetitive perception of the events as uncontrollable leads to cognitive deficits (learned helplessness), which in turn increase the likelihood for depressive symptoms to emerge.

Within the universal, prevention, resilience interventions, the occurrence of depressive symptoms is viewed as an outcome of individuals' tendency to perceive events as uncontrollable. The sense of uncontrollability leads to generalised cognitive schemata, which in turn leads to emotional dysfunction and depressive symptomatology. However, all these theories have been informed by the theoretical basis of targeted interventions (Reivich & Gillham, 2003; Stallard, Simpson, Anderson, & Goddard, 2008). A major difference, however, between targeted and universal populations is that in the case of the former, the existence of negative cognitive patterns is more likely than in the latter. This has important implications regarding the applicability of these theories in informing the development of universal, prevention, resilience interventions, given that it is highly unlikely for universal populations to have established negative cognitive patterns through their exposure to a repetitive learning process. It is crucial, therefore, to re-visit the theories which underpin the content of universal, prevention, resilience interventions. Re-visiting the theoretical content of these interventions will facilitate the identification of those theoretical components which could work for universal populations. These components could be disentangled, assisting the development of novel universal, prevention interventions and the refinement of the existing ones. Universal, prevention, resilience interventions have targeted depressive, internalising and externalising symptoms. It can be hypothesised, however, that the prevalence of these symptoms in a universal, adolescent population is low. There is a mismatch, therefore, between the outcome measures used to assess the effectiveness of such interventions and the characteristics of populations in which these interventions are implemented. Negative-oriented outcomes may not be appropriate for capturing the impact of universal, prevention, resilience interventions. The scarcity of empirical studies in assessing positive indicators of mental health and protective-enhancing factors highlight that this type of outcomes could be more appropriate for capturing the effectiveness of such interventions (Enns et al., 2016). Outcomes, which will assess positive indicators, such as emotion regulation, positive emotions, adaptive coping, and social skills, could better fit the scope of universal, prevention, resilience interventions, meeting the needs of universal populations (Dray et al., 2017; Huppert & So, 2013).

1.2.5 Policy, school context, gender differences and resilience interventions

Schools constitute a key setting for promoting mental health early in life. Mental health promotion strategies within schools can boost adolescents' mental health (Fazel et al., 2014). Schools can provide a vital environment where mental health promotion and prevention interventions can be implemented in a practical and feasible manner, providing the space for targeting multiple individual and contextual factors (Department of Health & Department of Education, 2017). Schools can provide a non-stigmatising environment, given that adolescents spend most of their days in schools and school-related variables, such as school achievement and education attainment, have been highlighted as crucial predictors of depression and health-risk behaviours in adolescents (Rahman et al., 2018). Given that most of the adolescents with subthreshold symptoms of anxiety and depression are remained unidentified (Merikangas et al., 2011), schools can play a multi-tiered role in promoting adolescents' mental health early, capturing societal and community needs (Kieling et al., 2011; Macklem, 2014; WHO, 2014).

Whole-school approaches have gained attention recently as an effective way to promote mental health and reduce the incidence of health risk-behaviours in adolescents (NHS England, 2013). Whole-school approaches can target a wide range of individual, contextual, and environmental indicators of mental health. Given the ecological and social benefits associated to the implementation of whole-school approaches, public health policy makers have advocated their wider dissemination in schools (NHS England, 2013). Given their holistic scope and mode of implementation, universal, prevention, resilience interventions can be smoothly incorporated within whole-school approaches. The implementation of the universal, prevention, resilience interventions can enrich educational curricula, providing a primary line of prevention and highlighting the role of teachers and school staff members as mental health providers (Department of Health & Department of Education, 2017). Public health agencies have stressed the need to develop theoretically-driven, universal, resilience interventions, which will be of low cost and feasibly incorporated within educational curricula (Holmes et al., 2018; WHO, 2013). As such, there is the need to develop the evidence base which will inform the development of such interventions. A necessary condition to do so, is to understand the key emotional, coping, and cognitive processes which underpin resilient functioning (Holmes et al., 2018; Patel & Goodman, 2007). Evaluative research can assist us on identifying the most effective components of the existing interventions while empirical research will permit us

to test theoretically-driven hypotheses in relation to the characteristics of universal, adolescent populations (Huppert, 2014; Macklem, 2014).

Whole-school approaches target multiple levels of prevention and promotion by tailoring the most appropriate interventions, taking into account the needs and characteristics of populations in which these interventions are implemented (Macklem, 2014). This is important when resilience-based interventions are delivered in schools, given that the construct of resilience is developmentally- and culturally-dependent (Luthar et al., 2006); thus, the effectiveness of such interventions is dependent to the effects of key moderators (Rutter, 2014). Whole-school approaches offer the flexibility to policy-makers to effectively disseminate universal interventions, by targeting key moderators which are crucial for the successful implementation of such interventions. One of the key moderators related to the implementation and effectiveness of universal interventions is the gender of participants (Derdikman-Eiron et al., 2011). It has been well-documented that females are more prone to experience depressive symptoms compared to males (Nolen-Hoeksema, 2001; Rutter, 2007). Recent research on gender differences in adolescents showed that female adolescents are more prone to develop alexithymic traits compared to male adolescents which in turn significantly increase the possibility to develop depression and anxiety (van der Cruijsen, Murphy, & Bird, 2019). It has also been reported that the prevalence of anxiety disorders is higher in female adolescents compared to their male counterparts (Lewinsohn, Gotlib, Lewinsohn, Seeley, & Allen, 1998) while female adolescents have a higher predisposition to develop bipolar disorders (Angst et al., 2018).

The occurrence of anxiety and/or depressive symptoms is significantly related to lower subjective well-being, lower self-esteem, higher academic problems and lower psychosocial functioning for both male and female adolescents (Derdikman-Eiron et al., 2011). Knowledge about gender differences in key indicators of mental health could permit a more flexible design of universal interventions, taking into account the contextual parameters (e.g. class composition) and population needs in which these interventions are implemented. In addition, knowledge about gender differences can assist us on interpreting the effects of universal interventions and explaining the variation in the effects of these interventions when these are implemented in different context (e.g. cultural background, class composition in terms of gender). Also, knowledge of gender differences on key mental health indicators can assist us in better explaining the processes underpinning

resilient functioning, permitting us to explore whether there is a uniformity of mechanisms underpinning resilient functioning between males and females.

1.3 Theoretical stance of this thesis

This section outlines the theoretical stance of this thesis regarding the definition of the resilience construct, the conceptualisation of resilient functioning, the statistical methods for assessing resilient functioning, and the theoretical frameworks adopted in the development of the novel conceptual model.

1.3.1 Research in universal, mental health prevention: knowledge gaps

There are two main knowledge gaps in the area of universal prevention, which have inhibited the development of evidence-based universal resilience interventions. First, there is a lack of theoretical base to inform the development of universal prevention interventions. This has been accounted by the poorly understood mechanisms underpinning the relationship between individual protective factors and resilient functioning (Thapar, Collishaw, Pine, & Thapar, 2012) and stresses the need to re-visit the theoretical content of these interventions. It has been suggested that focus should be tailored to investigate the components of a successful intervention, which follows a specific therapeutic approach, in order to identify those components that render this intervention effective (Calear & Christensen, 2010; Hetrick et al, 2015a). The identification of the most effective components of such interventions will unpack the mechanisms under which resilient functioning is achieved, illuminating the processes underpinning stress and protective factors.

Second, there is a lack of implementation research to identify why, how, and for whom these interventions work. The dearth of evaluative research regarding adolescents' perceptions from participating in universal, prevention, resilience interventions, has limited our understanding on how these interventions might work (Bastounis et al., 2017). The lack of knowledge about the barriers and facilitators of such interventions has led universal prevention interventions to be devalued. The limited knowledge on how the content, structure, and implementation of these interventions affect their applicability and effectiveness, has hindered their large-scale, roll-out in schools. It is vital therefore to assess and synthesise the perceptions of adolescents from attending universal, prevention

interventions. The synthesis of adolescents' perceptions will highlight these facilitators and barriers which affect interventions' implementation.

1.3.2 Assessing resilient functioning: definition, conceptualisation, theoretical and statistical frameworks adopted in this thesis

This thesis posits resilience as a multidimensional construct which is equated to individuals' ability to achieve competent functioning with high subjective well-being within stress. Resilience is, therefore, viewed as an outcome and not as a process, given that several ongoing developmental processes may lead to resilient functioning which are not identical for different cultural and age groups. This is in line with the current trend in resilience research which suggests that an outcome-oriented definition of resilience could promote the translation of research evidence into practice, facilitating the development of evidence-based, resilience interventions (Chmitorz et al., 2017). This thesis posits that the resilient functioning as an outcome consists of indicators of flourishing, functioning in salient developmental tasks, the absence of dysfunction symptoms, and subjective well-being. In this thesis, resilience is viewed as a dynamic construct and not as a personality trait (Chmitorz et al., 2017), considering that many malleable, adaptive systems, which are embedded both in individual and external level, are interrelated (Masten, 2013, 2014a). Without devaluing the role of personality traits, I argue that protective and vulnerability factors can exert significant, programming effects on personality traits early in adolescence. It should be noted that the term "resilient functioning" has been used throughout this thesis, underscoring the malleable nature of the resilience construct and its conceptualisation as a continuous, dynamic outcome. In this thesis, resilient functioning has been assessed on the basis of individuals' performance in surrogate measures of mental health in relation to non-specific, stress load (Chmitorz et al., 2017).

There is a need to expedite research in resilience, taking into account the public health and societal needs for universal prevention in school. A prerequisite to do so, is that empirical research in resilience should be theoretically-driven, while the choice of objectives and the selection of outcomes should be embedded in cogent theoretical frameworks, reflecting the characteristics of the understudy population each time (Luthar et al., 2006). This will facilitate the interpretation of research evidence and their transferability into practice. This thesis focuses on universal, adolescent, student populations in which elevated symptoms of mental dysfunction are not likely to occur and the possibility to study these populations

within the context of severe adversity is a priori excluded. In this thesis, therefore, adversity is considered in terms of individuals' cumulative, stress perceptions in their everyday life. Although, this stance could be subject to critique, given that resilient functioning presupposes the exposure of the individual to significant adversity, I argue that it is critical to test resilient functioning in the context of daily stressors. The reason to do so, is that adolescents nowadays experience myriads of daily, minor stressors and hassles which in turn cumulatively build a "toxic" environment for their mental health. New challenges, which are associated with the contemporary lifestyles and the rapid transformations of social ecosystems, threaten adolescents' mental health and underscore the need to evolve preventative strategies. New sources of stress, such as cyber-bullying (Extemera, Quintana-Orts, Mérida-López, & Rey, 2018; John et al., 2018) and novel technologies for social networking (Woods & Scott, 2016), have severe repercussions on adolescents' mental health. It is vital therefore to adjust the prevention strategies to everyday challenges in order to better accommodate the needs of adolescent groups. Resilient functioning has been used in this thesis as a concept which aims to increase adolescents' level of preparedness before the actual adversity occurs (Yehuda, 2014), following a mental health promotion approach (Fredrickson, 2004; Huppert & So, 2013).

In this thesis, the conceptualisation of the resilient functioning has been guided by a cogent set of theoretical frameworks. Based on the Health Promotion framework and Salutogenesis theory, the conceptualisation of resilient functioning follows a strength-based approach while the selection of outcome measures as indicators of resilient functioning has been guided by the flourishing and subjective-well-being framework (Huppert & So, 2013). Briefly, Health Promotion framework focuses on developing personal skills and how these skills could lead to resilient functioning. Flourishing can be viewed as a multidimensional construct which targets individuals' positive characteristics and positive functioning, consisting of features, such as emotional stability, vitality, resilience, optimism, happiness, self-esteem, engagement, meaning, positive relationships, and competence (Huppert & So, 2013). Within the flourishing framework, optimal mental health is equated not only to the absence of mental health problems but also includes positive aspects of mental health, such as hedonic (e.g. positive feelings) and eudemonic (e.g. positive functioning) well-being. The above frameworks target adolescents as central research agents, adopting a holistic approach for assessing resilient functioning. A holistic, strength-based approach for assessing resilient functioning includes indicators of

flourishing and subjective well-being alongside mental health problems, fulfilling the needs of universal adolescent populations.

Resilience research will be expedited by shedding light on the mechanisms under which universal interventions work. It is crucial therefore to identify protective-enhancing factors which exert mediating and moderating effects on resilient functioning. The investigation of the interaction effects of protective-enhancing factors, being embedded in longitudinal designs, will promote the dissemination of tailored, resilience-based interventions (Dray et al., 2017; Kalisch et al., 2017). Within-group analysis permits us to investigate the mediating and moderating role of protective factors, targeting a homogeneous group of individuals (Luthar, Sawyer, & Brown, 2006). Within-group analysis will uncover pathways under which resilient functioning emerges, highlighting the processes under which protective-enhancing and vulnerability-enhancing factors work (Davydov et al., 2010; Luthar et al., 2006). Sensitive developmental periods, such as early adolescence, can show us how these adaptive systems work and under which condition are triggered (Masten, 2014). As such, the testing of resilient functioning in this thesis has been based on a protective-enhancing model and it has been statistically assessed via a variable-focused, within-group model (for an overview, see section 1.1.3, page 24).

1.4 Concluding Remarks

In this chapter, the definition and conceptual controversies of the resilience construct were discussed, highlighting how the high variability in conceptualising resilient functioning has impeded research progress. In this chapter, a narrative review regarding the evidence base of universal, prevention, resilience interventions implemented in schools was undertaken. The inconsistent findings regarding the effectiveness of these interventions has stressed the need to identify the most effective components of successful interventions, highlighting barriers and facilitators related to content and implementation. In the next two chapters, two separate reviews, a meta-analytic systematic review and a qualitative evidence synthesis, are presented. The meta-analytic review aims to test the effectiveness of the most widely implemented, resilience intervention, disentangling the components which render this intervention effective. The qualitative evidence synthesis aims to identify barriers and facilitators related to the content, structure and implementation of universal, prevention, resilience interventions, by synthesising the perceptions of adolescents from participating in such interventions. The findings of these reviews will

inform the development of a novel, conceptual, strength-based model which will predict resilient functioning in UK-based, adolescent populations.

1

CHAPTER 2

The effectiveness of Penn Resiliency Programme (PRP) and its adapted versions in reducing symptoms of depression and anxiety, and promoting explanatory style: A systematic review and meta-analysis

2.1 Introduction

There is a need to investigate the components of a successful universal prevention intervention, which follows a specific therapeutic approach, in order to identify these components which renders this programme effective (Calear & Christensen, 2010; Hetrick et al., 2015b). This need becomes more apparent for school-based, universal prevention interventions which have shown inconsistent effects in decreasing depression and improving resilient functioning in universal student populations. Public health agencies stress the need for implementing holistic, preventative interventions which will target whole classes of students offering a primary line of prevention. Universal, school-based, prevention interventions have been broadly implemented the last twenty years, including students, parents, and key stakeholders. In the light of mixed findings regarding their effectiveness, there is a need to break down the content of these interventions in order to identify which components work for the universal populations (Patel et al., 2014). The next section provides a systematic assessment and analysis of the effects of the most widely implemented resilience-based prevention intervention which has been proposed for large scale roll-out in schools.

2.1.2 Testing the effectiveness of Penn Resilience Programme (PRP)

A seminal intervention that has been widely implemented both as universal and targeted intervention is the Penn Resiliency Programme (PRP) (Gillham, Brunwasser, & Freres, 2008). PRP is a 12-session programme applicable to children aged 10-14 years with its duration ranging from 90 to 120 min per session. PRP is based on the tenets of Beck's Cognitive Theory (Beck, 1979) and the ABC model of Ellis (1962), consisting of an intra-personal cognitive component and an interpersonal social-problem solving component

[1] 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.

(Gillham et al., 2008). Briefly, cognitive component of PRP targets cognitive restructuring, students' explanatory style, and maladaptive coping strategies (Gillham et al., 2008). The problem-solving component of PRP targets seven individual skills, namely: Assertiveness, negotiation, relaxation, procrastination, social skills, decision-making, and problem-solving (Gillham et al., 2008). The aim of PRP is: a) to target the link between maladaptive cognitions and emotional-behavioural outcomes by challenging students' stable explanatory style and b) to promote goal-setting by combating passive responses (Gillham & Reivich, 2004). PRP has been administered by school personnel and mental health professionals (MHPs), including scenario-based and homework activities.

The content of PRP, embedded in other universal prevention interventions, has been implemented in culturally diverse populations. School-based, resilience-based, prevention interventions, such as 'Op Volle Kracht' (OVK) (Tak et al., 2012), Optimism Lifeskills Programme (OLP) (Quayle, Dziurawiec, Roberts, Kane, & Ebsworthy, 2001) and Aussie Optimism Programme (AOP) (Roberts, 2006), plus AOP's derivatives, namely Positive Thinking Programme (PTP) (Rooney et al., 2006) and AOP-PTS (Rooney, Hassan, Kane, Roberts, & Nesa, 2013), are conceptually based on PRP following similar methods. OVK is a school-based, resilience-based, prevention intervention of 16 sessions of 50 min each, which has been delivered either as targeted or universal and it is applicable to adolescents aged 12-14 years (Tak et al., 2012). OVK shares the same basis as PRP (Beck, 1979; Ellis, 1962), after being culturally modified in order to be applicable to Dutch teenagers (Tak et al., 2012). In OVK, cognitive distortions, explanatory style, coping and social skills are targeted, while OVK has been administered by school personnel and MHPs.

OLP (Quayle et al., 2001) is an identical version of the Penn Prevention Programme (Jaycox, Reivich, Gillham, & Seligman, 1994) applicable to Australian teens aged 10-13 years. It consists of 8 weekly sessions of 80-min each and it is based on Cognitive-Behavioural Therapy (CBT) and ABC model, including an attribution style training (Seligman et al., 1988). OLP targets students' interpretations about daily problems, coping strategies and social skills. AOP consists of 20 weekly sessions of 60-min each and it is applicable to students aged 11-13 years (Roberts, 2006). AOP is based on CBT, targeting students' negative explanatory style, interpersonal skills and thinking style and it has been delivered by school personnel (Roberts et al., 2010). PTP (Rooney et al., 2006) consists of 8 weekly sessions of 60-min each and it is based on AOP, with its content to have been

modified in order to capture the needs of younger individuals. Based on CBT, the chain between beliefs and emotional outcomes, plus explanatory style, are targeted. AOP-PTS (Rooney et al., 2013) consists of 10 sessions of 1hr each, targeting cognitive and behavioural skills.

2.1.3 Why this review is important?

In the only existing meta-analytic review, PRP was found effective in reducing depressive symptoms (Brunwasser, Gillham, & Kim, 2009). Drawing data from both randomised and non-randomised studies of universal and targeted approaches, 17 studies with a total sample size of 2498 individuals and age range of 8-18 years were identified. A significant mean effect size (ES), d = 0.11, [0.01, 0.20], comparing PRP to non-intervention control, was found at post-intervention. The ESs were significant at 6-8 months and 12-month follow-up with d = 0.21, [0.11, 0.31] and d = 0.20, [0.09, 0.32] respectively. The ESs became non-significant at post intervention, when active-controls were imported in the analysis, d = -0.02, [-0.19, 0.14] and 6-8-month, d = 0, [-0.18, 0.19], and after removing non-randomized studies, d = 0.09, [-0.02, 0.19]. PRP can produce small, significant effects in reducing depression when it is compared against non-intervention. Due to its wide implementation, PRP has been proposed as a potential candidate for large scale roll-out (Hetrick et al., 2015); however, in the presence of inconsistent findings, more robust evidence is needed (Brunwasser et al., 2009).

The need to explore whether PRP's effects are meaningful in reducing anxiety symptoms has been reported (Brunwasser et al., 2009). School-based, prevention interventions have been found effective in reducing anxiety (Neil & Christensen, 2009) and given the increase in prevalence of sub-clinical anxiety symptoms in youth (Fink et al., 2015), anxiety was assessed as secondary outcome in this review. Second, the need for uncovering the mechanisms, which underpin the effects of PRP in order to optimize its effectiveness, has been reported (Brunwasser et al., 2009). PRP focuses on improving individuals' explanatory style, which is considered as a mediator for reducing depressive symptoms (Brunwasser et al., 2009). According to the hopelessness theory (Abramson, Metalsky, & Alloy, 1989; Abramson, Seligman, & Teasdale, 1978), maladaptive attributions in the face of negative events account for the exacerbation of symptoms of hopelessness and depression. Negative explanatory style has been found to be a significant predictor of depressive symptoms in late childhood (Nolen-Hoeksema, Girgus, & Seligman, 1992),

partially mediating the impact of cognitive-behavioural (CB) interventions on depressive symptoms (Horowitz et al., 2007). Higher levels of hopelessness have been found to predict depression's onset in high-risk adolescents, inhibiting CB intervention's effects (Weersing, Jeffreys, Do, Schwartz, & Bolano, 2016). Data of PRP's effects on explanatory style was therefore aggregated.

Given its wide implementation, the need to assess whether PRP's effectiveness holds across countries and under real-life world conditions, is evident (Brunwasser et al., 2009). The characteristics of the intervention and service providers have been outlined as crucial moderators of school-based interventions' impact (Sandler et al., 2014). The implementation of the intervention was therefore tested on the basis of the intervention's characteristics (PRP versus its derivatives) in order to identify components which may inhibit the intervention's effectiveness. In addition, it has been suggested that MHPs are more efficient in delivering such interventions compared to school teachers (Stice et al., 2009; Wahl, Adelson, Patak, Possel, & Hautzinger, 2014). PRP and its derivatives were therefore assessed on the basis of the service provider (MHPs versus teachers). There is a need also for exploring the sources of variation in order to highlight the underpinning mechanisms of PRP (Brunwasser et al., 2009), considering the high heterogeneity which is evident on PRP's effects (Hetrick et al., 2015b). Given that a methodological sound assessment of interventions is needed; this review applied rigid quality criteria, including randomised controlled and cluster randomised controlled trials only.

This review aims to synthesise the evidence regarding the effectiveness of universal applications of PRP and its derivatives in preventing depression and anxiety and improving explanatory style and social skills in students aged 8-17 years. Only school-based, universal applications of PRP and its derivatives were included in this review. PRP's derivatives were defined as those interventions, which are conceptually based on PRP, namely CB theory and problem-solving, being embedded in PRP's structure. This review aims to identify factors, which are associated with the effectiveness of PRP, testing the putative moderating effects of intervention's characteristics and service providers. This is the first review in the literature focusing on a specific intervention, which follows a specific therapeutic approach (CBT), expanding PRP's assessment beyond the scope of depression. In this meta-analytic review, the PICO statement can be reported as such:

- Population (P): students aged 8-17 years

- Intervention: School-based, universal applications of PRP and its derivatives
- Comparator: Against any (Active control, Non-Intervention, Usual care, Waiting-list)
- Outcomes: depressive symptoms as primary, anxiety, explanatory style and social skills as secondary

2.2 Methods

A systematic review and meta-analysis were conducted. The presentation of the findings conforms to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009, Figure 10, Appendix IV). The protocol of this systematic review and meta-analysis is registered with the PROSPERO (CRD42015019811, Title: The preventive effectiveness of the Penn Resiliency Programme PRP, and its adapted versions: protocol for a systematic review and meta-analysis).

2.2.1 Eligibility criteria

All published randomised controlled trials (RCTs) and cluster RCTs, testing the effectiveness of the universal application of school-based PRP or any of its derivatives, targeting depression and (or) any of the secondary outcomes of interest, compared with any type of control condition (active control such as health management sessions, non-intervention such as usual learning sessions and waiting-list), were eligible for inclusion. Compared to the previous meta-analytic review of PRP (Brunwasser et al., 2009), this study included only studies published in English in peer-reviewed journals, which are school-based, universal, and adopted a RCT or cluster RCT design. This review draws data from participants aged 8-17 years, taking into account that it is unlikely for depressive symptoms to emerge before the age of 8 (Hankin et al., 1998). In addition, none of the universal applications of PRP have been delivered in populations under the age of 8.

The criteria for including studies into the current meta-analysis were according to participants' age, content and application of the implemented intervention (universal school-based PRP or universal school-based PRP's derivatives), types of controls (active control, non-intervention, and waiting-list), and selected outcomes (depression as primary outcome and/or any of anxiety, explanatory style and social skills as secondary outcomes),

being measured by validated self-report measures, such as Children's Depression Inventory (CDI) (Kovacs, 1985) for depressive symptoms, Reynolds Children's Manifest Anxiety Scale (RCMAS) (Reynolds & Richmond, 1979), Spence Children's Anxiety Scale (SCAS) (Spence, 1998) and State-Trait Anxiety Inventory for Children (STAIC) (Spielberger, Sydeman, Owen, & Marsh, 1999) for anxiety symptoms, Children's Attributional Style Questionnaire (CASQ) (Seligman et al.,1984) for explanatory style and Matson Evaluation of Social Skills with Youngsters (MESSY) (Matson, Rotatori, & Helsel, 1983) for social skills.

2.2.2 Search strategy

Libraries and databases, which were searched between 1974 and 16th April 2015 after consultation of an expert librarian, were: Cochrane Central Register of Controlled Trials (CENTRAL), Cumulative Index to Nursing and Allied Health Literature (CINAHL), EMBASE, MEDLINE (including PubMed), PsycINFO, SCI (Science Citation Index), Science Direct, Scopus. Online databases of grey literature, which were searched, were: Clinical Trials http://clinicaltrials.gov, and ISRCTN Register. Our search was optimized by using the clinical search filters for electronic databases, which are recommended by York University and SIGN. RCTs (plus cluster) were included. Extensive hand-searches of public online databases and contacts of field experts were conducted. Non-randomized trials, dissertations, theses or studies describing an intervention without providing an evaluation, were excluded. Medical subject specific headlines were searched in a concrete syntax strategy. Three syntax sets were used for searching Medline, EMBASE and PsycINFO based on our PICO headings (1st set: Randomized controlled trial OR clinical trial OR cluster randomized trial OR randomization OR random allocation OR single-blinded OR double-blinded OR usual care; 2nd set: Children OR student* OR adolescent* OR school OR child OR classroom; 3rd set: resilienc* OR recovery OR hardiness OR resistance OR cognitive behavioral OR cognitive behavioural OR school based programme* OR universal OR prevention OR mental health). An additional syntax term was added (depression.ab.) for narrowing our results in EMBASE database.

When full-text was not available, authors were contacted to retrieve a full-text. Studies were excluded, if they were describing the evaluation of targeted (selective or indicated) applications of PRP and its derivatives; they were not school-based or were not assessing any of the a priori selected outcomes of interest. Lead authors were contacted when there

were not enough details about their interventions' conceptual fidelity with PRP. The contacts were made in a fortnight basis. After two unsuccessful contact-attempts, the studies were excluded. In four authors, who were contacted, two of them did not respond and their studies were excluded.

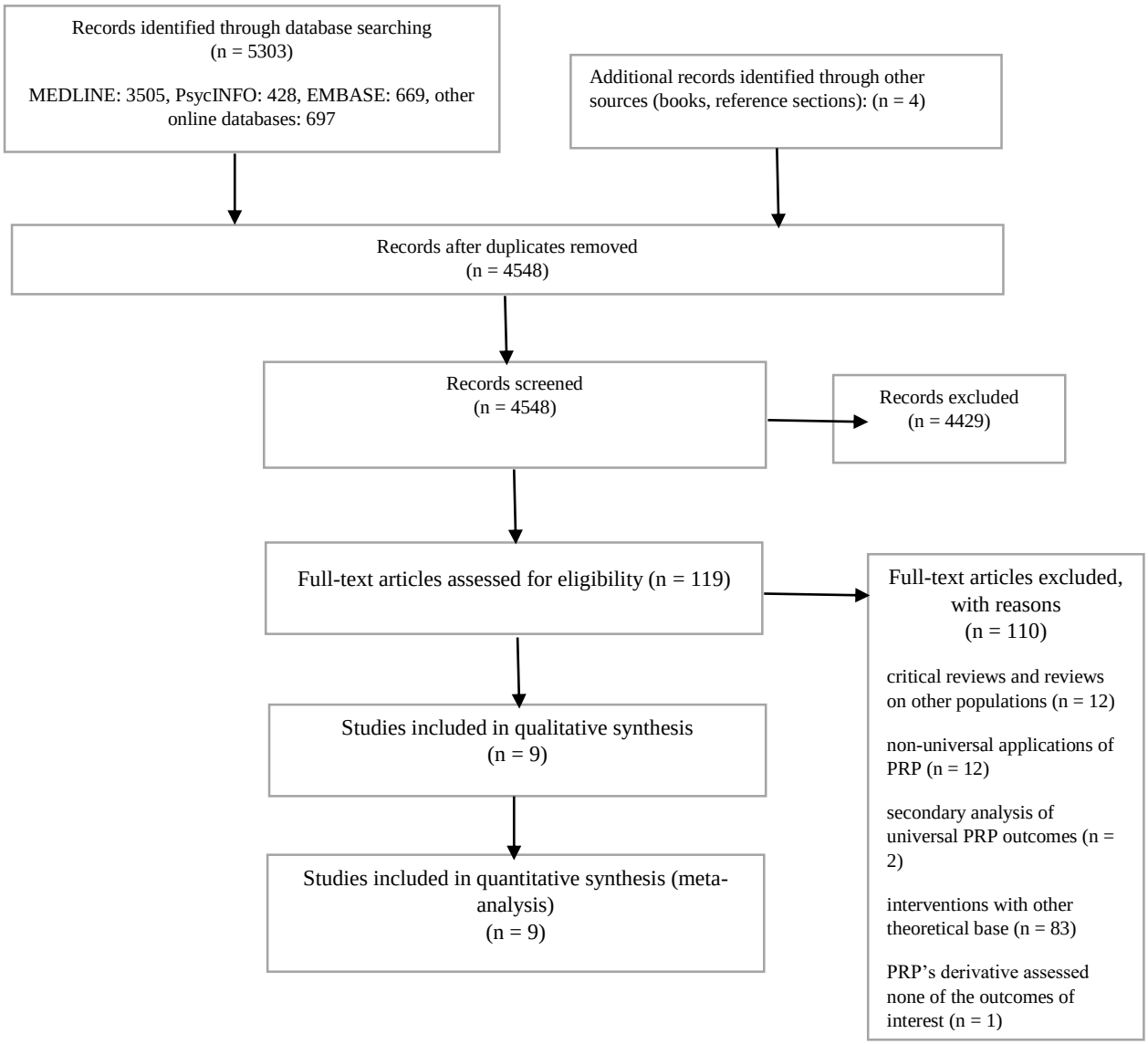
To identify studies meeting inclusion criteria, two authors (AB & AB) reviewed independently the selected articles. The first author reviewed titles and abstracts identified in the search strategy. When titles and abstracts were insufficient to determine inclusion criteria, full articles were retrieved. The full text of all relevant studies was reassessed for inclusion by two independent reviewers and included or excluded as appropriate. Disagreements were resolved after discussion. Reference lists of included articles were searched for additional studies. Fig. 1 presents a detailed flow diagram of the study selection process as well as the number and reason for excluded studies.

2.2.3 Data extraction

The Effective Practice and Organization of Care Review Group (EPOC) data abstraction form was used to extract data from the included studies. Two reviewers extracted data independently and any disagreements were resolved after discussion. Data extraction forms included details regarding study population, participants' characteristics, baseline characteristics, details of the intervention and control conditions, study methodology, recruitment and study completion rates, outcomes and times of measurement, indicators of acceptability to users, information for assessment of the risk of bias and variables related to study quality. Conditions were coded either as intervention (PRP, derivatives or slightly modified versions) or as active (health management sessions), non-intervention (lesson as usual) or waiting-list controls.

When multiple intervention and control groups were present, a composite score was obtained, combining the results of each intervention and control group respectively in order to obtain a pairwise comparison (Deeks, Higgins, & Altman, 2008). The same strategy was followed when we had many clusters, which were not reported together. In only one study, we excluded the active control group (Gillham et al., 2007), as its level of fidelity to the main intervention group, could not be determined.

Figure 1. PRISMA flow diagram of the included studies



2.2.4 Quality Assessment

Quality of included studies was assessed by using the Cochrane Collaboration tool for assessing risk of bias (Higgins & Altman, 2008). Adequate reporting led us to rate a study's section as low-risk, whereas insufficient reporting led us to rate studies' sections as high-risk. In case there were not enough details for any section, it was rated as unclear in risk and it was considered as a potential threat for bias. Two researchers independently rated the risk of bias for each included study. The last section of the risk of bias tool was used as a catch-up tool for assessing any potential threats, which were not captured in the previous sections. Any disagreements were resolved after discussion. Publication bias was addressed by visually inspecting funnel and counter-funnel plots while small-study effect

was addressed by undertaking Egger's test (Egger, Smith, Schneider, & Minder, 1997). Egger's test was conducted using Stata 14.0.

The Quality Assessment Tool for Quantitative Studies, developed by the Effective Public Health Practice Project, was used for assessing the quality of evidence (Jackson,Waters, Guidelines for Systematic Reviews in Health P. & Public Health T, 2005). This tool includes components of intervention integrity and was judged to be suitable to use in systematic reviews of effectiveness of public health and health promotion interventions (Armstrong, Waters, & Doyle, 2008). The Quality Assessment Tool for Quantitative Studies was preferred over GRADE approach (Guyatt et al., 2008), as being more suitable for capturing different levels of evidence which are reported in complex health promotion interventions.

2.2.5 Data Analysis

Data analysis was performed using RevMan Version 5.3 (Nordic Cochrane Centre, 2014). Mean differences and standardized mean differences were computed according to the type of questionnaires that were used by importing them into RevMan 5.0. Controlled ESs (intervention versus controls) were computed only at post-intervention, comparing directly PRP and its derivatives to all types of control. Mean differences on the primary outcome (depression) were computed to Hedge's g. Hedge's g was obtained by subtracting post-intervention control mean by post-intervention mean, divided by their pooled standard deviation and implementing the correction factor J (Borenstein, Hedges, Higgins, & Rothstein, 2009). Given the heterogeneity of methodologically diverse studies, a random effects model to calculate ESs was adopted. In addition, we explored whether the cluster randomized designs had imported clusters' intra-class correlation coefficient (ICC) into their analysis. For those cluster RCTs in which the analysis was performed using the individual as the unit of allocation, the effective sample size correction was applied according to the Cochrane Handbook Guidelines (Higgins, Deeks, & Altman, 2008).

2.3 Results

2.3.1 Description of studies

Table 1 (see Appendix I) presents a summary of nine included studies (Australia, Netherlands & USA) of PRP and its derivatives, which were implemented in students aged 8-17. The control groups, utilized in the included studies, were AC, NI and WL. Across all

included studies (9 studies, 4744 participants), three studies applied a randomized design (Chaplin et al., 2006; Pattison & Lynd-Stevenson, 2001; Quayle et al., 2001) and six applied a cluster randomized design (Gillham et al., 2007; Kindt, Kleinjan, Janssens, & Scholte, 2014; Roberts et al., 2010; Rooney et al., 2006, 2013; Tak, Lichtwarck-Aschoff, Gillham, Van Zundert, & Engels, 2015). In three RCTs, individual was used as the unit of analysis, while cluster was used as the unit of analysis in five cluster RCTs. In one cluster RCT (Rooney et al., 2006), analysis was performed using the individual as the unit of analysis; the effective sample size correction was therefore applied. Clusters' ICC estimation was obtained by an external source (Rooney et al., 2013). Two of three studies, in which PRP was implemented, were delivered by PRP's developers (Chaplin et al., 2006; Gillham et al., 2007), while one study implemented the OLP (Quayle et al., 2001) and two studies implemented the OVK (Kindt et al., 2014; Tak et al., 2015). Three studies implemented AOP or its identical versions (PTP and AOP-PTS) (Roberts et al., 2010; Rooney et al., 2013, 2006). Four to nine studies in overall had a sample size between 47 and 136 participants. The age range across the studies was from 9 to 16 years and all the studies assessed depression as their primary outcome. The most frequently assessed secondary outcome was anxiety.

Fig. 2 (see Appendix I) presents authors' judgements about the ratings for included studies in each item of risk of bias tool. Most of the RCTs' were of high quality. In two of the studies (Gillham et al., 2007; Roberts et al., 2010), it was not clear whether clusters' ICC estimation was considered in the analysis. These studies were rated as high-risk in the section of “other bias”. Studies' characteristics related to allocation procedures were taken into account especially for individual RCTs. Given the nature of intervention and control conditions, a complete blinding procedure was impossible; however, given the type of assessment (self-report questionnaires) most of the studies were rated as low-risk in “blinding” sections of the risk of bias tool. Protocols of RCTs' were obtained, where it was possible, in order to assess the fidelity between protocols and trials' reported results. Evidence of selective reporting resulted in rating these studies as high-risk in “selective reporting” section of risk of bias tool. Studies, which followed an intention-to-treat analysis, were rated as low-risk according to Cochrane Handbook for Systematic Reviews of Interventions (Higgins et al., 2011). Most of the cluster RCT's were rated as high quality. Most of the individual RCTs did not adequately report design and randomization procedures, leading to an inflated risk of bias scores.

2.3.2 Power calculations

We had a sufficient amount of statistical power (0.84-0.95) to detect an ES of 0.11 in our analyses with the overall sample for depression. Statistical power to detect a small ES of 0.14 for anxiety and explanatory style was 0.58 and 0.43 respectively. The power of subgroup analyses to detect an ES of 0.11 was greater than 0.50 except among the participants in PRP (non-derivatives) intervention and MHPs' subgroups.

2.3.3 Main results

A small non-significant mean difference, favouring the intervention condition, was found for depression, MD=-0.23, 95% CI= [-1.09-0.62], p = 0.59 (see Table 2 for a forest plot including all the studies). A significant effect, favouring control condition, was observed SMD = 0.13, 95% CI = [0.00 - 0.26], p = 0.04 for anxiety symptoms. The mean difference in explanatory style was non-significant, favouring control condition, MD = 0.80, 95% CI = [-1.04-2.63], p = 0.39 (see Table 3 for secondary outcomes, Appendix 2).

2.3.4 Additional results

Results of the sensitivity analysis show a small and non-significant effect on depression, favouring control condition, MD = 0.09, 95% CI = [-0.61 - 0.80], p = 0.80 (see Table 3 for all additional analyses). Two subgroup analyses were conducted comparing the effects of PPR versus its derivatives on reducing depression and PRP's effectiveness, when it is delivered by MHPs or school teachers. A small, non-significant effect, favouring intervention condition on reducing depression, was found for both subgroups, MD = -0.48, 95% CI = [-2.38 - 1.41], p = 0.62, for PRP intervention and MD = -0.14, 95% CI = [-.17 - 0.89], p = 0.79, for PRP's derivatives. Similarly, a small and non-significant effect, favouring intervention condition, was found when administrators were MHPs, MD = -0.28, 95% CI = [-3.04 - 2.49], p = 0.84 and school teachers, MD= -0.06, 95% CI = [-1.16 - 1.05], p = 0.92. A post-hoc analysis, comparing the small (Chaplin et al., 2006; Pattison & Lynd- Stevenson, 2001; Quayle et al., 2001; Rooney et al., 2006) versus large trials (Gillham et al., 2007; Kindt et al., 2014; Roberts et al., 2010; Rooney et al., 2013; Tak et al., 2015), revealed that smaller trials gave a more liberal, yet non-significant estimation, about programme's effectiveness on depressive symptoms. A post-hoc analysis, comparing interventions lasting 8 to 12 sessions (Chaplin et al., 2006, Gillham et al., 2007, Pattison & Lynd- Stevenson, 2001, Quayle et al., 2001, Rooney et al., 2013, Rooney et al., 2006) versus those lasting more than 12 sessions (Kindt et al., 2014; Roberts et al., 2010; Tak et

al., 2015), showed that shorter-in-duration interventions are more effective in decreasing depressive symptoms; albeit this effect was not statistically significant MD = -1.15, 95%CI = [-2.53, 0.24], p = 0.10. However, a significant effect, favouring the control condition, was found in decreasing the depressive symptoms in trials lasting more than 12 sessions MD = 0.53, 95%CI = [0.04, 1.03], p = 0.03.

Table 2. Forest plot and effect size estimates for the effectiveness of PRP and its derivatives in reducing depression. Mean differences < 0 represent intervention effects on depressive symptoms.

Study	Statistics for each study				Mean Difference IV, Random, 95% CI
	Hedge's *g*	Standard error	Lower Limit	Upper Limit	
Chaplin et al. (2006)	-0.4210	1.5121	-6.0137	-0.0863	
Gillham et al. (2007)	-0.0450	0.6650	-1.6134	0.9934	
Kindt, Kleinjan, Janssens, & Scholte (2014)	0.0180	0.4209	-0.6849	0.9649	
Pattison & Lynd-Stevenson (2001)	0.0125	1.9724	-3.7658	3.9658	
Quayle, Dziurawiec, Roberts, Kane, & Ebsworthy (2001)	0.4284	2.4820	-1.7046	8.0246	
Roberts et al. (2010)	0.1401	0.6583	-0.3403	2.2403	
Rooney, Hassan, Kane, Roberts, & Nesa (2013)	-0.1405	0.5520	-2.2520	-0.0880	
Rooney et al. (2006)	-0.5674	2.0033	-9.0763	-1.2237	
Tak, Lichtwarck-Aschoff, Gillham, Van Zundert, & Engels (2015)	0.1069	0.3604	-0.0065	1.4065	
Total (mean diff.)	-0.23	0.43	-1.09	-0.62	

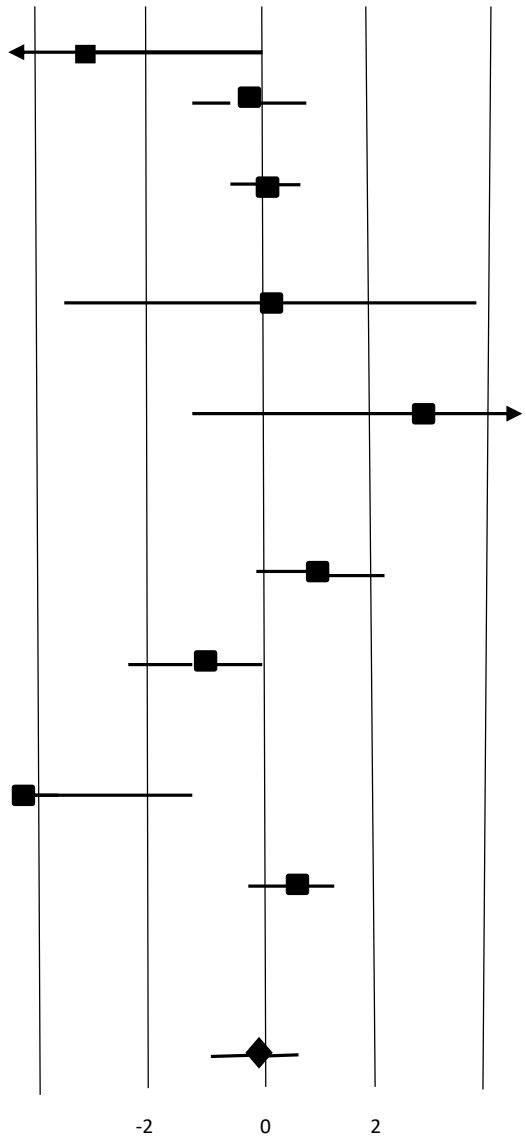


Table 3. Sensitivity and subgroup analyses results. Scores < 0 indicate reductions in depressive symptoms. The asterisk in the fifth column indicates whether the level of heterogeneity was statistically significant.

Outcome	k	*n*	Effect size (95% CI)	Heterogeneity (% I^2)
Depression				
Follow-up	9	4744	MD = -0.23 (-1.09 to 0.62)	65*
Sensitivity analysis	5	4448	MD = 0.09 (-0.61 to 0.80)	60*
Sensitivity analysis (post-hoc)	7	3741	MD = 0.28 (-0.39 to 0.95)	36
Subgroup analysis (depression)				
PRP	4	630	MD = -0.48 (-2.38 to 1.41)	42
Adapted versions	5	4114	MD = -0.14 (-1.17 to 0.89)	76**
Subgroup analysis (depression)				
MHP	4	1534	MD = -0.28 (-3.04 to 2.49)	68*
Teachers	3	2680	MD = -0.06 (-1.16 to 1.05)	70*
Anxiety				
Follow-up	4	1518	SMD = 0.13* (0 to 0.26)	20
Explanatory style				
Follow-up	3	1063	MD = 0.80 (-1.04 to 2.63)	78**
Post hoc subgroup analysis 1 (depression)				
Small trials	4	296	MD = -1.50 (-4.71 to 1.71)	64*
Large trials	5	4448	MD = 0.09 (-1.09 to 0.80)	60*
Post hoc subgroup analysis 2 (depression)				
Trials duration < 12 sessions	6	1633	MD = -1.15 (-2.53 to 0.24)	52
Trials duration > 12 sessions	3	3111	MD = 0.53 (0.04 to 1.03)	0

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

2.3.5 Publication bias

Inspection of the funnel and counter funnel plots (Fig. 2a, Appendix I) did not reveal severe asymmetry for the main analysis. In addition, Egger's test was found non-significant (β = .75, 95%CI = [-.82, 2.32], p = .274) (Figure 2b, Appendix I). I can therefore assume that neither publication bias nor small-study effect bias are present in the results of main analysis.

2.3.6 Heterogeneity

Heterogeneity was high for between group mean differences in depression in the main, I^2 = 65%, Tau^2 = 0.86, df = 8, p = 0.004 and sensitivity analysis, I^2 = 60%, Tau^2 = 0.38, df = 4, p = 0.04 (see Table 3). Heterogeneity was considerably lower after conducting the post-hoc sensitivity analysis, limiting our analysis only to those studies which targeted the same age group, I^2 = 36%, Tau^2 = 0.25, df = 6, p = 0.15. In the subgroup analyses, the level of heterogeneity of the first group (PRP interventions) was considerably low, I^2 = 42%, Tau^2

= 1.58, df = 3, p = 0.16, compared to the level of heterogeneity of PRP derivatives' subgroup, I^2 = 76%, Tau^2 = 0.92, df = 4, p = 0.002.

2.4 Discussion of findings

This systematic review addressed the question whether universal applications of school-based PRP and derivatives are effective in reducing depression or anxiety and improving explanatory style at post-intervention in students aged 8-17 years. There was no evidence regarding the effectiveness of PRP or its derivatives in reducing depression or anxiety and improving explanatory style. ESs of different directions were reported among the studies. ESs of four studies favour the intervention condition (Chaplin et al., 2006; Gillham et al., 2007; Rooney et al., 2013, 2006) and ESs of five studies favour control conditions (Kindt et al., 2014; Pattison & Lynd-Stevenson, 2001; Quayle et al., 2001; Roberts et al., 2010; Tak et al., 2015). Small (0.0125) to large (-0.5674) ESs were reported to these trials. A number of factors, such as design (cluster or individual RCT), type of intervention (PRP or derivatives), different administrators (MHPs or school personnel), age group or sample size did not appear to influence the magnitude and significance of results.

The two PRP studies, which were conducted by the developers of the programme (Chaplin et al., 2006; Gillham et al., 2007), found some positive, yet non-significant for the cluster RCT, results in reducing depressive symptoms. AOP-PTS and PTP (Rooney et al., 2006, 2013) found a short-lived effect in reducing depressive symptoms, with significant results at post-intervention for the cluster RCT. These effects however, were not maintained over time and were absent when AOP implemented to older individuals. OVK, PPP and OLP were not effective in reducing depressive symptoms. A more liberal estimation, favouring intervention condition, which was detected in small trials (n < 137) can be attributed to the potential ceiling effects of selective recruitment, which is likely to occur in small trials (Contopoulos-Ioannidis et al., 2005). Substantial heterogeneity was evident in the results of the main and sensitivity analysis. A post-hoc sensitivity analysis revealed that the source of heterogeneity could be the age of participants as the level of heterogeneity became low after excluding the studies, which targeted younger children (Rooney et al., 2013, 2006). Regarding the effectiveness of PRP's derivatives on anxiety symptoms and explanatory style, effects favouring the control condition were found, with these effects to

be significant for anxiety; however, specific recommendations about programme's effectiveness on these two outcomes cannot be reported due to the dearth of data.

2.4.1 Critique of PRP's content

There was no evidence that universal, school-based PRP or its derivatives are statistically effective on any of the outcomes of interest in students aged 8-17 years at post-intervention. It is suggested therefore that large scale roll-out of PRP and its derivatives in their current form cannot be recommended. Despite the fact that four out of nine studies had limited power, most of the programmes failed to detect a significant effect despite the high fidelity of derivatives' content to the original PRP and the satisfactory rates of attendance, while sample size and quality of studies were not found to moderate the findings. Cognitive training, which permeates PRP's implementation, focuses on challenging children's explanatory style as a putative mediating pathway to depression. Explanatory style has been highlighted as a crucial mechanism, under which CB-oriented interventions affect individuals with elevated symptoms of depression, suggesting that interaction between early interpersonal stressors and maladaptive inferential styles can accelerate the formation of a stable and global explanatory style. Taking into account that the interaction among cognitive vulnerability factors becomes more complex during adolescence (Abela & Hankin, 2008), explanatory style could be a target for configuration in younger individuals. It is suggested however, that further research is needed in order to highlight these intrapersonal factors operating in prevention programmes in a universal setting.

The interaction between inferential styles and stress constitute a stronger predictor for depression in adolescents compared to children (Lakdawalla, Hankin, & Mermelstein, 2007). Given that most of the universal PRP versions target early to mid-adolescence students, the implementation of PRP could be benefited by targeting these interpersonal factors, which account for stress elevations in adolescents. Despite it is beyond the scope of this review, dependent interpersonal stress has been found to mediate the relationship between negative cognitive style and depressive symptoms (Auerbach, Ho, & Kim, 2014), while domain-specific self-efficacy predicts depressive symptoms, buffering stressors' impact (Steca et al., 2014). Improved interpersonal relationships, which are regarded by the students as crucial for their social competence (Shochet, Montague, Smiths & Dadds, 2014), can mitigate the deleterious effects of commonly occurred

stressors in school (Turner, Reynolds, Lee, Subasic, & Bromhead, 2014). Commonly occurred stressors in schools, such as bullying, are related to high rates of social anxiety among adolescents (Yen et al., 2013). Given that universal interventions, which target social emotional and interpersonal skills, can be effective in reducing depression (see also S. M. Jones, Brown, & Lawrence Aber, 2011), it is hypothesised that future PRP versions could benefit from targeting students' interpersonal and social competence skills.

2.4.2 Moderators of the effectiveness of PRP and its derivatives

There is a need to assess whether the duration of these interventions affect their effectiveness. This is particularly important, given that longer –in duration - interventions have been found to be less effective (Stice et al., 2009), with the most optimal duration of these interventions ranging from 8 and 12 sessions (Calear & Christensen, 2010). In this review, most of the interventions delivered 8 to 12 sessions except of OVK and AOP-PTS (Roberts et al., 2010), in which 16 and 20 sessions were delivered respectively. The second post-hoc analysis tested whether interventions consisting of 8 to 12 sessions were more effective than those whose duration exceeded the 12 sessions. The post-hoc analysis revealed that students participating in the control arms of interventions with long duration (more than 12) had statistically significantly lower depression scores than those who participated in the intervention arms of the same interventions (see Table 3). It can be speculated therefore that shorter interventions of PRP (8-12 sessions) are more effective than extended versions of PRP. This evidence, however, should be interpreted cautiously, given that this post-hoc analysis was underpowered. Future research on PRP should further investigate how the number of sessions and the duration of interventions affect interventions' effectiveness. Future research should also address how the content and structure of these interventions could be modified, aiming to increase interventions' effectiveness. For example, it was reported that the rigid content of OVK might have accounted for students' limited engagement (Tak et al., 2015). This is particularly important, given that greater motivation and self-reported positive atmosphere in the classroom predicts depressive symptoms reduction (Kindt et al., 2014). I can speculate therefore that future PRP versions adopting a more reflective style (e.g. including students' biographic scenario-based activities and electronically delivered recreational activities) could increase students' engagement and motivation, leading to a further decrease of depressive symptoms. However, this suggestion is based on the synthesis of literature and not on the actual data; as such, it should be interpreted cautiously. There was no evidence

that the type of programme administrators affected the direction or magnitude of findings, as both groups were ineffective; however, specific recommendations cannot be reported due to the dearth of data. In the light of mixed evidence regarding teachers' efficiency to deliver CBT-based interventions (Fox et al., 2014; Neil & Christensen, 2009; Stallard et al., 2014; Stice et al., 2009; Wahl et al., 2014), there is a need to assess whether school teachers could be effective administrators of resilience-based interventions. Given that teachers' beliefs about their own capacity and are critical for the delivery and sustainability of such programmes (Taylor et al., 2014), it is crucial for future research to explore teachers' attitudes on delivering resilience-based interventions, identifying individual and contextual barriers which might impede the delivery of such programmes from teachers.

2.4.3 Limitations and strengths

Several limitations of the current meta-analysis should be acknowledged. First, the limited number of studies which met the inclusion criteria led to underpowered analysis for the secondary outcomes and two groups in subgroup analyses. Given the scarcity of data, mean differences for one of the secondary outcomes were not aggregated (i.e. explanatory style). Second, this meta-analysis assessed the effectiveness of universal PRP and its derivatives only at post-intervention, whereas there is evidence that some effects of PRP may emerge later (Brunwasser et al., 2009; Quayle et al., 2001). Third, ESs were obtained assuming normality of outcomes' data distribution, whereas in some studies outcomes' data distribution was positively skewed (Chaplin et al., 2006). Fourth, in two of the studies included in this review (Pattison & Lynd-Stevenson, 2001; Quayle et al., 2001), the allocation concealment of participants was not clear. Although these studies were designated as RCTs and were analysed as such in this meta-analysis, the allocation concealment in these studies might had been problematic. The results of the main analysis should therefore be interpreted under this limitation. This review confers however, research and practical benefits. First, this review is based on a prespecified protocol, conforming to the highest quality methodological standards. Second, this meta-analysis provides evidence regarding PRP's suitability for large scale roll-out, informing policy makers and key stakeholders. Third, this review applied rigid quality criteria, reducing the methodological diversity of the included studies. Fourth, this review highlights the need for re-visit the content, structure, and outcomes of universal, school-based, resilience-based, prevention interventions.

2.4.4 Concluding remarks

There was no evidence that universal PRP or its derivatives reduce depression or anxiety and improve explanatory style at post-intervention; therefore, the large-scale, roll-out of universal PRP in its current form- cannot be recommended. Universal, resilience interventions can promote students' mental health; however, the content of universal PRP should be reconsidered. Future adjustments, which will target interpersonal factors within the context of commonly occurred stressors in school, could increase intervention's effectiveness. In addition, CBT-based universal prevention programmes have been found effective in reducing anxiety symptoms. Given that anxiety symptoms often co-exists with depressive symptoms, PPR interventions could adopt a more holistic scope targeting anxiety symptoms. Positive indicators of mental health, such as well-being and positive emotions, could also be more appropriate outcomes for assessing the effectiveness of universal, resilience interventions. Positive indicators of mental health could exert indirect effects on subthreshold symptoms of depression and anxiety at a first stage, where negative thinking patterns have not transformed to cognitive schemata yet. Positive indicators of mental health and resilience-oriented, protective factors could counterbalance the deleterious effects of daily stressors, facilitating the efficient regulation of individual resources. There is a need therefore to re-structure the universal, prevention, resilience interventions, aiming to better accommodate the needs of the population in which they are implemented. As such, the views and perceptions of participants and key stakeholders participating in such interventions would be critical for re-visiting the content, structure, and implementation of these interventions.

2

CHAPTER 3

Exploring Students' Participation in Universal, Depression and Anxiety, Prevention Programmes at School: A Meta-aggregation

3.1 Introduction

The inconsistent effects of universal, resilience-based, prevention interventions in decreasing depressive symptoms has led their utility to be questioned. The inconsistent effects of these interventions can be attributed to: i) the under-developed theoretical basis of these interventions and ii) the lack of evaluative research on how these interventions work. The scarcity of evaluative research on how the processes of change occur within adolescent populations has limited our understanding about barriers and facilitators related to the implementation of such interventions (Hart & Heaver, 2013). Barriers related to the implementation of universal, prevention interventions, such as poorly coordinated systems of care and shortages of trained service providers, has been found to constrain the dissemination of such interventions (Macklem, 2014). Given the superior effects of targeted preventions compared to the universal ones, something which has led the utility of the universal interventions to be devalued, it is critical to highlight those factors which account for the difference in the effects of universal prevention programmes and the targeted ones. A more thorough understanding of the factors which differentiate the two applications will lead to the development of tailored universal interventions, which in turn will better accommodate the needs of the populations in which these are implemented. The increasing prevalence of anxiety in adolescents (Fink et al., 2015) and the need to facilitate students' emotional development in schools (Green Paper, 2017) has stressed the need to re-visit the structure and content of the universal prevention interventions. Students' perspectives regarding the provided mental health services is necessary for improving the provided mental health services in schools, taking into account the public health priority to build partnerships with student populations and key stakeholders within schools (DeLoach McCutcheon et al., 2014). Students' accounts on how they perceive the implementation of universal, prevention interventions can highlight facilitators and barriers regarding the

[2] Bastounis, A., Callaghan, P., Lykomitrou, F., Aubeeluck, A., & Michail, M. (2017). Exploring Students' Participation in Universal, Depression and Anxiety, Prevention Programmes at School: A Meta-aggregation. *School Mental Health, 9*(4), 372-385.

content and structure of such interventions, driving the development of more effective approaches for prevention in the school context. In this chapter, a qualitative evidence synthesis was performed, using students' feedback for evaluating the provided mental health services in schools, focusing on their perceptions regarding the implementation of universal prevention interventions.

3.1.2 Need for identifying barriers and facilitators of universal, resilience-based, prevention interventions

The inconsistent effects of universal prevention interventions can be attributed to the unexplored longitudinal relationships between protective factors and mental health (Thapar et al., 2012). The limited understanding of the causal pathways between protective factors and mental health has hindered the development of highly tailored depression prevention interventions for universal populations. CBT-based interventions have been found effective in tackling symptoms of depression in high-risk and depressed adolescents, by affecting individuals' inferential styles (Weersing et al., 2016) and behavioural patterns (Arora, Baker, Marchette, & Stark, 2017). Given that the vast majority of universal prevention interventions is based on CBT and/or IPT, there is a need to unpack the components of the CBT and/or IPT-based interventions in order to highlight how these components could better work for universal school populations (Hetrick et al., 2015b).

The lack of evaluative research on how the structure and the implementation of universal, depression-prevention interventions impact their effectiveness and feasibility has limited our knowledge regarding the underpinnings of the most effective universal interventions. Analysis of qualitative data is an essential part in evaluating complex interventions, given that it highlights facilitators and barriers regarding the implementation, structure, and content (Moore et al., 2015). Qualitative studies can provide us with a deep insight regarding variations in effectiveness of complex interventions (Lewin, Glenton, & Oxman, 2009). Participants' feedback can be useful in revising the content and structure of the school-based, depression-prevention interventions (Stallard et al., 2013), elucidating the barriers which may inhibit the effectiveness of such interventions (DeLoach McCutcheon et al., 2014; Sandler et al., 2014). In the context of mental health prevention in school, competing responsibilities and lack of support from teachers and administrators are considered as barriers for the effective implementation of these interventions (Langley, et al., 2010). It is of critical value therefore to identify facilitators and barriers related to the

structure, content, and implementation of universal prevention interventions in order to provide recommendations regarding the most suitable approaches for universal populations.

3.1.3 Aim and scope of meta-aggregation as a method for synthesis of qualitative data

This meta-aggregation aims to synthesise the findings from universal, depression and/or anxiety, CBT and/or IPT-based, interventions implemented in schools which are focused on reducing depression and anxiety in student populations aged 8-17 years. Only school-based, universal interventions targeting depression and/or anxiety, whose theoretical framework is based on CBT and/or IPT, are included in this meta-aggregation. Based on the philosophical foundation of Pragmatism (Lockwood, Munn, & Porritt, 2015), meta-aggregation "seeks to summarise findings from original qualitative studies in order to produce cross-study generalizations which in turn will lead to recommendations for the key stakeholders and policy makers" (Hannes & Pearson, 2012, p. 23). We therefore sought to summarize common findings among homogeneous studies, aiming to provide cross-study generalizations which will inform decision-making practice (Hannes & Pearson, 2012; Lockwood et al., 2015). This meta-aggregation sought to identify facilitators and barriers related to the content, structure, and implementation of school-based, universal depression and anxiety prevention interventions, by summarising participants' perceptions and their lived experiences from participating in such interventions. This is the first meta-aggregation which provides a context-specific synthesis, focusing on the universal CBT and/or IPT-based, school-based, depression and anxiety prevention interventions.

3.2 Methods

A meta-aggregation was conducted to explore the question "What are the perceptions and the lived experiences of students participating in universal, school-based, depression and anxiety prevention interventions which are based on CBT and/or IPT". The presentation of findings conforms to the enhancing transparency in reporting the synthesis of qualitative research (ENTREQ) statement (Tong, Flemming, McInnes, Oliver, & Craig, 2012). The ENTREQ statement aims to promote explicit and comprehensive reporting of the synthesis of qualitative studies. It consists of 21 items grouped into five domains: namely, introduction, methods and methodology, literature search, selection, appraisal, and synthesis of data (Tong et al., 2012).

3.2.1 Eligibility criteria

All published qualitative evaluation studies exploring participants' perceptions and lived experiences of universal, school-based, CBT and/or IPT-based, depression and anxiety prevention interventions, were eligible for inclusion. Only original qualitative studies published in English in peer-reviewed journals from January 2000 to September 2016 were assessed. This meta-aggregation draws data from students aged 8-17. The PICOS (population, phaenomena of interest, comparators, outcomes, study design) approach was used to define the inclusion and exclusion criteria (O'Connor, Green, & Higgins, 2008).

- Population: students aged 8-17.
- phaenomena of Interest: experiences and perceptions from participating in universal, school-based, depression or anxiety prevention interventions which are based on CBT and/or IPT
- Comparators: all comparators
- Outcomes: depression and/or anxiety
- Study design: original qualitative studies only

Most of the universal depression prevention interventions are based on CBT, targeting mainly depressive symptoms, while a few have incorporated IPT elements. Given that it is unlikely for depressive symptoms to emerge before the age of 8 (Hankin et al., 1998) and the optimal time for preventing anxiety is in late childhood (9-10 years) (Farrell & Barrett, 2007), this meta-aggregation draws data from participants aged 8 to 17. Given that we aim to draw data from a homogeneous, in terms of methodology, sample of studies, only original qualitative studies are included in this meta-aggregation. Another reason for including only qualitative studies and excluding mixed-methods ones was to ensure that the primary focus of the studies would be the qualitative evaluation of an implemented intervention.

3.2.2 Search strategy

Libraries and databases which were searched between 2000 and 19th September 2016 were: Cumulative Index to Nursing and Allied Health Literature (CINAHL), EMBASE, MedLine (including PubMed), PsycINFO, Scopus, Science Direct. Extensive hand-searches of public online databases and cross-references checking, were conducted. Quantitative, mixed-methods studies, unpublished studies, pilot or feasibility studies, and

studies which did not assess any of the outcomes of interest (depression or anxiety symptoms), were excluded. Medical subject specific headlines were searched in a concrete syntax strategy. Four concrete syntax sets were used for searching Medline on our SPICE headings, with an additional 5th syntax set to be used for narrowing our searches: (1st set: school OR classroom OR multi-site OR education; 2nd set: adolescent* OR student* OR teacher* OR provider* OR personnel OR administrator*; 3rd set: resilienc* OR recovery OR hardiness OR resistance OR cognitive behavioral OR cognitive behavioural OR school-based OR programme* OR program* OR universal OR prevention OR promotion OR psychoeducation OR interpersonal OR therapy OR mindfulness OR intervention*; 4th set: depression OR anxiety OR coping OR social OR learning OR wellness OR health behaviour* OR health behavior* OR emotion* OR environment OR sustainability; 5th set: evaluation OR qualitative).

To identify studies meeting inclusion criteria, two postgraduate researchers reviewed independently the retrieved articles. When titles and abstracts were insufficient to determine inclusion criteria, full articles were retrieved. The full text was reassessed for inclusion by the two independent reviewers and included or excluded as appropriate.

3.2.3 Quality assessment

The JBI QARI Critical Appraisal Checklist for Interpretative and Critical Research was used for assessing methodological quality of the included studies (JBI Manual, 2014). The 10-item Critical Appraisal Checklist instrument assesses congruity between the philosophical/theoretical position adopted in the study, study methodology, study methods and the research question, the representation of the data, and the interpretation of the findings of each of the selected studies (Hannes & Pearson, 2012, p. 27). The instrument also assesses the cultural or theoretical orientation of the researcher and whether there is any influence of the researcher on the study and vice versa. The instrument also assesses whether participants' voices have been adequately represented in the study and whether the interpretation and analysis of the results are congruent with the study's conclusions. The quality assessment determined whether a study was included. Two independent reviewers assessed the quality of all the selected studies and any disagreements were resolved after discussion.

3.2.4 Data extraction, levels of plausibility and data synthesis method

The JBI QARI Data Extraction for Interpretative and Critical Research abstraction form was used to extract data from the included studies. Data extraction forms included details regarding studies' citation, the population, the phenomena of interest, the context, the adopted methodology, the qualitative research methods used in the studies and cultural information, allowing the extraction of the same type of data across the included studies (JBI Manual, 2014). In meta-aggregation, the units of extractions are specific findings highlighted by the authors which constitute textual conclusions and can be presented as metaphors, key themes/sub-themes or statements. Two reviewers AB & FL extracted data independently and any disagreements were resolved after discussion. The findings were extracted by the reviewer from the original studies, pointing out specific quotations in order to justify the generation of each finding. Our focus therefore was to extract the findings generated by the researchers of each study, without interpreting the actual data. Sub-themes (findings) of the studies were extracted. The reason for choosing to include sub-themes into our aggregation was that an overlap between studies' themes was evident, something which could lead to the missing of important data. The extraction and synthesis of findings was assisted by QSR International's NVivo 11 qualitative data analysis Software (NVivo, 2014).

Each finding was assigned a rating which represented its level of plausibility in relation to the degree of its authenticity to the actual data (credibility). Two independent reviewers (AB & FL) assigned the rating for each finding. Any disagreement was resolved after discussion. Three levels of credibility were assigned for each finding (JBI Manual, 2014). The findings which authentically represent the actual data and are not open to challenge were assigned a rating of "unequivocal". The findings which provided a plausible interpretation of the actual data but are open to challenge were assigned a rating of "equivocal" and the findings which are not supported by the data were assigned a rating of "unsupported" and excluded from the aggregation. This meta-aggregation conforms to JBI-QARI meta-aggregation approach for synthesising qualitative data (Lockwood et al., 2015; JBI Manual, 2014). The first reviewer was responsible for clustering similar-in meaning findings, which were extracted from the included studies, in discrete categories.

The categories including similar in meaning findings, were clustered, forming synthesised findings. Synthesised findings can be described as an "overarching description of group of

categorized findings, which aim to assist policy and practice by providing recommendations" (Hannes & Pearson, 2012, p.32). Synthesised findings are presented in an indicatory form, facilitated the interpretation of the evidence (Hannes & Pearson, 2012). The confidence in the estimation of the output of the synthesis is assessed in terms of the dependability and credibility of the synthesized findings, following the ConQual approach (Munn, Porritt, Lockwood, Aromataris, & Pearson, 2014). Dependability is assessed by evaluating whether the individual studies fulfil the criteria of dependability as they are defined by the first five items of the JBI-QARI Critical Appraisal Checklist (congruity between the research methodology and the research question or objectives, congruity between the research methodology and the methods used to collect data, congruity between the research methodology and the representation and analysis of data, statement locating the researcher culturally or theoretically, and influence of the researcher on the research and vice versa). Credibility of individual findings is graded by assessing the congruence between authors' interpretation and the provided data. Downgrading of the dependability occurs when the included studies do not meet at least four out of five criteria for dependability, while downgrading for credibility occurs when there is a mixture of unequivocal and/or equivocal and unsupported individual findings (Munn et al., 2014). The confidence of estimates of the synthesized findings for both dependability and credibility leads to an overall ranking for each synthesized finding, which ranges from high to very low (high, moderate, low, and very low) (Munn et al., 2014).

3.3 Results

The electronic searches identified 6203 records after duplicate removal and 4 records that were identified from other sources. All the identified citations in the initial electronic database searching were checked for inclusion or exclusion. Full-texts were obtained for 115 records in total. These records were checked for inclusion or exclusion by two independent reviewers. Of these remaining 115 records, only 5 studies fulfilled the eligibility criteria and were included. The kappa coefficient for interrater agreement in the identification of the eligible studies and their quality assessment was .83 and .54 respectively. The PRISMA diagram (Moher, Liberati, Tetzlaff, & Altman, 2009) outlines all the stages for the selection process for the included studies, providing reasons for exclusion (Fig.3).

3.3.1 Study and participants' characteristics

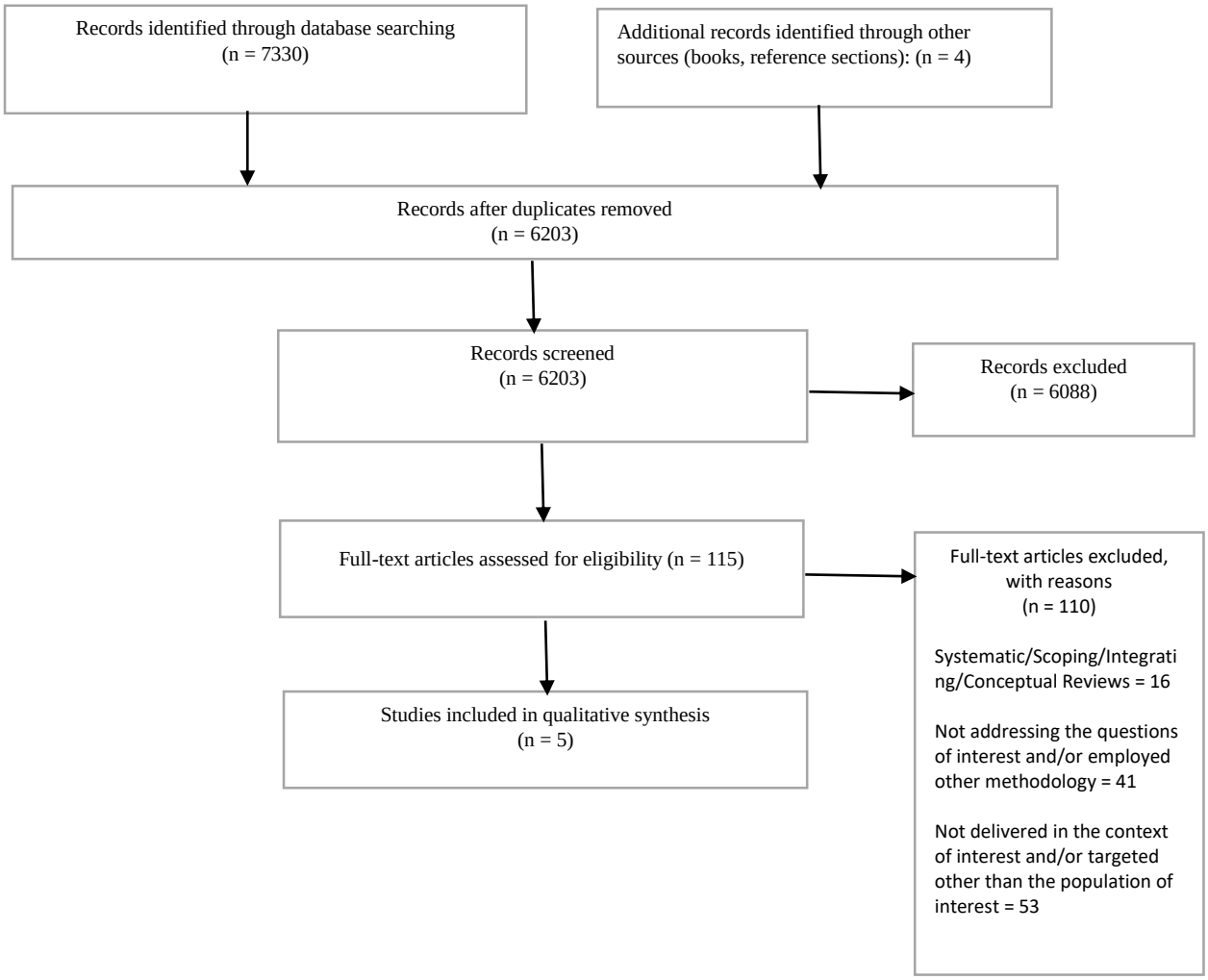
As shown in Table 4 (Appendix I), five studies were included in this meta-aggregation. Two were undertaken in Sweden (Garmy et al., 2015; Kvist Lindholm & Nelson-Zetterqvist, 2015), two in the UK (Skryabina et al., 2016; Taylor et al., 2014) and one in Australia (Shochet et al., 2014). The studies collected qualitative data from 387 students who had participated in universal depression and/or anxiety prevention interventions, while quotations were reported from 69 students. The age range of the participants fluctuated from 9-16 years. All the included studies evaluate participants' perceptions and lived experiences of participating in interventions, three of which were CBT-oriented (Garmy et al., 2015; Kvist Lindholm & Nelson-Zetterqvist, 2015; Skryabina et al., 2016) and the remaining two incorporated both CBT and ITP elements (Shochet et al., 2014; Taylor et al., 2014). Four of the interventions (Garmy et al., 2015; Kvist Lindholm & Nelson-Zetterqvist, 2015; Shochet et al., 2014; Taylor et al., 2014) targeted depressive symptoms as primary outcome, while one targeted anxiety symptoms (Skryabina et al., 2016). All the included studies describe evaluations of the implementation of universal, school-based intervention targeting depression and/or anxiety. Two of the studies undertook individual interviews with the students (Kvist Lindholm & Nelson-Zetterqvist, 2015; Shochet et al., 2014), two of them conducted focus groups (Garmy et al., 2015; Skryabina et al., 2015) and one of them conducted focus groups and interviews (Taylor et al., 2014). Three of the studies analysed the data thematically, while the two remaining studies (Garmy et al., 2015; Kvist Lindholm & Nelson-Zetterqvist, 2015) followed content and discourse analysis respectively.

3.3.2 Study quality

All the included studies met the eligibility criteria for reporting original qualitative data, exploring the perceptions and lived experiences of students participating in universal, school-based, depression and anxiety prevention interventions. All the included studies were of high quality, adequately describing the context and the aims, albeit only one study (Kvist Lindholm & Nelson-Zetterqvist, 2014) clearly reported the theoretical and philosophical perspective in which the study was based on (see Table 4, Appendix I). All the studies were ethically approved and the research methodology of all the included studies were in congruence with research objectives and the selection of research methods in analysing and interpreting the data. In only one study (Taylor et al., 2014), a rich description of students' perceptions was not evident, providing us with only three quotes.

In all the studies, there was a congruity between the reported conclusions of the data analysis and the interpretation of this data, taking into account that only a few extracted findings received a rating of equivocal and only one finding was graded as unsupported (Taylor et al., 2014). The unsupported finding was not included in the analysis. In addition, all the studies provided brief statements which outlined the potential influence of the researcher to the undertaken research and vice versa, pointing out limitations related to the transferability of conclusions.

Figure 3. PRISMA flow diagram of the included studies



3.3.3 Confidence in the estimation of synthesized findings: Dependability and credibility

Using the ConQual approach (Munn et al., 2014) included studies were graded as high, moderate, low, or very low. The confidence in the estimate of the synthesised findings is defined by the dependability and the credibility. All the studies received a high rating for

dependability as they fulfilled at least four out of five criteria for dependability, while one study (Kvist Lindholm & Nelson-Zetteqvist, 2014) fulfilled all the criteria (see Table 4, Appendix I). There were 33 sub-themes which were extracted as findings from the accounts of the students who participated in these programmes (see Table 5).

The reason for extracting sub-themes instead of the themes was to retain the richness of the data. The synthesis of the individual findings into categories and the summarization of these categories into synthesized findings was conducted according to the similarity in meaning of the extracted findings from the included studies (Hannes & Pearson, 2011), conforming to the JBI principles for synthesising qualitative data in meta-aggregation synthesis (JBI Manual, 2014). Most of the findings (31/33) received a rating of unequivocal, while only two received a rating of equivocal (Stress Management and Balloon-Challenge-problem-solving). Both of the findings which were rated as equivocal provide an illustration of the data which is open to challenge and therefore they were assigned a lower value of credibility. The synthesis of the findings led to 7 categories which in turn were merged into two synthesised findings (see Tables 5 & 6). The first synthesised finding received a high quality grading and the other received a moderate quality grading (see Table 6). The second synthesised finding received a moderate quality rating (downgraded one level) regarding the confidence of the output because it consists of a mixture of equivocal and unequivocal individual findings.

3.3.4 Synthesis of findings into categories

The meta-aggregation revealed 7 categories which were formed by summarising similar-in meaning individual findings which were extracted from the included studies (see Table 5). The first category which is labelled “Applicability of prevention interventions to universal populations” consists of four findings. The second category which is labelled “A positive cognitive style” consists of 2 findings. The third category which is labelled “Structure and implementation” consists of 10 findings. The fourth category which is labelled “Empathy” consists of three findings. The fifth category which is labelled “Personal attributes” consists of three findings. The sixth category which is labelled “Social skills” consists of three findings. The seventh category which is labelled “Emotion regulation strategies” consists of 8 findings.

Category 1 (Applicability of prevention interventions to universal populations): This category consists of four findings (Who'd benefit from the program, Treatment rather than prevention, Negative thoughts as distal agents, Negative framing). This category reveals that the depression-oriented nature of these interventions and their focus on how to tackle negative thoughts, limits interventions' applicability. Although, students revealed that these nterventions assisted them with recognizing negative thoughts and their effects on their mood, they would prefer these interventions to focus more on activities which would promote positive thinking.

Category 2 (A positive cognitive style): This category consists of two findings (More Helpful cognitions, Directed thinking). Students reported that their participation in these programmes helped them to think more positively, rendering them more capable to tackle negative thoughts.

Category 3 (Structure and implementation): This category consists of 10 findings (Rapport with young people, Number of sessions, Types of teaching, Workbook's visual elements, Tutor's role, Longer and more sessions, Hand-on activities and group work, Fun and help, Emphasis on performance, Positive activities). Students reported that this type of interventions would be more applicable to them, if they consisted of hand-on and interactive activities. Students felt that the discussions in the lessons were repetitive, limiting their motivation and concentration to attend. Students reported that a rapport between the interventions' administrators and participants as well as administrators' confidence in delivery of such interventions are a prerequisite for the success of these interventions.

Category 4 (Empathy): This category consists of three findings (Considering other more – Improved empathy, Improved relationships – recognizing feelings in others, Considering others). Students revealed that their participation in such interventions helped them to cultivate their empathy, referring to specific examples on how they started to think about others thoughts and intentions. Students reported that participating in these interventions taught them to tolerate others, rendering them more capable to take others' perspective; with these skills in turn exerting positive effects on the quality of their interpersonal relationships.

Category 5 (Personal attributes): This category consists of three findings (Improved self-confidence, Improved self-esteem – self-confidence, Coping step plan-problem-solving). Students felt that their participation in such programmes increased their self-confidence and self-esteem. Students reported that their increased self-confidence improved their coping skills, reducing their tendency for self-criticism.

Category 6 (Social skills): This category consists of three findings (Increased use of social support, Trusting the group, Balloon challenge and problem-solving). Students reported that their participation in such programmes, increased their social skills, helping them to be more reflective and establish stronger bonds with their classmates. Students reported that the participation in these interventions helped them to become more socialised, promoting social support-seeking behaviours. The increase of their social skills and social seeking support behaviours improved the groups' cohesion in chasses which attend these interventions.

Category 7 (Emotion regulation strategies and interpersonal relationships): The next category consists of eight findings (Stress management, Managing difficult emotions – Keeping calm, Managing difficult emotions – Managing anger, Awareness and management of emotions, Staying calm in a conflict, Red and green thoughts, Relaxation, Talking it through). Students reported that their participation in such programmes evolved their emotion regulation skills. These skills assisted them on more efficiently regulate their family and social relationships, handling anger and disputes more effectively. In addition, they reported that they were benefited from participating in these interventions by effectively regulating their stress and improving their coping and negotiation strategies.

3.3.5 Synthesis of Categories

Similarity in meaning between categories led to the generation of a set of synthesized findings (Hannes & Pearson, 2011). In the context of meta-aggregation, synthesised findings can be stated either as "if-then" statements or following an indicatory form (JBI Manual, 2014). The seven categories in this meta-aggregation were summarized in two synthesized findings.

Table 5
Overview of the extracted findings, credibility ratings, and citations

Findings	Credibility rating	Citations
Who'd benefit from the program	Unequivocal	Kvist Lindholm & Zetterqvist Nelson, 2015
Treatment rather than prevention	Unequivocal	Kvist Lindholm & Zetterqvist Nelson, 2015
Negative thoughts as distal agents	Unequivocal	Kvist Lindholm & Zetterqvist Nelson, 2015
Negative framing	Unequivocal	Garmy et al., 2015
More Helpful cognitions	Unequivocal	Shochet et al., 2014
Directed thinking	Unequivocal	Garmy et al., 2015
Rapport with young people	Unequivocal	Taylor et al., 2014
Number of sessions	Unequivocal	Taylor et al., 2014
Types of teaching	Unequivocal	Taylor et al., 2014
Workbook's visual elements	Unequivocal	Skryabina et al., 2016
Tutor's role	Unequivocal	Skryabina et al., 2016
Longer and more sessions	Unequivocal	Skryabina et al., 2016
Hand-on activities and group work	Unequivocal	Skryabina et al., 2016
Fun and help	Unequivocal	Skryabina et al., 2016
Emphasis on performance	Unequivocal	Garmy et al., 2015
Positive activities	Unequivocal	Garmy et al., 2015
Considering others	Unequivocal	Garmy et al., 2015
Considering other more – Improved empathy	Unequivocal	Shochet et al., 2014
Improved relationships – recognizing feelings in others	Unequivocal	Skryabina et al., 2016
Improved self-confidence	Unequivocal	Garmy et al., 2015
Improved self-esteem – self-confidence	Unequivocal	Shochet et al., 2014
Coping step plan (problem-solving)	Unequivocal	Skryabina et al., 2016
Increased use of social support	Unequivocal	Shochet et al., 2014
Trusting the group	Unequivocal	Garmy et al., 2015

Balloon challenge (problem-solving)	Equivocal	Skryabina et al., 2016
Stress management	Equivocal	Garmy et al., 2015
Managing difficult emotions – Keeping calm	Unequivocal	Shochet et al., 2014
Managing difficult emotions – Managing anger	Unequivocal	Shochet et al., 2014
Awareness and management of emotions	Unequivocal	Skryabina et al., 2016
Staying calm in a conflict	Unequivocal	Shochet et al., 2014
Red and green thoughts	Unequivocal	Skryabina et al., 2016
Relaxation	Unequivocal	Skryabina et al., 2016
Talking it through	Unequivocal	Shochet et al., 2014

Table 6. *ConQual summary of findings table*

Synthesised findings	Type of research	Dependability	Credibility	ConQual score
Synthesised finding 1	Qualitative - evaluative	High	No change	High
Synthesised finding 2	Qualitative - evaluative	High	Downgrade 1 level	Moderate

Synthesis 1: Although a few students reported that their participation in these interventions facilitated to adopt a more positive thinking style by recognizing the deleterious effects of negative thoughts, most of the students revealed that the depression-focused orientation of these interventions limits the programmes' applicability. They suggested that a switch from the repetitive training on negative thoughts to practicing positive skills via the use of interactive and hand-on activities delivered by experienced administrators would have maximized the interventions' applicability, retaining their interest and motivation (Category 1, 2, 3)

Synthesis 2: Students reported that these types of interventions were beneficial in improving their interpersonal relationships, by boosting their self-confidence, empathy, social skills and most importantly by fostering the adoption of a more positive emotion regulation strategy and adaptive negotiation strategies, which in turn led to better

relationships with peers and family and greater capacity in dealing with anger and disputes (Category 4, 5, 6, 7).

3.4 Discussion

This is the first meta-aggregation to present students' perceptions and lived experiences from participating in universal, school-based, CBT and/or IPT-based interventions which target depression and anxiety. This meta-aggregation aims to evaluate the structure and content of such interventions by synthesising students' voices. Students' voices are critical in terms of reconceptualising the content, structure, and implementation of these interventions in order to be more applicable to a universal school sample. The synthesis of data provided two synthesised findings, which in turn provide useful recommendations to key stakeholders and policy-makers, regarding the facilitators and barriers of the content, structure, and implementation of universal, school-based, depression and anxiety prevention interventions.

3.4.1 Facilitators and Barriers of universal, resilience-based, prevention interventions

Participants revealed that the depression-focused orientation of these interventions limits the interventions' applicability, reducing their motivation, enthusiasm, and concentration to attend these sessions, something which in turn might decrease programmes' effectiveness. This stresses the need for synchronising the aim and content of universal, resilience-based, prevention interventions, considering that the perceived relevance of the skills taught in school-based interventions is associated with the degree of practicing these skills in real life (Farrell et al., 2015). Indeed, interventions which target educative and competency skills can be more applicable for delivery in universal populations (Weare & Nind, 2014). Social-Emotional learning (SEL) programmes can foster supportive relationships among the students and reward social, health, and academic behaviour, adopting an educational-oriented, mental health promotion approach (Greenberg et al., 2003). There is evidence that SEL programmes, which target academic achievement and interpersonal strategies, can decrease internalising behaviours (Jones et al., 2011). Recent evidence suggests that an integrated universal approach which combines positive behavioural and social emotional learning elements can promote mental health and decrease externalizing behaviours in a sample of elementary students (Cook et al., 2015).

Some of the students reported that a prerequisite for the successful implementation of universal interventions is for these to be delivered by experienced administrators who will have established rapport first with the students. It could be likely therefore teachers and school staff to be preferred by the students, given the daily contact and the time they spend at school which renders them more capable for building a stronger rapport. Health professionals, however, have been found more effective in delivering universal, school-based, prevention interventions compared to school teachers (Stallard et al., 2014). Taking into account the financial constraints of public health services, teachers could be a cost-effective choice for implementing universal interventions (Stallard et al., 2014). It is crucial therefore for future research to explore the perceptions/views of teachers regarding the implementation of such interventions in schools. In addition, students' accounts revealed that the incorporation of hand-on activities into these programmes, could maximize their applicability, increasing their motivation to attend and bolstering the class cohesion in school. It can be speculated therefore that universal interventions consisting of competency enhancement activities could be smoothly absorbed by students, retaining their motivation to attend and increasing their engagement.

The second synthesised finding highlights the importance of interpersonal relationships on mental well-being. The participants revealed that they benefited from participating in such interventions in terms of increasing their self-confidence, empathy, and social skills. These personal attributes are considered by parents and students as essential targets of school-based, emotional, well-being interventions (Coverdale & Long, 2014). Interpersonal techniques focused on adolescents (IPT-A), albeit presuppose the diagnosis of depression, could enrich the content of the universal depression interventions. IPT-A techniques target negotiation interpersonal strategies in relation to adolescents' developmental needs, taking into account the structural changes which occur within the family (Mufson et al., 2004).

Most of the students indicated that these interventions were effective in increasing their emotion regulation in terms of dealing with anger and disputes with peers and family, resulting in turn in better interpersonal relationships which are critical for their mental well-being. Positive emotion regulation strategies as well as improved stress management skills were highlighted as the most beneficial outcome from participating in this type of programmes. Adaptive emotion regulation strategies can inhibit the course of externalizing behaviours (Zhao & Zhao, 2015) while negative emotion regulation strategies have been

found to mediate the relationship between the perception of stressful events and depressive symptoms in adolescents (Luecken & Rubinov, 2012). Recent evidence suggests that training on emotion regulation can be smoothly incorporated into school-based, SEL programmes (Modecki, Zimmer-Gembeck, & Guerra, 2017). SEL interventions can train children and adolescents to increase their interpersonal and self-management skills through academic and literacy practice, adopting a pedagogical approach for increasing students' social-emotional competencies (Jones et al., 2011). A pedagogical-oriented, resilience-focused approach in developing social and emotional skills in children and adolescents through academic curricula renders itself as a more feasible approach for school-based, universal prevention. It is suggested therefore that future universal interventions delivered in schools should continue focusing on emotion regulation strategies as a way of improving interpersonal relationships, targeting social emotional competencies through literacy and academic practices.

3.4.2 Strengths and limitations

This is the first synthesis of qualitative data which explores students' perceptions and lived experiences from participating in universal, school-based, depression and anxiety prevention interventions which are based on CBT and/or ITP. In the light of conflicting findings regarding the effectiveness of such interventions which has led their utility to be impugned, this meta-aggregation offers insight regarding the most beneficial components of such interventions, highlighting as well barriers which limit the interventions' effectiveness. The synthesised findings of this meta-aggregation highlight effective approaches regarding the structure, content, and implementation of universal, resilience-based, prevention interventions. These approaches provide practical guidance regarding the more efficient design and implementation of school-based, universal interventions. Based on the few studies which were judged as eligible for inclusion, this meta-aggregation highlights the need for including the participants' in the phases of developing and evaluating universal, school-based, interventions. The limited number of studies included in this meta-aggregation underscores that the participants' feedback has been ignored, reducing the contextual specificity of such interventions.

This meta-aggregation has inevitably some limitations. First, the small number of studies, albeit the richness of data, decreases the transferability of the findings. Second, this meta-aggregation did not summarize the views and perceptions of key stakeholders such as

teachers from participating in such interventions. Third, in the context of meta-aggregation we cannot synthesise actual data drawn from participants, relying on authors' own interpretations of the data. Fourth, the transferability of findings is limited for the school-based, universal, resilience-based, prevention interventions which target anxiety, given that only one from the included studies targeted anxiety as its primary outcome.

3.4.3 Implications for practice & research

Students' accounts showed that the content and implementation format of the universal, prevention resilience interventions should be modified. It was found that the theoretical content of these interventions does not meet the demands and expectations of participants. It can be hypothesised therefore that the implementation of universal, prevention interventions in schools will benefit from incorporating elements from SEL programmes which have been found effective in universal student populations. Future universal prevention interventions which will target emotion regulation strategies, key personal attributes, and competencies in relation to the interpersonal relationships, will be more applicable for universal populations, increasing interventions' applicability and impact. Given that the depression-oriented content of these interventions limits the motivation and engagement of participants, I argue that positive indicators of mental health could be a more appropriate target for universal prevention interventions. It is suggested, however, that future implementation of universal prevention interventions should also target sub-threshold anxiety symptoms. Anxiety symptoms in adolescence confers great risk for depression and adverse mental health events to emerge in early adulthood. Given that sub-threshold anxiety symptoms are increased in adolescents and taking into account the shared developmental patterns between anxiety and depression (Fink et al., 2015; McLaughlin & King, 2016), universal prevention interventions should target anxiety complementary to positive indicators of mental health and protective factors of resilience functioning.

The findings of this meta-aggregation have also implications for the research. Students' accounts underscored the gap between their expectations form participating in a universal, resilience interventions and the content of these interventions. Students' accounts revealed that the inclusion of more positive activities, will capture the positive indicators of mental health, being more applicable for universal populations. This has also implications on the choice of outcome measures which have been used, given that depressive-oriented,

outcome measures may not be appropriate for capturing the effects of the universal, prevention interventions. In addition, students' accounts revealed that resilience, protective factors, such as self-efficacy, social skills, emotion regulation, and negotiation strategies may be more appropriate targets for universal prevention interventions. There is the need therefore to re-develop universal, prevention interventions, fulfilling the needs of universal, adolescent populations. Given, however, the dearth of empirical research in investigating the underpinning pathways of resilient functioning (Dray et al., 2017), there is an impetus to further explore the relationships between adolescents' protective factors and stress. It should be noted, however, that these suggestions should be interpreted cautiously. The reason is that in this meta-aggregation I did not synthesise data directly coming from teachers. Given that teachers play a crucial role in the school context, there is a need for future research to target teachers' perceptions regarding the content and implementation format of universal resilience interventions. Teachers could also provide feedback regarding the barriers which are related to the implementation of these interventions and how their content could – if it is needed – to be modified in order to capture the needs of the students. This is particularly important, given that in some interventions is the teachers that are responsible for the implementation of such interventions.

CHAPTER 4

Predicting resilient functioning in an UK-based, adolescent population: Theoretical basis and operationalisation of a novel, conceptual, strength-based model

4.1 Introduction

The findings from the meta-analytic, systematic review highlighted the need to modify the content and structure of universal, resilience interventions. The systematic assessment of the most widely implemented, resilience intervention revealed that its universal application was not effective in reducing depressive and anxiety symptoms in adolescents. The findings from the meta-analysis underscored the need to identify most effective components of these interventions in order to meet the needs and characteristics of universal, student populations. Participatory approaches, which include participants of such interventions as co-researchers, can highlight the most effective approaches of these interventions. The dearth, however, of qualitative, evaluative work has impeded the progress, obscuring the identification of barriers and facilitators related to the implementation of universal interventions. A meta-aggregation of qualitative evidence was undertaken. The findings of this meta-aggregation highlighted that there is a mismatch between the scope of universal, resilience interventions and the needs of the adolescents participating in these interventions. These findings underscored the inappropriateness of the disease-oriented outcome measures to assess the effectiveness of such interventions, stressing the need to switch the scope and content of these interventions and following a more strength-based, positive-oriented, prevention approach.

Students' accounts from participating in such interventions provided me with a bank of intra-individual factors which were highlighted as optimal targets for resilience interventions. Factors such as self-efficacy, emotion regulation, and positive emotions were reported as key factors in promoting interpersonal skills and cognitive functioning, facilitating participants' resilient functioning amid stress. These findings are in line with current research in the field of resilience which underscore the importance to explore the underpinning processes between protective factors and resilient functioning (Dray et al., 2017; Kalisch et al., 2017). In addition, the disease-oriented focus of the universal interventions was reported as a significant drawback of such interventions. Given that

there is an urgent need to promote the implementation of strength-based, mental health interventions in adolescents (Enns et al., 2016; Jane-Llopis, Anderson, & Herrman, 2014), this thesis sought to explore the processes under which specific, protective, intra-individual factors lead to resilient functioning. Based on the findings of the meta-analytic review and meta-aggregation, a novel, conceptual, strength-based model predicting resilient functioning in UK-based adolescents, was developed. Given the multi-dimensional nature of the resilience construct and the wide range of environment-personal variables underpinning resilient functioning, the development of this conceptual model has been guided by a set of frameworks. The rationale for developing this conceptual model was guided by the health promotion framework, conforming to the MRC framework for developing and evaluating complex interventions. The selection of outcomes was guided by the flourishing and well-being framework while the conceptualisation of the resilient functioning as a continuous, dynamic construct was informed by the Salutogenesis framework. In this chapter, the theoretical basis and operationalisation of this model, are presented.

4.2 The development of a novel, conceptual, strength-based model for predicting resilient functioning in adolescents

This model seeks to highlight the processes under which key protective factors lead to resilient functioning amid stress. Given that this study targets universal, adolescent populations, the underpinning mechanisms between protective factors and resilient functioning were investigated within the context of cumulative, non-specific stress. The selection of cumulative, non-specific stress load as model's predictor accommodates the characteristics of universal, adolescent populations, taking into account that the incidence of mental health problems in universal settings is low. It is assumed therefore that the percentage of adolescents having experienced significant types of adversity, such as maltreatment or abuse, will be low. In addition, it is anticipated that it would be unlikely for most of the adolescents in universal samples, to have developed negative cognitive patterns, which in turn would predispose them for experience significant mental health disturbances. The selection of stress perceptions as model's predictor, aiming to capture adolescents' perceptions of generic stress in everyday life.

4.2.1 Stress perceptions, protective factors, and mental health

Stress is a non-specific reaction to an external stimulus, which is perceived by the individual as threatening, and activates neurobiological, physiological, cognitive, and behavioural responses (Lazarus & Folkman, 1984). Long-term stressors inhibit a wide range of cognitive processes and individuals' different cognitive styles account for differences in vulnerability to stress (Calvo & Gutierrez-Garcıa, 2016). Individuals' behavioural responses to stress are dependent on individuals' appraisals on how they control and cope with the external stimuli which are perceived as threatening and uncontrollable (Dantzer, 2016). Appraisals can be defined as individuals' perceptions regarding the occurrence of the external stimuli and the meaning they ascribe to them (Lazarus & Folkman, 1984). Individuals' appraisals emerge as key cognitive mediator between the occurrence of risky externals stimuli and cognitive-behavioural outcomes, affecting the adoption of behavioural-coping and emotion regulation strategies (Lazarus & Folkman, 1984). Individuals' primary and secondary appraisals can influence coping behaviours, establishing habitual emotional responses (Lazarus & Folkman, 1984) while emotions can boost or inhibit specific coping strategies (Folkman & Moskowitz, 2000). Primary appraisals pertain to persons' ability to perceive external stimuli as relevant to their own goals, commitments, and values while secondary appraisals refer to cognitive-evaluative process which is undertaken when the external stimuli are considered as threatening or uncontrollable to person's goals, values, and commitments (Lazarus, 1999).

Coping strategies are generally divided to positive reappraisal, problem-focused, and emotion-focused strategies (Folkman & Moskowitz, 2004). Positive reappraisal pertains to the cognitive process which allows individuals to focus on the good aspects of the environmental stimuli, facilitating the experience of positive emotions and well-being, and constructing a new meaning for the imposed stressor (Aldao. Jazaieri, Goldin, & Gross, 2014). Problem-focused strategies refer to individuals' thoughts and behaviours which aim to solve the underlying cause of experienced distress while emotion-focused coping strategies reflect individuals' attempts to regulate their emotional responses in the face of adversity (Folkman & Moskowitz, 2000). Intra-individual factors have been found to exert significant changes on individuals' responses on environmental stimuli. Weak coping self-efficacy, weak executive function, cognitive inflexibility, and weak emotion regulation constitute important risk factors for developing depression, whereas high coping self-efficacy, cognitive flexibility (e.g. positive explanatory style, positive reappraisal, and

acceptance), optimal emotion regulation, and active coping styles tackle stress-induced, depressive symptoms and render resilient outcomes more favourable (Southwick & Charney, 2012; Southwick, Vythilingam, & Charney, 2005). Positive protective factors, such as coping self-efficacy, adaptive emotion regulation strategies, and positive emotions, were highlighted as more appropriate targets for universal, resilience-based interventions in adolescent populations (Bastounis et al., 2017). The testing of the protective factors within resilience interventions, however, has been neglected, reflecting the disease-oriented scope of such interventions.

4.3 The rationale for developing a theoretically-driven model of resilient functioning

One of the reasons that progress in resilience research has remained constrained is the scarcity of theoretically-driven, empirical models in testing individual, protective factors and mental health within the context of specific populations and settings. The proposed conceptual model represents direct and indirect relationships between stress perceptions and resilient functioning. The inception of the model was based on cogent theoretical frameworks and its operationalisation was based on sound theories. The next section provides a description of the theories which guided the operationalisation of this conceptual model.

4.3.1 The impact of stress perceptions on mental health

In the context of stress-coping theory, the presence of a stressor elicits both internally-based feedback systems (e.g. physical reactions, neuro-biological changes, cognitive appraisal processes) and externally-based systems (e.g. environmental changes), affecting cognitive processing and self-regulation behaviour (Lazarus & Folkman, 1984). Stress emerges as an outcome of an unbalanced relationship between person's resources (e.g. goals and goals hierarchies, beliefs about self and world, and personal resources) and environmental demands (e.g. demands, constrains, opportunities, and culture), where environmental demands exceeds personal resources (Lazarus, 1999). The evaluation of stressors and individuals' behavioural responses to stressors are dependent on individuals' cognitive and neurophysiological patterns which have been developed via the systematic exposure to similar stimuli (Fink, 2016; Siegrist, 2016). The term "allostasis" refers to the activation of a set of brain mediators, which in turn allow organisms to adapt in the changing environmental landscape and function in the face of altered psychological parameters (Karatsoreos & McEwen, 2013). Allostatic process is vital for the individual to

retain organism's haemostasis amid stress; however, dysregulation of "allostasis" process (i.e. allostatic load), causes disruptions in individuals' physiological and psychological health states (McEwen, 1998). Dysregulation of allostatic process increases individuals' sensitivity to perceive environmental cues as stressful (Lazarus, 1999). Internal representations of stimuli as threatening have been posited as the key mechanism for distinguishing anxious adolescents from healthy ones in a sense that more threatening internal representations feed maladaptive attention regulation patterns, which in turn, tailor maladaptive behavioural repertoires (Waters & Craske, 2016). Given that early experiences of heightened stress may account for neurobiological changes predisposing individuals to develop psychopathology (McCrory, De Brito, & Viding, 2012), it is crucial to intervene early targeting individuals' appraisal style. Different kinds of control, such as direct behavioural control (i.e. availability of personal actions which shape stress stimulation), perceived control (i.e. sense that the environmental input is controllable), cognitive and self-regulative control (i.e. ability to control behavioural and emotional response reactions when environmental cues are perceived as stressful), underpin individuals' stress-response reactions (Steptoe & Pool, 2016). Individuals' assets, the availability of environmental resources, and specific types of control are critical in shaping person's secondary appraisals, which in turn, affect individuals' responses to stress (Dantzer, 2016; Lazarus, 1999; Rosenbaum & Ronen, 2013; Steptoe & Pool, 2016). Differences in individual secondary appraisals account for differences in stress vulnerability, rendering themselves as optimal targets for prevention (Calvo & Gutierrez-Garcıa, 2016).

4.3.2 Self-efficacy and emotion regulation: key protective factors leading to resilient functioning

One of the most crucial secondary appraisals in shaping behaviour is the perceived self-efficacy towards a goal (Bandura, 1997). In the context of social-cognitive theory, perceived self-efficacy is defined as individuals' secondary appraisal of their own coping capacities and capabilities to enact a certain behaviour (Bandura, 1997; Benight & Bandura, 2004). High perceived self-efficacy promotes the use of adaptive coping strategies while it affects self-regulation processes by enhancing individuals' problem-solving skills and behavioural repertoire (Bandura, 1997; Benight & Bandura, 2004). Domain-specific, perceived self-efficacy has been highlighted as a crucial cognitive factor in initiating and maintaining physical activity (Hamilton, Warner, & Schwarzer, 2017)

while it mediates the relationship between social support and physical activity (Chen, Sun, & Dai, 2017). Coping self-efficacy has been found to be negatively related to burnout (Laschinger, Borgogni, Consiglio, & Read 2015) and mediate the relationship between depression and cyberbullying in adolescents (Trompeter, Bussey, & Fitzpatrick, 2017). Poor self-efficacy predicts the increased substance use in adolescent populations (Schwinn et al., 2016) and it has been associated with externalising symptoms and use of environmental resources in adolescents (Loton & Waters, 2018; Plass-Christl et al., 2017). Low self-efficacy has been found to interact with threatening perceptions of daily hassles, predicting the incidence of panic disorder and panic attacks in adolescents and young adults (Asselmann, Wittchen, Lieb, & Beesdo-Baum, 2017).

Although self-efficacy has been broadly targeted as a key mediator in behaviour change interventions (Sniehotta, Scholz, & Schwarzer, 2005), most of the resilience-based prevention interventions have not targeted resilience-oriented protective factors, such as self-efficacy (for an overview, see Enns et al., 2016). The main reason why the role of self-efficacy has been relatively overlooked in the context of resilience prevention interventions is because most of these interventions have adopted a disease-oriented approach. Most of these interventions have focused on the role of vulnerability factors and the processes underpinning the perpetuation of mental health problems, having overlooked the importance of positive indicators (e.g. subjective well-being, positive emotions) in sustaining an optimal mental health. It has been hypothesised therefore that self-efficacy could play a significant role in promoting resilient functioning (Beninght & Cieslak, 2011). Given that the content of most of the universal, resilience-based interventions has not been theoretically-based in a sense that they have borrowed their content from their targeted counterparts (Gillham & Reivich, 2004), it is pivotal to contribute to the theoretical development of these interventions. To do so, there is the need to unpack the processes under which these interventions work, testing how resilience-oriented protective factors, such as self-efficacy, can mitigate stress effects and improve psychological outcomes (Chmitroz et al., 2017; Dray et al., 2017; Kalisch et al., 2015). Given the urgent public health need to shift the focus of universal prevention interventions to more proactive-oriented approaches targeting (Dray et al., 2017; Enns et al., 2016; Green Paper, 2017; Keyes, 2013; Patton et al., 2016; WHO, 2017), self-efficacy could be a critical factor in terms of improving markers of subjective wellbeing and coping capacity. Strength-based universal interventions could increase the level of adolescents' mental

health preparedness before stressors emerge, meeting the public health needs and fulfilling the governmental policies. In this study, self-efficacy is targeted as a key protective factor (Beningt & Cieslak, 2011) which is hypothesised that mediates the relationship between daily stressors and resilient functioning.

Emotion regulation can be defined as a process 'involving changes in the latency, rise time, magnitude, duration and offset of responses in behavioural, experiential and physiological domains' of individuals" (Gross, 1999, p.542). Emotion regulation strategies can be broadly divided in two categories: antecedent-focused, emotion regulation strategies and response-focused emotion regulation strategies (Gross, 1998). Antecedent-focused emotion regulation strategies are directed to modify the emotional input of the stimuli before emotional reactions emerge, whereas response-focused emotion regulation strategies are directed to modify the emotional input after emotional reactions emerge (the terms are analogous to the terms "problem-based" and "emotion-focused" in the stress-coping theory, for an overview see Gross, 2014).

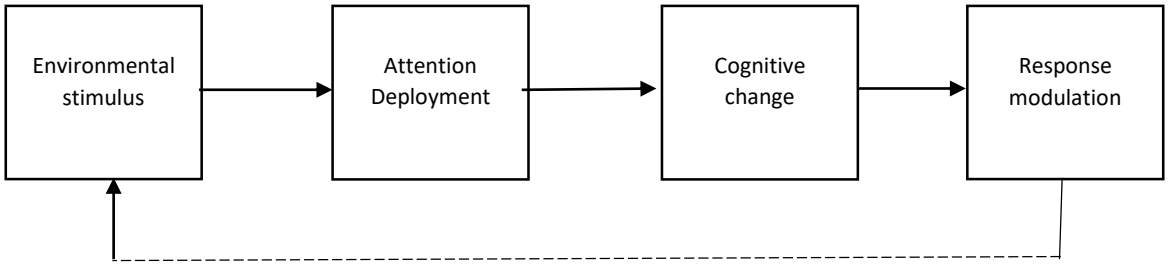


Figure 5. An adapted representation of the process model of emotion regulation (Gross, 2004). This figure highlights how the environmental input (e.g. stimuli) leads to behavioural and emotional responses. The environmental input is being modified by the primary appraisals (e.g. attention deployment) and secondary appraisals (e.g. cognitive change). The three arrows highlight the process under which the antecedent-focused emotion regulation strategies work while the dashed arrow highlights the process under which the response-focused regulation strategy works.

Maladaptive emotion regulation strategies, such as rumination and suppression, are positively associated to psychopathology and incidence of depression (Li, Xu, & Chen, 2015; Nolen-Hoeksema & Aldao, 2011), whereas adaptive emotion regulation strategies, such as reappraisal and acceptance, are negatively related to mental health disturbances (Schaffer, Naumann, Holmes, Tuschen-Caffier, & Samson, 2017). Adaptive emotion regulation strategies, such as re-appraisal, have been found to mediate the relationship between mindfulness and depression (Desrosiers, Vine, Klemanski, & Nolen-Hoeksema, 2013), reducing the impact of emotional reactivity on depressive symptoms (Shapero,

Abramson, & Alloy, 2016). Difficulty in understanding and expressing emotions constitute prominent characteristics of anxious adolescents (Mathews et al., 2016) while habitual avoidance of external stimuli, which are perceived as stressful, has been proposed as a key pathway for increasing anxiety symptoms (Arnaudova et al., 2017). This becomes more apparent early in adolescence when individuals' maladaptive beliefs regarding the controllability of emotions can lead to the establishment of stagnant patterns of maladaptive emotion regulation, which in turn increases the likelihood for depressive symptoms to emerge in late adolescence and early adulthood (Ford, Lwi, Gentzler, Hankin, & Mauss, 2018; Ortner, Briner, & Marjanovic, 2017). Emotion dysregulation early in adolescence has been associated with suicidality, anger later in life (Okado & Bierman, 2014), depressive symptoms (Sai, Luo, Ward, & Sang, 2016), social anxiety, and anxious arousal (Mayorga et al., 2018). Cognitive reappraisal in adolescence has been associated with the cognitive reframing of negative experiences (Feder, Haglund, Wu, Southwick, & Charney, 2013), promoting resilient functioning (Tugade & Fredrickson, 2004). Given that the use of emotion regulation increases by age (Garnefski, Legerstee, Kraaij, Van den Kommer, & Teerds, 2002), training in emotion regulation early in adolescence has been proposed as a crucial target for resilience-based interventions (Modecki et al., 2017). It has been proposed that emotion regulation strategies can boost resilience-oriented protective factors by exerting moderating effects between stress and resilient functioning (Troy & Mauss, 2011). Although it is only until recently that emotion-regulation has been tested in the context of resilience-based interventions, a growing body of evidence suggests that emotion regulation could play a key role in increasing resilient functioning and preserving optimal mental health. It has been suggested that a positive-oriented emotion regulation repertoire could modify stress appraisals, facilitating the better allocation of individual and environmental resources (i.e. moderating effects) (Bonanno et al., 2013; Chmitroz et al., 2017; Kalisch et al., 2015). As such, emotion regulation has been targeted as a key factor of resilient functioning in this study (Troy & Mauss, 2011), being hypothesised that it can exert multiplicative moderating effects in self-efficacy.

4.3.3 Mental well-being and resilient functioning

In the context of the Broaden-and-Build Theory, resilient functioning presupposes the experience of both hedonic and eudemonic well-being (Tugade, Fredrickson, & Barrett, 2004). The experience of positive emotions has been found to broaden the scope of

attention and cognition, leading to an upward spiral of individuals' thought-action repertoires with long-term adaptive benefits (Fredrickson, 2004; Fredrickson & Branigan, 2005; Tugade et al., 2004). Positive emotions enhance individuals' ability to efficiently regulate their resources and dealing with environmental stressors (Davydov et al., 2010). The experience of positive emotions can restore coping resources amid adversity, assisting individuals to build psychological resources in the face of traumatic experiences (Tugade & Fredrickson, 2006; Fredrickson & Joiner, 2002) and increasing their level of preparedness for dealing with future stressors (Waugh, 2014). Repetitive experience of positive emotions can confer mental health benefits by establishing positive moods and affects (Fredrickson & Joiner, 2002), which in turn expand individuals' coping and executive functions' repertoire (Waugh, 2014), while training of personal strengths and resources can assist individuals to maintain acceptable levels of well-being even when they experience symptoms of stress and anxiety (Bos, Snippe, de Jonge, & Jeronimus, 2016).

4.3.4 Theoretical underpinnings and proposed mechanism of the model

Secondary appraisals of stressors have been hypothesised to exert interactive (i.e. mediating and moderating) effects between primary appraisals (e.g. stress perceptions, attention bias) and mental health (Bandura, 1997). Based on the proposed hypotheses of Benight & Cieslak, (2011) and Troy & Mauss, (2011), a novel, conceptual, strength-based model, which predicts resilient functioning in a universal, school-based, sample of UK-based adolescents, was developed and tested (fig. 4). The need to provide a robust theoretical basis for testing the role of protective factors within resilience research has been reported (Kalish et al., 2017). Perceived self-efficacy beliefs (i.e. social, academic, and emotional) and emotion regulation strategies (i.e. reappraisal and suppression) were tested whether they exert mediating and moderating effects respectively between perceptions of stress and resilient functioning. The conceptualisation of resilient functioning was based on a strength-based approach, including surrogate measures of mental health. Measures of flourishing, subjective well-being, coping capacity in social-emotional tasks, and symptoms of anxiety were used for assessing resilient functioning. To the best of my knowledge, this is the first conceptual model which seeks to predict resilient functioning in a UK-based, adolescent sample, following a strength-based approach and accommodating the characteristics and needs of universal, adolescent populations.

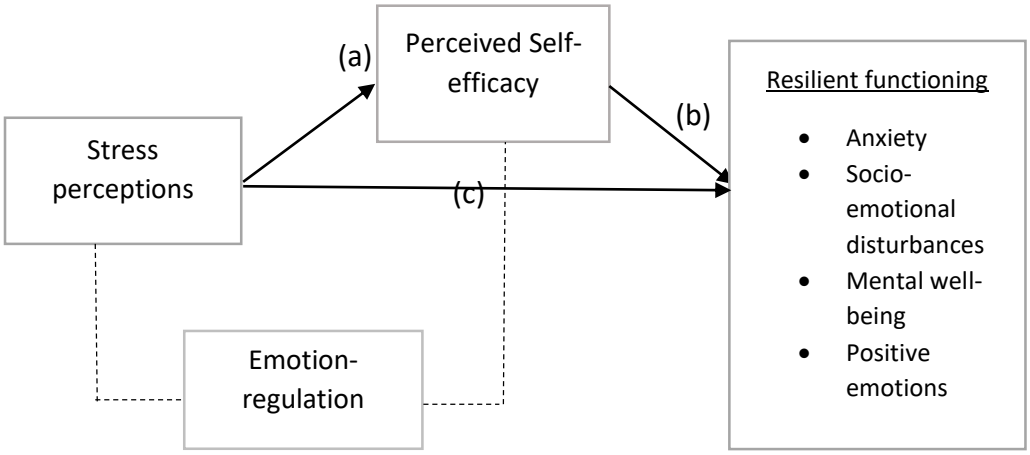


Fig. 4. Proposed mechanism of the model, showing the relationships between perception of stress (primary appraisal) and resilient functioning (path c), which are being partially mediated (paths a, b) by perceived self-efficacy (secondary appraisal). The relationship between the stress perceptions and perceived self-efficacy is hypothesised to be moderated (dashed line) by emotion regulation strategies (reappraisal versus suppression). This model suggests that individuals' capacity to cognitively regulate their emotions broaden individuals' scope in using more proactive secondary appraisals, such as self-efficacy. Given that emotion regulation strategies become more stagnant with age, this model underscores that early-experienced, emotion regulation strategies render the individual more prone to adopt specific secondary appraisals. It is hypothesised therefore that the repetitive use of adaptive emotion regulation strategies (e.g. reappraisal) increases the likelihood for the individual to make use of self-efficacy. Resilient functioning has been tested in the context of perceived stress while surrogate measures of mental health have been used for assessing resilient functioning (Chmitorz et al., 2017). Resilient functioning consists of four outcomes, namely: i) mental well-being (assessing flourishing), ii) positive emotions (assessing subjective well-being), and iii) social-emotional disturbances (coping capacity in socio-emotional tasks), and iii) levels of anxiety. The model follows a strength-based approach for assessing resilient functioning, including indicators of subjective well-being and coping capacity. The above schematic representation has been adapted by the schematic representations of Beninght & Cieslak, (2011) and Troy & Mauss, (2011).

A set of well-grounded theories have guided the development of this conceptual model. The selection of stress perceptions as model's predictor was based on the stress-coping theory (Lazarus-Folkman, 1984), the selection of the perceived self-efficacy as model's mediator was based on social-cognitive theory (Bandura, 1997), the selection of cognitive emotion regulation as model's moderator was based on the emotion regulation theory (Gross, 1998; Gross, 2013), the selection of positive emotions, mental well-being, and socio-emotional disturbances as model's outcomes was based on the Broaden-and-Build Theory, flourishing and subjective well-being framework (Fredrickson, 2004; Huppert & So, 2013; Keyes, 2013). The choice of anxiety as an additional indicator of resilient functioning in this model fulfils three purposes: i) resilience as a construct presupposes the absence of mental health problems, ii) the prevalence of subthreshold symptoms of anxiety amongst adolescents is high (Fink et al., 2015), and iii) impaired cognitive regulation has

been proposed as a pathway leading to the development of anxiety disorders (Arnaudova, Kindt, Fanselow, & Beckers, 2017).

4.4 Concluding remarks

The proposed model tests the mediating and moderating effects of perceived self-efficacy and emotion regulation respectively on adolescents' resilient functioning. This model posits that individuals' perceived capacity to deal with stressors mediates the relationship between the non-specific, daily stress and resilient functioning. The second component of the model posits that emotion regulation strategies can moderate the relationship between stress perceptions and perceived self-efficacy. As such, adaptive emotion regulation strategies, such as reappraisal, could neutralise the stressful representations of the external stimuli, enabling the individual to use their own perceived capabilities effectively. This model follows a strength-based approach, including outcome variables of subjective well-being and coping capacity alongside anxiety. This model has several strengths. First, resilience has been conceptualised as a multi-dimensional, outcome construct, facilitating the interpretation of the research findings and their dissemination into practice. Second, the conceptualisation of the construct has been based on a cogent set of theoretical frameworks. Third, the operationalisation of the model has been theoretically- and evidence-based, being informed by the findings of my systematic reviews. Fourth, this model follows a strength-based approach, conforming to the governmental guidelines and following the current trends in resilience research. To the best of my knowledge, this is the first conceptual, strength-based model which seeks to predict resilient functioning in a UK-based, adolescent population. This model, however, has also some limitations. First, this model includes only one predictor variable, limiting model's ability to investigate relationships between protective factors and domain-specific, predictors of stress (e.g. parental conflict). Second, the operationalisation of resilient functioning does not include an indicator of interpersonal skills. An adaptive interpersonal skillset was emerged as a key component of resilient functioning in the qualitative evidence synthesis. There are two reasons why I decided not to include an additional outcome which would have assessed interpersonal skills. First, the development of the model had been finalised before completing the analysis of meta-aggregation. A further modification of the model would have led to the re-submission of ethics application, which in turn would have delayed the starting date of the study. This would have posed a risk to the implementation of my

longitudinal study, given the tight deadlines within which this study had to be undertaken and the fixed dates in which the participation of the school Academy had been agreed. Second, the inclusion of an additional questionnaire in the battery of measures used in this study would have significantly added to the time needed to fill in the battery of measures. This would have had led to extensive missing data, given that my study's sample consisted of students who were not experienced in participating in questionnaire-based studies. As such, I decided to keep in my model only those variables which have been highlighted as core anchors of resilience, based on the existing literature and the findings of my systematic reviews.

CHAPTER 5

Methods and Statistical analysis plan

5.1 Aim of the study

The aim of this study was to test the validity of a novel, conceptual, strength-based model in predicting resilient functioning in adolescence. The predictive validity of this model was tested prospectively (baseline and 6-month follow-up), aiming to draw causal inferences regarding the ability of specific protective factors to exert interactive effects between stress and resilient functioning. This model aims to test whether the effects of stress on resilient functioning are causally mediated by perceived self-efficacy. In addition, this model assessed whether the relationship between stress and self-efficacy are being moderated by emotion regulation (i.e. moderated-mediation analysis) prospectively. As such, this model tested whether these moderated-mediation effects between stress perceptions and resilient functioning change across time (i.e. longitudinal moderated mediation analysis). The findings of this model will inform the evidence base regarding the role of specific, protective factors in increasing resilience, counterbalancing stress levels. The findings of this model can be used for developing novel, universal, resilience interventions which will be applicable to universal, adolescent student populations.

5.2 Research Objectives and Hypotheses

This study had five, key, research objectives:

1. To test whether the effects of stress perceptions on resilient functioning are being indirectly inferred (i.e. mediated) – and to what extent - by perceived self-efficacy at baseline.

2. To test whether these conditional, indirect effects are being moderated by the self-regulation strategies (i.e. suppression and reappraisal) at baseline.

3. To test whether the direction and magnitude of the indirect effects of perceived self-efficacy hold across at the 6-month follow-up.

4. To test whether the mediating effects of the perceived self-efficacy are being moderated by the emotion regulation strategies at follow-up (i.e. longitudinal, moderated-mediation model).

5. To test whether stress perceptions and perceived self-efficacy at baseline can causally predict perceived self-efficacy and resilient functioning.

It is hypothesised that perceived self-efficacy will partially, significantly yet, mediate the relationships between stress perceptions and the indicators of resilient functioning (i.e. four surrogate measures of mental health). It is also hypothesised that the mediating effects will keep the same direction at follow-up while their magnitude will increase through time. In addition, it is hypothesised that the mediating effects of self-efficacy will be dependent on the use of emotion regulation strategies. More specifically, it is hypothesised that the use of reappraisal will increase the proportion of the effects passing through self-efficacy. Within longitudinal analysis, it is expected that the observations among model's variables will be causally supported by the data. As such, it is hypothesised that stress perceptions and perceived self-efficacy at baseline will predict self-efficacy and resilient functioning respectively at follow-up. It is also hypothesised that stress perceptions at baseline will significantly and negatively predict the perceived self-efficacy at follow-up. Perceived self-efficacy at baseline will significantly and positively predict mental well-being and positive emotions at follow-up, whereas perceived self-efficacy at baseline will significantly and negatively predict anxiety and social-emotional disturbances at follow-up.

5.3 Study design

A prospective, questionnaire-based, observational (pseudo-longitudinal), cohort study with two waves (baseline and 6-month follow-up) was conducted. Within this study, each participant filled seven validated instruments at baseline and follow-up, plus a log-key form. Observational designs are well-suited for exploring the pathways underpinning the relationship between protective factors and resilient functioning (Chmirotz et al., 2017), allowing me to draw causal inferences within complex, moderated-mediation models (Krull, Cheong, Fritz, & MacKinnon, 2016).

5.3.1 Measures

Seven, validated instruments, assessing model's variables plus a log-key form were administered to participants. Model's predictor, mediator, and moderator were respectively assessed by the Global Measure of Perceived Stress Scale (PSS) (Cohen, Kamarck, & Mermelstein, 1983), which assesses the stress perceptions, the Self-Efficacy Questionnaire for Children (SEQ-C) (Muris, 2001), which assesses the perceived self-efficacy, and the Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA) (Gullone & Taffe, 2012), which assesses the use of reappraisal and suppression as cognitive emotion regulation strategies. Model's outcome variables were assessed by the Warwick-Edinburgh Mental Well-being Scale (WEMWBS) (Clarke et al., 2011), which assesses mental well-being, the Revised Children's Manifest Anxiety Scale (RCMAS) (Reynolds, 1980), which assesses levels of anxiety, the Positive & Negative Affect Scale (PANAS) (Watson, Clark, & Tellegen, 1988), which assesses positive and negative emotions, the Positive & Negative Affect Scale for Children (PANAS-C) (Laurent et al., 1999), which used for assessing positive and negative emotions in adolescents aged less than 14, and the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997), which assesses social-emotional disturbances. All the measures used in this study have been found to have strong psychometric properties.

- Global Measure of Perceived Stress Scale (PSS) (Cohen et al., 1983): PSS is a 10-item, self-report, Likert-type scale assessing the degree to which situation in one's life are appraised as stressful. PSS is a global measure of perceived stress. Five different values can be ascribed to the items: 0=Never, 1=Almost Never, 2=Sometimes, 3=Fairly Often, and 4=Very Often. PSS scores are obtained by summing the responses of the six negatively stated items (1,2,3,6,9, & 10) and the reversed scores (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) of the four positively stated items (items 4, 5, 7, & 8). PSS has been validated in two college and high-school student samples with coefficient alpha reliabilities to reach .84 and .85 respectively (Cohen et al., 1983). PSS scores have been correlated (small to moderate correlations) to life event scales while it has been found to better predict changes in depressive symptomatology and various health outcomes compared to life event scales (Cohen et al., 1983). In this study, a shorter, 10-item version of PSS was used. The internal consistency of the 10-item PSS version has an internal

consistency of a = .87 (Cohen & Williamson, 1988). The internal consistency of the 10-item version of PSS in this study was high (Cronbach a = .81).

- Self-Efficacy Questionnaire for Children (SEQ-C) (Muris, 2001): SEQ-C is a 21-item, self-report, Likert-type scale assessing three domains of self-efficacy: i) social self-efficacy that has to do with the perceived capability for peer relationships and assertiveness, ii) academic self-efficacy that is concerned with the perceived capability to manage one's own learning behaviour, to master academic subjects, and to fulfil academic expectations; and iii) emotional self-efficacy that pertains to the perceived capability of coping with negative emotions. Each item has to be scored on a 5-point scale (1 = not at all and 5 = very well) while total scores are obtained by summing all the scores across all the items. SEQ-C has been validated in adolescents aged between 14-17 and it has been found to have a sound internal consistency reliability (Cronbach's alpha = .88 for the total self-efficacy score and between .85 and .88 for the subscales' scores) (Muris, 2001). SEQ-C scores have been found to be negatively related to the depressive symptomatology measures (Muris, 2001) while has been accounted for a proportion of the variance of symptoms of anxiety disorders (Muris, 2002). The original version of SEQ-C consisted of 24 items; however, due to the low-factor loading of three items, these items were removed (Muris, 2001). In this study, the 21-item version of SEQ-C was used. The internal consistency of the SEQ-C in this study was high (Cronbach α = .87).

- Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA) (Gullone & Taffe, 2012): The ERQ-CA is a 10-item, self-report, Likert-type scale assessing the use of two cognitive emotion regulation strategies, namely cognitive reappraisal and expressive suppression, in adolescents. Cognitive reappraisal is an antecedent-focused emotion regulation strategy which modifies the environmental input and its emotional impact while expressive suppression is a response-focused emotion regulation strategy which involves the inhibition of the emotion-expressive reaction as a result of the environmental input. The ERQ-CA consists of six items assessing reappraisal and four items assessing suppression. Higher scores on each scale indicate greater use of the corresponding ER strategy. It is a revision

of the adult version (Gross & John, 2003). The only difference between the original version and the ERQ-CA is the simplification of wording in to be more accessible for adolescent populations and the reduction of the response scale length to five points (1 = strongly disagree, 2 = disagree, 3 = half and half, 4 = agree, 5 = strongly agree). It has been validated in a sample of children and adolescents aged 10-18 and it was found to have sound internal consistency, sound construct and convergent validity. For the 6-item CR scale, the alpha reliability coefficients were .82 for 10- to 12- and 13- to 15-year-olds; .83 for the total sample and girls; .85 for boys; and .86 for 16- to 18-year-olds. For the 4-item ES scale, the alpha coefficient was .75 for total sample and ranged from .69 (for the 10- to 12-year-olds) to .79 (for the 16- to 18-year-olds) (Gullone & Taffe, 2012). In this study, I used the simpler-in-wording scale, keeping the 10-item, response scale. The internal consistency of the ERQ-CA in this study was satisfactory (Cronbach $\alpha = .70$). Participants' total scores was assessed by subtracting their scores in the suppression scale from their scores in the reappraisal scale. The reason to assess emotion regulation as a continuous measure of overall reappraisal capacity was because individuals in early and mid-adolescence have not formed a stagnant pattern of emotion regulation strategies yet. It has been documented that the formation of a specific emotion regulation repertoire is achieved through mid-to-late adolescence while emotion regulation strategies are most effectively used in early adulthood (Desatnik et al., 2017; Theurel & Gentaz, 2018). Given that it is highly likely for both suppressing and reappraisal emotion regulation strategies to co-exist at this developmental stage, I chose to assess participants' score in emotion regulation as a continuous measure.

- Warwick-Edinburgh Mental Well-being Scale (WEMWBS) (Clarke et al., 2011): The WEMWBS is a 14-item, self-report, Likert-type scale. It assesses mental well-being, including both eudemonic and hedonic aspects of wellbeing. It includes 14 positive rated items. Five values can be ascribed to these items ("none of the time", "rarely", "some of the time", "often", "all of the time") with higher scores indicating a higher level of mental wellbeing. Composite scores are obtained by summing all the scores. WEMWBS has been validated in school populations aged 12-17. Cronbach's alpha for WEMWBS was .87, strong internal positive correlations between individual items and total scores were evident while the test-

retest correlation was satisfactory (ICC = .66) (Clarke et al., 2011). WEMWBS is a psychometrically strong population measure of mental wellbeing, and can be used in teenagers aged 13 and over. The internal consistency of WEMWBS in this study was high (Cronbach α = .88).

- Revised Children's Manifest Anxiety Scale (RCMAS) (Reynolds & Richmond, 1978; Reynolds & Richmond, 1997): RCMAS is a 37-item, self-report instrument including three different subscales of anxiety: i) Physiological Anxiety, ii) Worry/Oversensitivity, and iii) Social Concerns. A fourth subscale, the Lie scale, measures the social desire to present oneself denying his/her negative characteristics. The instrument consists of 37 dichotomous questions where respondents answer with a "yes" or "no". RCMAS has been validated in school populations with their age ranging from 6 to 17. It has satisfactory content and construct validity while its internal consistency reliability ranges between .83 and .85 (Reynolds & Richmond, 1978). Although several newer tools for assessing anxiety have come out, there is strong support for the utility of the RCMAS (Seligman, Ollendick, Langley, & Baldacci, 2004). The internal consistency of RCMAS in this study was high (Cronbach α = .90).

- Positive & Negative Affect Scale (PANAS) (Watson et al., 1988): PANAS is a 20-item, self-report scale assessing two primary dimensions of mood (positive and negative affect). Ten items represent positive mood and ten items represent negative mood descriptors. Five values can be ascribed in each item (1 = very slightly or not at all, 2 = a little, 3 = moderately, 4 = quite a bit, & 5 = extremely). Composite scores for each subscale are obtained by summing the scores of each item in each subscale. PANAS has been validated in a sample of undergraduates and adult populations. PANAS's internal consistency reliability ranges for positive affect descriptors from .86-.90 and for negative affect descriptors .84-.87 (Watson et al., 1988). The correlation between the NA and PA scales is low, ranging from -.12 to -.23 (Watson et al., 1988). PANAS is a reliable and valid tool for measuring these two mood dimensions. The internal consistency of PANAS in this study was high (Cronbach α = .85).

- Positive & Negative Affect Scale for Children (PANAS-C) (Laurent et al., 1999): PANAS-C is a 20-item, self-report scale assessing two primary dimensions of mood (positive and negative affect). Ten items represent positive mood and ten items represent negative mood descriptors. Five values can be ascribed in each item (1 = very slightly or not at all, 2 = a little, 3 = moderately, 4 = quite a bit, & 5 = extremely). Composite scores for each subscale are obtained by summing the scores of each item in each subscale. PANAS-C was validated in a sample of students with their age ranging from 9 to 14. PANAS-C performed psychometrically similar to the original version (Laurent et al., 1999). PANAS-C was used in this study for participants aged less than 14. The same tool was used for these participants at 6-month follow-up. The internal consistency of PANAS-C in this study was high (Cronbach α = .82).

- Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997; Goodman, 2001; Goodman, Ford, Simmons, Gatward, & Meltzer, 2000): SDQ is a 25-item, self-report tool comprising 5 scales of 5 items each. The five scales measure: i) emotional problems scale (items 3, 8, 13, 16, & 24), ii) Conduct problems Scale (items 5, 7, 12, 18, & 22), iii) Hyperactivity scale (items 2, 10, 15, 21, & 25), iv) Peer problems scale (items 6, 11, 14, 19, & 23), and v) Prosocial scale (items 1, 4, 9, 17, & 20). Three values can be ascribed in the items ("Somewhat True", "Not True", & "Certainly True"). Most of the items are scored in order ("Somewhat True = 1", "Not True = 0", & "Certainly True = 2"), whereas the items 7, 21, 25, 11, & 14 are scored in reverse order. SDQ has been validated in children and adolescents aged 11-15 years. SDQ has satisfactory internal consistency reliability (mean Cronbach α: .73) and test-retest reliability (mean: 0.62) (Goodman, 2001). SDQ is good at detecting conduct, hyperactivity, depressive, and some anxiety disorders while is a valid measure for assessing adjustment and psychopathology in children and adolescents. The internal consistency of SDQ in this study was high (Cronbach α = .81). Descriptives of participants' scores in SDQ are provided for all the SDQ's subscales and the two main composite subscales (internalising and externalising symptoms) both at baseline and follow-up. In this study, I used the total composite score of participants in the SDQ by adding the scores for hyperactivity, emotional symptoms, conduct problems, and peer problems

(Goodman, 1997). Participants' scores in the prosocial subscale were not incorporated into the total difficulties score "*since the absence of prosocial behaviours is conceptually different from the presence of psychological difficulties*" (Goodman, 1997, p. 582). There are two reasons why I used a total SDQ score for each participant. First, the focus of this study is to assess different indicators of resilient functioning. As such, a total score in each of the outcome variables would facilitate the interpretation of the findings. Second, this study was conducted in a universal sample which is not of increased risk to develop mental health problems. As such, it is highly unlikely for most of the participants participating in this study to have increased levels of symptoms (i.e. subthreshold and/or clinical) in each of the SDQ's subscales. It is therefore out of the scope of this study to explore the relationship between stress and specific socio-emotional disturbances.

5.3.2 Ethics

This study was approved by the Research Ethics Committee of Faculty of Medicine and Health Sciences, University of Nottingham (Ethics Reference Number: E10112015 SoHS PhD, Date: 03/02/2016). The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki, 2013 and the principles of Good Clinical Practice, and the Department of Health Research Governance Framework for Health and Social care, 2005. The study was not initiated before the protocol, consent forms and participant information sheets had received approval from the Research Ethics Committee (REC). Minor protocol amendments were made and implemented immediately; however, the REC was informed. No adverse events occurred in this study. Monthly supervision meetings were conducted to monitor the progress of the study and ensure that issues related to the timing and sensitivity of recruiting young people were addressed. I received relevant training in obtaining informed consent and engaging children and young people in research (Module: Children and Research, M34175 UK, INT 14-15, University of Nottingham). I was aware of and complied with data protection legislation. All the information collected during this study was kept in locked filing cabinets and were only accessed by the immediate research team. This includes questionnaires, consent/assent forms, information/explanation sheets and study flyers. Anonymity was preserved at all times during and after the study time period. All participants were allocated a case number. In case, any ethical issues would have emerged during the study, they would be

immediately reported to principal supervisors. No ethical issues were emerged during this study. The process of obtaining participant informed consent or assent and parent/ guardian informed consent was in accordance with the REC guidance. The participants and participants' legal guardian/parent signed dated the consent forms before the person can participate in the study. The decision regarding participation in the study was entirely voluntary. The head-teachers and I emphasized to them that consent can be withdrawn at any time without penalty. So, they were able to withdraw from the study at their own request and at any time. No amendments in the consent form were made during this study.

Each participant was assigned a study identity code number for use on log-key form, other study documents, and the electronic database. The documents and database also used their initials (first letters of forename and surname separated by a hyphen or a middle name initial when available) and date of birth (dd/mm/yy). The identifiers used were robust and able to prevent miss-assignment of data in databases. The database was in-built checked to ensure that the identifiers used match with the allocated study number. The identifiers also allowed sufficient identification to prove a person exists and matches the consent obtained. Given that digits can easily be transposed and that participants can share initials and year of birth, I used the date of birth as identifier, conforming to REC's guidance. Three identifiers in conjunction with the study number were used. Log-key forms were treated as confidential documents and held securely in accordance with regulations. Source documents including consent forms, study records, field notes, and questionnaires, were filed at my locked cupboard. I was the only person having access to study documentation other than the regulatory requirements listed below. I was endeavoured to protect the rights of the study's participants to privacy and informed consent, and adhered to the Data Protection Act, 1998. The log-key forms collected the minimum required information for the purposes of the study. Log-key forms were held securely, in a locked cupboard. Access to the information was limited to my supervisors, me, and any relevant regulatory authorities (see above). Computer held data including the study database was held securely and password protected. All data was stored on a secure dedicated web server. Access was restricted by user identifiers and passwords (encrypted using a one-way encryption method).

The University of Nottingham as research Sponsor indemnified its staff, research participants and research protocols with both public liability insurance and clinical trials

insurance. These policies included provision for indemnity in the event of a successful litigious claim for proven non-negligent harm. Study conduct was subject to systems audit for inclusion of essential documents; permissions to conduct the study; CVs of study staff and training received; local document control procedures; consent procedures and recruitment logs; adherence to procedures defined in the protocol (e.g. inclusion / exclusion criteria, timeliness of visits); accountability of study materials and equipment calibration logs. Monitoring of study data included confirmation of informed consent; source data verification; data storage and data transfer procedures; local quality control checks and procedures, back-up and disaster recovery of any local databases and validation of data manipulation. I carried out monitoring of study data as an ongoing activity. Entries on log-key forms was verified by inspection against the source data. Where corrections were required these were carried a full audit trail and justification. In compliance with the Good Clinical Practice (GCP) guidelines, regulations and in accordance with the University of Nottingham Code of Research Conduct and Research Ethics, I maintained all records and documents regarding the conduct of the study. These will be retained for at least 7 years or for longer if required. If I no longer able to maintain the study records, a second person will be nominated to take over this responsibility. The study documents held by me on behalf of the Sponsor shall be finally archived at secure archive facilities at the University of Nottingham. Individual participant personal information obtained in this study are considered confidential and disclosure to third parties is prohibited. Participants' confidentiality was ensured by utilising identification code numbers to correspond to research data collected in the computer files. Data generated in this study is available for inspection on request by the University of Nottingham representatives, the REC, local Research and Development Department (R&D) and the regulatory authorities. The findings of the study will be written up for publication in peer-reviewed journals. All published data was anonymized, and participants were allocated a case-sensitive code. The findings were also presented at international conference. No identifiable personal data was published.

5.3.3 Procedure & Study configuration

Five different school federations from East Midlands area were invited to participate in this study. Only one school federation was accepted the invitation and participated in this study. During the initial contacts (phone and e-mail), I informed the executive head teacher (P.H.) regarding the aims and methodology of the study. I provided the executive

head teacher with an overall plan of the study and study's time frame. I made a contact with the head teacher of the federation (E.H.) on 11/03/2016, informing him/her about study's ethical considerations, study's overall plan and time frame, study's materials, student's age range for participating in this study, the outcomes that will be assessed, and highlighting the research and practical implications from participating in this study. After an initial e-mail and phone contact, I visited the head teacher in order to provide a detailed description of the study, presenting study's materials and give a session to teachers who participated in this study. Most of the teachers did not attend this training session, due to competing demands. The distribution of the study's material during the first wave of data collection (baseline assessment) took place between 15 May 2016 and 12 June 2016. Active consent was requested in hard copy by students aged over 16, whereas, for those aged under 16, active assent for participating in this study was obtained by their legal guardians/parents. The whole process for obtaining the consent/assent forms were guided by the school's head teachers, conforming to the REC's suggestions while I was being informed by the school's head teacher on a weekly basis regarding the flow of the recruitment. The administration of the questionnaires took place through school hours and it was delivered by the teachers of each class. The whole procedure was monitored by the head-teacher. The process of administration and filling in the questionnaires lasted approximately 45 minutes. I had provided in advance the head teacher with instructions for filling in the questionnaires. These notes were provided to the teachers through the head teacher. The teachers of each class were responsible for collecting the data while the whole process was monitored by the headteacthers (PH & EH). Most of the participants, all the teachers, and the head teacher found the whole process feasible and simple. The only problem which was mentioned was that some of the participants found that they had not enough time to fill in all the questionnaires. However, this was attributed by the schools' head teachers to the lack of experience of students in participating in questionnaire-based studies.

The head teachers were responsible for keeping a detailed list of the names of participants who participated at baseline in order to secure the successful tracking of participants at follow-up. Due to confidentiality issues, these lists were not accessible for use from me. I was present at the schools' federation during the first day of the baseline data collection. Given that different classes participated in this study and the high number of participants, baseline data collection could not be completed within one day. I was, therefore, contacted

only when the baseline data collection had been completed. In the meantime, I had kept a regular contact with the head teacher, securing that any problems, which might arise from the baseline data collection, would have solved immediately. No problems were reported during the baseline and follow-up data collection. The follow-up data collection took place between 20/01/2017 and 15/02/2017. The tracking of participants was assisted by the head teacher's list and the log-key form (initials, date of birth, age, gender, year in school, ethnicity, year in school, and number of siblings). A slight delay in the follow-up data collection was evident, due to the competing activities of the schools' federation (preparation for the Ofsted assessment).

5.3.4 Sampling design, participants, and sample size

In this study, a mixed-sampling approach was followed. A non-probability, convenient sampling approach was followed to recruit schools for participating in this study (between-schools) and a population-based, simple, random, probability sampling approach was followed to recruit participants in this study (within-schools) (Borenstein, Jager, & Putnick, 2013). In non-probability, convenient random sampling, participants are selected based on their accessibility and/or proximity to the research (Borenstein et al., 2013). In this study, the schools were recruited based on the accessibility to me. Although, this is the least reliable sampling design, it's is the easiest and cheapest sampling design to conduct (Adams, Khan, Raeside, & White, 2007), rendering itself as the most appropriate sampling method for testing novel research hypotheses. This sampling design has inevitably some limitations. Convenience random sampling designs have limited generalisability while underrepresentation of specific sociodemographic groups are evident (Borenstein et al., 2013). Study's participants, however, were recruited using a population-based, simple, random, probability sampling approach. Within this sampling design, each student had equal probabilities for being selected to participate in this study (Borenstein et al., 2013). As such, all the students in these schools were approached to participate in this study.

5.4 Statistical analysis plan

All analyses were conducted using Stata Version 15.0 (StataCorp., 2017) and assumed a statistical significance level of $p \leq 0.05$. I led the development and implementation of the statistical analysis plan and I conducted all the analyses both at baseline and follow-up. Before undertaking the analysis, an experienced statistician (BG) reviewed and approved the statistical analysis plan.

5.4.1 Data source, analysis sets, and population

During the baseline assessment, 593 students aged 11-17 were approached for participating in this study. Informed consent was received by 589 participants or parents/legal guardians. One of the classes consisting of 18 students did not return the questionnaires and for three students, who were aged less than 16, parents/legal guardians did not assent to participate. Nine participants answered less than 80% of the questionnaires' items; therefore, they were excluded from the analysis. The final baseline sample, which was imported to analysis, consisted of 561 participants. From the 561 students, who were finally included in the baseline assessment, only 249 participated in the follow-up. From these, 18 were excluded due to extensive missing data (more than 80%) and invalid responses in the questionnaires. The final follow-up data entered in the analysis consisted of 231 participants.

The baseline data set consisted of 150 variables. Demographic self-report form provided participants' identification number, initials, date of birth, age, gender, year in school, ethnicity, and number of siblings. Total composite scores were generated for: the strengths and difficulties questionnaire externalising symptoms scale score, strengths and difficulties questionnaire internalising symptoms scale score, strengths and difficulties questionnaire total composite score, stress perceptions total composite score, mental well-being total composite score, social self-efficacy scale score, academic self-efficacy scale score, emotional self-efficacy scale score, perceived self-efficacy total composite score, anxiety lie scale total score, physiological anxiety scale total score, worry anxiety scale total score, social anxiety scale total score, anxiety total composite score, positive emotions total score, negative emotion total score, total positive emotions composite score (difference in scores of positive emotions minus the negative ones for each participant), positive cognitive emotion regulation strategy total score (reappraisal total score), negative cognitive emotion regulation strategy scale total score (suppression total score), and cognitive emotion regulation total score (difference of reappraisal scores minus the suppression scores for each participant). The follow-up dataset consisted of: a patient identification variable which distinguishes the baseline and the follow-up scores of the participants, the stress perceptions total composite score at follow-up, the perceived self-efficacy total composite score at follow-up, the emotion regulation total composite score at follow-up (scores in reappraisal scale minus the scores of suppression scale), the mental well-being total composite score at follow-up, the anxiety total composite score at follow-

up, the strengths and difficulties total composite score at follow-up, the positive-negative emotions total composite score at follow-up (positive emotion scores minus the negative emotion scores). The unit of analysis was the individual, given that the data was not provided to the investigator clustered in classes.

This study seeks to develop the evidence base which in turn will tailor the development of universal interventions; study's research objectives do not therefore lend themselves to subgroup analyses. Participants were drawn from a school federation in the Nottinghamshire area while most of the participants were coming from the same socio-economic background. The duration of participation in this study was 6 months. The inclusion criteria for participating in this study were: i) students' age should be between 11 and 18, ii) students should be able to provide informed consent, iii) for those under 16 years, parental consent was necessary for participating, and iv) students should have a sufficient knowledge of English. The exclusion criteria were: i) participants aged less than 11 or more than 18 years, ii) they have insufficient command of English, iii) they were unable to provide informed consent, and iv) lack of parental consent for those aged less than 16 years.

5.4.2 Analysis objectives

The primary objectives of this study were to test whether: i) the effects of the predictor variable (i.e. stress perceptions) on the resilient functioning are mediated by the mediator variable (i.e. perceived self-efficacy) prospectively, ii) to test whether these mediating effects are changing as a result of a fourth variable (i.e. emotion regulation) prospectively, and iii) participants' scores on predictor and mediator variable at baseline predict the scores of mediator and outcome variables respectively at follow-up, fulfilling the assumptions of causal inference. A mediation and moderated-mediation analysis following structural equation were undertaken for testing the first and second primary objectives. A panel analysis following structural equation modelling for testing the third objective. The secondary objective of this study was to test whether the difference on scores between male and female participants, which were observed at baseline, are changed as a result of time at 6-month follow-up. A within-group, repeated-measures analysis was undertaken for testing the secondary research objective. The term "conditional indirect effects" has been used to denote mediating effects at baseline while the term "mediating effects" has been used to denote mediating effects at follow-up (Kline, 2016). The reason to do so, is

that the use of the term “mediating effects” presupposes that significant conditional indirect effects are also observed at follow-ups.

5.4.3 Endpoints & covariates

This study tested the validity of a first-stage, moderated-mediation model in predicting resilient functioning at baseline and follow-up. This study followed a 2-wave, prospective design. The duration of the study was 12 months while the endpoint of the study was the 6-month follow-up. Given that the gender has been found to moderate treatment outcomes in the care of anxiety (Grubbs et al., 2015), participants’ gender was assessed as a covariate in this study.

5.4.4 Handling of missing values

An initial assessment of missing data patterns in the baseline dataset was undertaken. Given that extensive missing data increases the risk for Type I and II errors (Little, Lang, Wu, & Rhemtulla, 2016), the proportion of missing data in this dataset could not be ignored (more than 5%). The missing data patterns were therefore explored in the baseline dataset, describing and locating the source of missingness. Complete cases reached the 34% of the dataset while the percentages of missing cases were ranging from 9% for stress perceptions scores to 23.6% for socio-emotional disturbances scores. Given the 2-wave, pseudo longitudinal design of this study, a general missing data pattern between the two waves was evident alongside a monotone (attrition) missing data pattern. After describing and locating the sources of missingness, an assessment of the missing data mechanisms took place. Missing data mechanisms describe how the probability of a missing value relates to the data, consisting of three main approaches, namely: i) Missing at Random Data (MAR), ii) Missing Completely at Random Data (MCAR), and iii) Missing Not At Random (MNAR) (Enders, 2010). In the context of MAR, the causes of the missing data are in the observed data. In the context of MCAR, the missing data patterns have zero associations with any variables included in the dataset. In the context of MCAR, every missing data treatment, except of single imputation techniques, produces unbiased parameters estimates (Little et al., 2016). In the context of MNAR, the reason for missingness is systematic and it is not known to the researcher (the variable accounting for the missingness is not in the dataset).

First, I tested whether the patterns of missing data and whether the missingness can be predicted by the observed dataset (MAR assumption). If the results were non-significant, then the missing data pattern would be either MCAR or MNAR. I therefore conducted Little's MCAR, chi-square test to the outcome, moderator, and mediator variables which had the greatest proportion of missing data in the dataset (15% to 23% missing). Little's MCAR test investigates whether significant difference exist between the means of different missing-value patterns (Li, 2013). The test was significant (χ^2 distance = 99.04, *df* = 70, *p* = 0.012), providing evidence that the missing data in the baseline dataset was not MCAR. Next, I performed an extension of Little's MCAR test, the covariate-dependent missingness assumption test (CDM) (Li, 2013). The CDM test investigates whether auxiliary variables drawn from the dataset can predict the missing data patterns in the dataset (Li, 2013). I included the rest of the model's variables as auxiliary variables (stress perceptions and mental well-being), given that both were highly correlated to the model's variables with extensive missing data (Enders, 2010). Despite that both of my auxiliary variables were not complete, a good auxiliary variable is not required to have complete information to be valuable (Enders, 2010). The CMD test was highly non-significant (χ^2 distance = 343.05, *df* = 469, *p* = 1.00), implying that although the outcome, moderator, and mediator variables are not MCAR, the missing data mechanism can be viewed as CMD, meeting the MAR's assumption. As such, the means of outcome, moderator, and mediator variables were significantly different in in the completed sample compared to the non-completed sample. This practically means that the means of the outcome, moderator, and mediator variables change linearly in relation to the changes of the auxiliary variables, supporting the MAR assumption for the missing data (Li, 2013). The testing therefore of outcome, moderator, and mediator variables without adjusting for the covariates would be not valid, given that the MCAR assumption has been violated in this dataset (Li, 2013).

Given that there is strong evidence that data's missing data pattern is MAR, I decided to follow a stochastic, regression, multiple imputation method for filling in the missing data. In multiple imputation approach, a single imputation technique is repeated to simulate multiple plausible values for each missing data point (Little et al., 2016, p. 769). In this method each missing value is replaced by its predicted value but it has a normally distributed residual error terms added to the imputed predicted score (Little et al., 2016, p. 762). This method gives unbiased estimations under the MAR assumption for missing data patterns (Little et al., 2016). Although, full information maximum likelihood (FIML)

approach has certain advantages over multiple imputation, multiple imputation is a well-suited approach for treating missing data in mediation analysis, when scales scores are computed and we average multiple item scores (Little et al., 2016). I conducted a multiple imputation-oriented approach, namely the Bayesian, Markov Chain Monte Carlo, data augmentation method (Bayesian MCMC) (Little et al., 2016). MCMC is a method for estimating a Bayesian posterior distribution of model parameters, by constructing multivariate regression equations needed to impute the missing data (Little et al., 2016, p. 770). Bayesian approaches are well suited to treat missing data within mediation analysis (Enders, Fairchild, & MacKinnon, 2013). MCMC consists of two phases: imputation phase, and analysis and pooling phase. In my dataset, two variables were declared as auxiliary variables (total stress perceptions scores and total mental well-being scores) which were highly correlated with the variables with extensive missing values. One of the auxiliary variables (total mental well-being score) was found to be a significant predictor of total, socio-emotional disturbances scores ($t = -1.92$, $p = 0.02$), satisfying the MAR assumption. This means that total composite score of mental well-being is significantly lower in the non-completers of the total, composite social emotional disturbances scores.

A multivariate normal distribution "*mvn*" type of imputation was used while I run 20 imputations which are considered as optimal target in multiple imputation (Little et al., 2016). I run the imputation diagnostics, inspecting means, and box plots of the observed and imputed values. I inspected the relative increase in variance (RVI), the fraction of missing information (FMI), the degrees of freedom, the relative efficiency (RE) in order to assess how well the imputation was performed. Given the large proportion of the total sampling variance attributed to the missing data, I rerun more imputations (70) in order to be equal to the highest FMI percentage. The total imputation variance for the variables included in the imputation model were ranging from 0.0009 – 0.002, the RVI values were ranging from 0.55 – 0.92, the FMI values were ranging from 0.36 – 0.49, and RE values were ranging from 0.993 – 0.994. In addition, I assessed the convergence of my imputation model, examining visually trace and autocorrelation plots for these variables with high percentage of missing values (high FMI). Multiple imputation resulted in 151 imputed cases for anxiety scale, 61 for self-efficacy scale, 99 for positive and negative emotions scales, 85 for social and emotional disturbances scale, and 84 for emotion regulation strategies scale.

Given that baseline's data missing pattern is MAR, I followed the same approach for treating missing data at follow-up. After summarizing the extent to which follow-up data was missing (8-15% of missing data), I declared my dataset as "*mlong*" and explored the amount and the patterns of missing data. The 42% of the dataset provided full data while the greatest amount of missing information was observed in the questionnaires assessing anxiety symptoms and socio-emotional disturbances. Then, I reshaped the dataset from long to wide, taking into account the effect of time (j) for each participant (patient id). The reshape of the dataset broke down the variables, resulting in new variables according to the stage these were assessed (stage 1 as baseline and stage 2 as follow-up). I identified which variables in my imputation model had the greatest proportion of the missing information, using the "mi register imputed" command. Then, I specified my imputation model and the number of imputed datasets which were imputed (20). I run the "mi imputed chained" command, using the variables which were highly correlated with the variables with the greater proportion of missing data. I did not add predictors which were not correlated, given that this could have resulted in additional unexplained variation in the dataset (Alison, 2002). The pooling of the imputations resulted in an overall of 225 observations for the baseline and follow-up variables entered in the imputation analysis. More specifically, the imputations added 10 observations to stress perceptions variable at baseline, 11 to the stress perceptions at follow-up, 52 to the levels of anxiety symptoms at baseline, 60 to the levels of anxiety symptoms at follow-up, 23 and 18 to the self-efficacy at baseline and follow-up respectively, 16 and 6 to the emotion regulation for the baseline and follow up respectively, 28 and 50 to the positive emotions for the baseline and follow-up respectively, and 31 and 54 to the socio-emotional disturbances at baseline and follow-up respectively. Anxiety symptoms, mental well-being, and positive emotions were significant in both datasets. Then I reshaped my dataset from wide back to long format and inspected the dataset. After inspected the imputations, I run the analytic model within each of the imputed datasets, using the "*mi estimate: xtreg*" command. This provided me with a combined, single set of estimations (i.e. coefficients and standard errors), accounting for the fact there were two observations per participant. Both at baseline and follow-up, most of the missing data was observed in the questionnaires assessing anxiety (RCMAS) and socio-emotional disturbances (SDQ). I tested therefore whether there were significant differences on model's variables between the completers and non-completers of RCMAS and SDQ. To do so, I run four factorial MANOVAs assessing completers and non-completers as independent variables and the rest of model's variables as response

variables. Participants were imported to the MANOVA as an independent variable after creating two dummy variables (one for completers and one for non-completers, 0 = completers RCMAS, 1 = non-completers RCMAS, 0 = completers SDQ, 1 = non-completers SDQ). The same procedure was followed with the follow-up dataset.

5.4.5 Statistical procedures

After cleaning and preparing the baseline dataset in a coherent format for analysis, I explored whether the assumptions of parametric data had been met. Visual inspection of histograms, boxplots, scatterplots, and descriptive statistics assisted me on identifying outliers and exploring the general trends of the data. I explored issues related to the normality in the distribution of errors, the linearity in the relationships among the predictor, the mediator, the moderator, and model's outcome variables, the homogeneity of errors' variances, and the independence of errors' variance. Data was checked for outliers and influential cases, by using scatterplots and graph matrices. Normality of variables' residuals were checked by inspecting kernel density estimates and standardized normal probability (P-P) plots. In addition, I checked model's predictor and mediator variables for multicollinearity, given that a relatively high correlation between those variables was observed. The variance inflation factor (VIF) values between predictor and mediator, and predictor and moderator variable did not indicate threat for multicollinearity (VIF values ranging from 1.22 to 1.67 for all the outcomes of interest, so they were lower than 2). Linearity assumptions between the predictor and the outcome variables were checked by inspecting scatterplots of standardised residuals and augmented partial residual plots. Associations between the model's variables were tested by undertaking sets of Pearson correlations, applying the Bonferroni correction. Simple and multiple linear regressions provided me with an initial support about the associations among model's variables at baseline. Regression diagnostics showed that my data met the assumptions for undertaking ordinary linear regressions. Gender differences on model's variables were explored by undertaking independent, pair-sample, unrelated-group t-tests.

Four separate path regression analyses were conducted, providing me with the estimates regarding the direction and magnitude of the mediating effects of the mediator variable (i.e. perceived self-efficacy). Four separate single mediator models were tested following structural equation modelling ("*sem*" command), using bootstrapped standard errors and confidence intervals. Under a bias-corrected bootstrap method, approximately 462 participants are sufficient for assessing mediation effects in a single mediator model,

retaining power .80 and assuming small effect sizes in both indirect paths (Fritz and MacKinnon, 2007; Vittinghoff, Sen, & McCulloch, 2009). Mediation analyses provided me with the proportion of the total predictor's effect mediated and the ratio of the indirect to direct effects. All the mediation analyses were based on the mediation model shown below (figure 5), which can be statistically represented as: $Y = i_1 + c' X + e_1$, $Y = i_2 + c'X + bM + e_2$, and $M = i_3 + aX + e_3$. Each letter (a,b,c) denotes the relationships between the variables, the parameter e_2 denotes the part of the Y which is not explained by its relationship with X and M, and the parameter e_3 denotes the part of M which is not explained by its relation with X (MacKinnon, Fairchild, & Fritz, 2007).

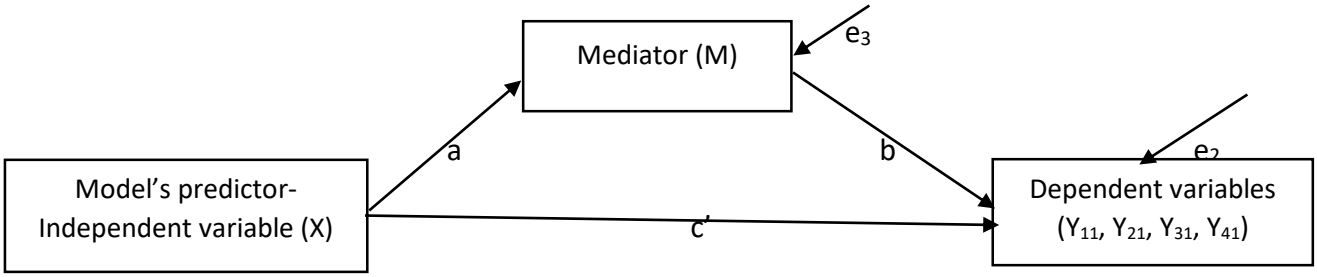


Fig. 5. Representation of the path diagram of a single mediator, partial-mediation model. The independent variable (X) is related to the mediator (M) which in turn is related to the dependent variables in each mediation analysis. Part of the proportion of the effects of the predictor on the outcomes of interest are indirectly inferred by the mediator variable (partial mediation).

Bootstrapping is one resampling method, where the sample of the study is conceptualised as a pseudo-population which represents the broad population from which the sample has been recruited (Preacher, Rucker, & Hayes, 2007). In bootstrapping, the sampling distribution of any statistic can be generated by calculating the same statistics in multiple resamples of the dataset while no assumptions about the shape of the sampling distribution are necessary for conducting inferential tests (Preacher et al., 2007). Bootstrapping is one of the more valid methods for testing intervening variable effects, providing us with standard errors and normal-based, bootstrapped confidence intervals around the indirect effect (Williams & MacKinnon, 2008).

After obtaining the effect estimates for the conditional indirect effects, I tested whether the strength of the mediator's effects are dependent on the level of the proposed moderator variable (i.e. moderated-mediation analysis) (Preacher et al., 2007). Based on my research objectives, I tested whether the moderator variable moderates the path between the predictor and the mediator (first-stage moderated-mediation). Moderation effects can be presented as: $Y = (a_0 + a_2W) + (a1 + a_3W)X + r$, where $(a_1 + a_3W)$ is the function of the

moderator (Hayes, 2013; Preacher et al., 2007). A sample size between 400 and 500 participants is sufficient for detecting a low mediating effect (b = .14) when moderation is present, retaining 80% power. I assumed therefore that my baseline dataset had sufficient power to detect moderated-mediation effects

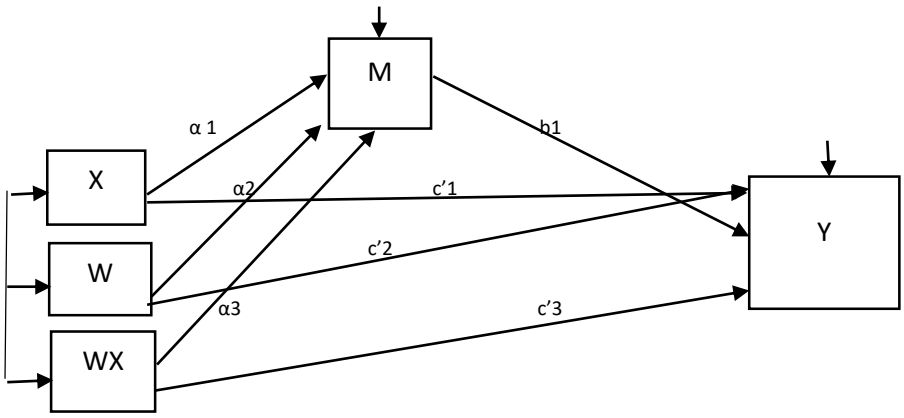


Fig. 6. Statistical representation of the first-stage, moderated mediation effect. The a1 path of a simple mediation model, being moderated by a fourth variable (moderator variable, W) (Hayes, 2013; Preacher et al., 2007). The conditional indirect effect of X on M can be expressed as $f(\theta|W) = b_1 (a_1 + a_3 W)$, where f(θ|W) term denotes that the indirect effect is a function of random variables (regression coefficients) contained in a vector θ (Preacher et al., 2007).

The predictive validity of my model was also tested longitudinally. A two-wave, longitudinal design can provide information regarding the temporal precedence of model's variables, assisting me on drawing causal inferences regarding the observed relationships and allowing me to rule out alternative explanations. To do so, a panel dataset was built, including only the participants who participated in both waves of the study. The format of the final dataset was transformed from wide to long. This data transformation resulted in allocating information for every participant in two rows (one row for the baseline and own row for the follow-up). The procedure for data management was as follows: i) an auxiliary variable was generated to indicate whether the dataset rows contain baseline or follow up information and only the data from participants who contributed in both study waves were kept (matching the participants), ii) additional variables were created and represented the values of explanatory variables during baseline and follow-up, and iii) the dataset was declared as panel data for analysis purposes using the "*xtset"* command in Stata, matching participants' identify and stage of data collection (baseline or follow-up).

Within longitudinal analysis, an autoregressive, panel model was tested. Autoregressive panel models are well suited for exploring intra-individual variation (Rovine & Molenaar, 2016). Briefly, autoregressive panel models are time-series models in which each

participants' measure predicts the measure of the same participant at a later time point (Rovine & Molenaar, 2016). Within autoregressive panel models, both longitudinal and contemporaneous relationships across the two waves can be tested (see figure 7). The assessment of the final model was carried out in a single, simultaneous structural equation modelling (SEM) approach under the maximum likelihood (MLMV) method. The SEM approach is well-suited for testing cross-lagged, autoregressive panel models, constraining particular sets of paths to be equal to zero or equal to each other. Autoregressive, cross-lagged panel models offer the advantage to investigate both contemporaneous and longitudinal associations (Krull et al., 2016). The analysis of this model was undertaken following the MLMV method. Under MLMV method, the available cases in the dataset are used to compute maximum likelihood estimates of parameters' values. Maximum likelihood method is an optimal method for handling missing data under the MAR assumption, providing unbiased estimates and negating the loss of power (Allison, 2001). For all the other analyses at follow-up dataset, I used the imputed dataset, running the commands "*mi estimate"* and "*cmdok"*. The "*mi"* estimate prefix is used to analyse multiple imputed data by fitting a model to each of the imputed datasets and pooling individual results using Rubin's combination rules (Rubin, 1996) while the "*cmdok"* command allows "*mi estimate"* command to work with commands that are not supported by Stata.

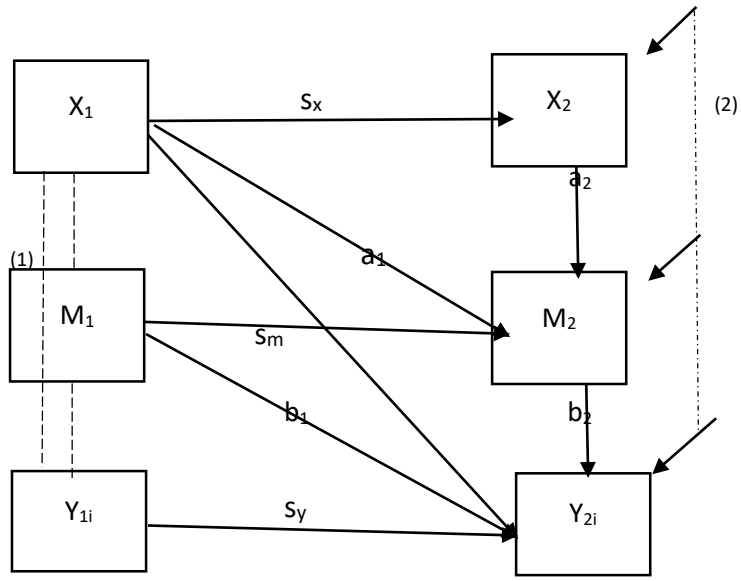


Fig. 7. Representation of the study's autoregressive, panel, model with longitudinal and contemporaneous mediation across two waves (MacKinnon, 2008). X_1 denotes the predictor at time point t, M_1 denotes the mediator at time point t+1, and Y_{1i} denotes each of the outcomes at time point t. X_2, M_2, and Y_{2i} denote the values of X_1, M_1, and Y_{1i} at time point t+1.

The longitudinal mediational pathways in the autoregressive panel model can be expressed as: $M_2 = i_{m2} + a_1X_1 + a_2X_2 + s_mM_1 + e_{m2}$, $Y = i_{y2} + b_1M_1 + b_2M_1 + c'_1X_1 + c'_2X_2 + s_y Y_1 + e_{y2}$ (Krull et al., 2016; MacKinnon et al., 2008). The coefficient a_1 represents the effect of X_1 on M_2 after controlling for the effects of X_2 on M_1 while the coefficient a_2 represents the effects of X_2 on M_2 after controlling for the effects of X_1 on M_1. The coefficient b_1 expresses the effects of M_1 on Y_{2i} after controlling for the effects of X_1, X_2, and M_2. The coefficient b_2 expresses the effects of M_2 on Y_{2i} after controlling for the effects of X_1, X_2, M_2, and Y_{1I}. Under this model, mediation can be estimated from different coefficients (a_1b_1, a_2b_2, and a_1b_2). The indirect effect a_1b_1 is based on lag-1 relations while the indirect effect a_2b_2 is based on contemporaneous relations of the variables assessed in the second wave (Krull et al., 2016). The indirect effect denoted by a_1b_1 is considered as a more reliable estimator of mediation, given that the indirect effects a_1b_2 and a_2b_2 express cross-sectional relations which are more sensitive to bias (Cole & Maxwell, 2003). Dashed lines (1) represent disturbance covariance and dashed line (2) represent disturbance correlation. In the autoregressive panel model above, s_x, s_m, and s_y are coefficients which denote the effects that a variable has on itself at a later time point and estimate the stability of a variable across time. In the autoregressive panel models, there is a controlling of omitted variables which may confounding the causal effects when the dependent variable at time t is predicted by the predictor at time t-1. The estimation therefore of s_m and s_y lead to less biased estimations of a_1 and a_2 and b_1 and b_2 respectively.

Figure 7 represents how longitudinal mediation analysis was tested within this model. The role of moderator variable in moderating the path between the predictor and the mediator variable at follow-up (first-stage, longitudinal, moderated-mediation analysis) was tested by incorporating moderator's statistical product term into the analysis. This relationship in statistical syntax can be expressed as: [(m <- x)(y <- m x w mw)], where m denotes the mediator and w the moderator. A necessary condition before importing moderator's product term in the follow-up analysis is to centre the variables, which are involved in the product term, in respect to their means (i.e. $X_2 – X_m$ and $W_2 – W_m$). The reason to do so, is to control for the correlations between the product term and the first-order effect terms which may introduce high collinearity between baseline and follow-up (Kleine, 2016; Krull et al., 2016). I therefore centred the values of the predictor, mediator, and the moderator and then I imported them into the analysis. In addition, a post-hoc analysis was undertaken for testing alternative moderated mediation hypotheses at baseline and follow-

up. It was tested, whether the moderating role of emotion regulation affects both a_1 and b_1 paths (i.e. full moderated-mediation analysis, see Hayes, 2013; Preacher et al., 2007).

5.5 Summary

Longitudinal, moderated mediation models are particularly well suited for uncovering the protective processes underpinning resilient functioning. In this chapter, the aims of the study, study's procedure and configuration were presented. A statistical analysis plan provided all the technical information regarding the analysis. Strengths and limitations of the analyses were reported. The psychometrically valid measures used in this study, the fulfilment of assumptions for parametric testing, as well as, the within-methods design of this study, guaranteed sufficient statistical power in the analyses. The next chapter reports the findings from the data analysis.

3

CHAPTER 6

RESULTS

6.1 Baseline analysis

The total sample entered into the analysis were 561 participants. Participants were recruited from a school federation which consists of three different schools. The next section provides information regarding the descriptive statistics and characteristics of the baseline sample.

6.1.1 Descriptive statistics and characteristics of the baseline sample

The baseline sample was representative in terms of participants' gender while most of the participants were aged between 12 and 15 (see table 7). The greatest percentage of the participants (70.4%) was of white-British ethnic background while 52% of the participants were female. Approximately 40% of participants were drawn from the 7th and 9th year classes while 56% of participants had two to three siblings. The baseline sample was homogeneous in terms of ethnicity/racial background and age. Participants' socio-economic status (SES) was indirectly inferred by assessing participants' home postal code. Given that I did not use a direct measure to assess SES (e.g. family income), sample's heterogeneity in terms of SES cannot be excluded.

Table 7. Descriptive statistics of the baseline sample

Descriptive statistics			
Descriptive variables	**Categories**	**Number**	**Percentage%**
Gender	Male	262	46.70
	Female	287	51.15
	Not prefer to say	12	2.15
Age	11	27	4.81
	12	182	32.44
	13	139	24.77
	14	137	24.42
	15	52	9.26
	16	1	0.17
	Not prefer to say	23	4.09

[3] Bastounis, A., Callaghan, P., Aubeeluck, A., & Michail, M. (2017). Testing the validity of an integrated model in predicting resilience in adolescents, 31st Conference of the EHPS: Innovative Ideas in Health Psychology, Padova Italy, August. Padova: European Health Psychology Society (EHPS) – submitted for publication in peer-reviewed journal.

Ethnicity/racial background	African British	14	2.49
	White British	395	70.44
	Other African background	6	1.07
	Other white background	17	3.06
	Asian background	40	7.14
	Not prefer to say	29	5.18
	Non-respondents	60	10.62
Number of siblings	1	43	7.66
	2	174	31.01
	3	141	25.13
	More than 3	157	27.98
	Not prefer to say	46	7.30
Participants' year/grade in school	6	3	0.53
	7	131	23.35
	8	93	16.57
	9	100	17.72
	10	50	8.91
	Not prefer to say	184	32.79

The greatest proportion of missing information was observed in the category of "participants' year/grade in school" (184, 32.8%). In general, the missing values in descriptive variables did not exceed the 10% in each category, except of the last category (i.e. participants' year/grade in school). During the baseline data collection, most of participants were in mid-adolescence. Most missing data was observed in the questionnaires assessing anxiety (RCMAS) and socio-emotional disturbances (SDQ). As such, two factorial MANOVAs were run for each measure (RCMAS and SDQ) in order to assess whether completers were significantly different compared to non-completers on the rest of variables. Results showed that there were not significant differences between completers and non-completers in any of the response variables (Table 39, Appendix II). I assume therefore that the missing data in these questionnaires can be explained by the ordering of the questionnaires (RCMAS and SDQ were the last questionnaires in the battery of measures administered to participants).

Table 8, presents sample's characteristics at baseline for all model's variables. The mean values, standard deviations, and confidence intervals, are reported. All the scores were

estimated in continuous scales. The scores have been estimated using the imputed dataset. Emotion regulation total composite score was estimated by subtracting suppression scores from reappraisal ones, providing me with a total composite score regarding the use of reappraisal as emotion regulation strategy. As such, negative total scores indicate greater use of suppression, whereas positive total scores indicate greater use of reappraisal. The mean use of reappraisal in the sample was m = 24.53 while the standard deviation of the scores was SD = 7.66. The mean and standard deviation of participants' use of suppression as emotion regulation strategy was m = 16.36 and SD = 4.70 respectively. Similarly, the total composite score of positive and negative emotions was estimated by subtracting the total scores of negative emotions from the positive emotions' scores. The mean, standard deviation of participants' experience of positive emotions was m = 30.36 and SD = 7.42 respectively. The mean, standard deviation, and of participants' experience of negative emotions was m = 23.30 and SD = 8.25 respectively. The total composite scores of anxiety symptoms, perceived self-efficacy, and socio-emotional disturbances subscales were generated by adding the subscales of each measure and following reverse coding of items when this was necessary. Descriptives for all the SDQ subscales and the two main composite scores (internalising and externalising symptoms) are provided.

Table 8. Characteristics of the baseline sample on the variables of the study.

	Baseline characteristics			
Measures	**Mean**	**Standard deviation (SD)**		**95%CI**
Stress perceptions (PSS)	17.53	7.12	3.57	31.48
Perceived Self-efficacy (SEQ-C)	65.88	13.05	40.30	91.45
Emotion regulation strategies (total reappraisal score) (ERQ-CA)	8.91	8.36	-7.47	25.29
Level of anxiety symptoms (RCMAS)	15.70	7.21	1.56	29.83
Social emotional disturbances (SDQ)	13.60	6.53	0.80	26.39
- *Emotional symptoms*	3.66	2.82	3.41	3.91
- *Conduct problems*	2.78	2.02	2.60	2.96
- *Hyperactivity/inattention*	4.58	2.47	4.35	4.80
- *Peer relationship problems*	2.68	1.96	2.51	2.86
- *Prosocial behaviour*	6.80	2.14	6.61	7.00
- *Externalising symptoms (conduct problems & hyperactivity/inattention)*	7.35	3.92	6.99	7.71

- *Internalising symptoms (emotional & peer relationship problems)*	6.31	4.02	5.94	6.68
Positive & negative emotions total composite score (PANAS)	7.78	12.51	-16.73	32.29
Mental well-being (WEMWBS)	44.84	10.09	25.06	64.61

Participants' stress perceptions were only slightly elevated (M = 12.6) compared to community samples of adolescents (Cohen, 1988). Given that values in PSS ranging from 13 to 26 indicate a moderate stressful appraisal style, it can be assumed that study's sample has a subthreshold stressful appraisal style. The mean value of anxiety symptoms in the baseline sample indicates that study's sample is free of moderate and severe anxiety problems, given that a total score over 19 in RCMAS indicates a clinically, significant anxious profile (Stallard, Velleman, Longford, & Baldwin, 2001). Sample's mean value in socio-emotional disturbances indicate that the sample's socio-emotional disturbances are low, given that a range of 16 to 19 in SDQ scores indicate borderline, clinically important, socio-emotional disturbances. Positive mean difference in the use of positive emotions indicates that the overall experience of positive emotions is greater compared to the negative one at baseline. This difference, however, is not sufficient for justifying the presence of a hedonic mental health state in study's sample. The reason is that a mean difference of 15 points in PANAS favouring the experience of positive emotions or the experience of positive emotions in a ratio of 3:1 compared to the negative ones are needed for justifying the presence of a hedonic mental health state (Tugade & Fredrickson, 2004; Watson, 1988). Although study's scores were slightly higher in PSS compared to other longitudinal cohorts, baseline scores in model's variables provide some evidence that study's sample does not accommodate the characteristics of a targeted population.

The dataset was graphically screened using histograms and boxplots. I checked whether data meets the assumptions of normality by exploring outliers, variables' distribution, and variables' homogeneity of variance. (Field, 2005). Data's distribution for attesting normality was assessed visually and by undertaking Shapiro's Wilk test (S-W). After removing the outliers, graphs showed that data was normally distributed; however, S-W test was significant for four variables (i.e. stress perceptions, anxiety symptoms, mental well-being, and positive emotions total score). The large sample size can lead to inflated values of S-W scores, given that even small deviations from normality can lead to

significant results of S-W within large datasets. Based on the Central Limit Theorem (CLT) and the visual representation of the distributions, however, I assumed that my data fulfils the criteria of normally distributed data. Briefly, CLT underscores that as the sample size increases, the shape of the sampling distribution approaches normal, whatever the shape of the parent population (Howell, 2012). The homogeneity of variance was checked by performing the Levene's test. All the variables met the criteria for parametric testing except of the variable of positive emotions (Levene's test: f = 0.69, p = 0.01). Levene's test informed me that the difference in variances between the positive emotions total scores, which were observed in male and female participants, were significantly different. However, large sample sizes can produce significant Levene's tests (Field, 2005). Thus, I double checked the homogeneity of variance between the gender groups for the positive emotions total scores by looking the variance ratio of the two groups. Then, I divided the variance of the group with the larger variance by the group with the lower variance, using the standard errors and standard deviations. Both results were less than 2; I can assume, therefore, that the condition of homogeneity of variance between the groups has been met (Field, 2005).

In line with recent epidemiological studies (Droogenbroeck, Spruyt, & Keppens, 2018; Fink et al., 2015), female adolescents were found to experience more symptoms of anxiety compared to their male counterparts (see Table 9, Appendix II). Female participants were found to have significantly, higher stress perceptions and more social disturbances while they exhibited significantly lower levels of perceived self-efficacy. Female participants were also found to have significantly lower mental well—being and lower positive emotions compared to their male counterparts. Gender differences were ranging from 1.58 for emotion regulation to 7.70 for positive emotions. Overall, female participants had significantly lower levels of resilience-oriented, protective factors while they experience significantly lower levels of eudemonic and hedonic well-being, and higher levels of anxiety. This evidence suggests that female adolescents are more prone to lower mental health and socio-emotional disturbances compared to male participants. Gender differences on model's variables were explored by independent, post-hoc t-tests. Given that the multiple comparisons increase the possibility Type II error to occur, I first investigated the gender differences by undertaking a multivariate analysis of variance (MANOVA). The multivariate approach controls for multiple chances to find differences by chance without assuming independence of the dependent variables. Multivariate

ANOVA showed significant difference on all model's variables; post-hoc, t-tests are presented. In addition, the response rate was similar across the two genders. The greatest proportion of missing values in female participants was observed in the RCMAS (30.7%) while the lower percentage was observed in the PSS (6.15%). The greatest proportion of missing values in male participants was observed in the SDQ (28.7%) while the lower percentage was observed in the PSS (5.87%).

6.1.2 Testing the relationships among model's variables: Correlations and regression analyses

All the model's variables met the assumptions for parametric testing, they were normally distributed, and were measured at an interval level. So, the associations among the model's variables were assessed by undertaking Bonferroni-adjusted correlations (see Table 10).

Table 10. Pearson's r correlations after the Bonferroni correction was applied (p value set at .001).

	Stress perceptions	Perceived self-efficacy	Emotion regulation	Levels of anxiety symptoms	Social emotional disturbances	Total composite score of positive emotions	Mental well-being
Stress perceptions	1						
Perceived self-efficacy	-0.59***	1					
Emotion regulation	-0.41***	0.51***	1				
Levels of anxiety symptoms	0.71***	-0.56***	-0.43***	1			
Social emotional disturbances	0.64***	-0.61***	-0.44***	0.77***	1		
Total composite score of positive emotions	-0.75***	0.71***	0.51***	-0.71***	-0.72***	1	
Mental well-being	-0.63***	0.74***	0.56***	-0.58***	-0.58	0.78***	1

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Significant, positive and negative high correlations coefficients were evident among the model's variables, ranging from -0.75 to 0.78. Stress perceptions were significantly and positively correlated with the anxiety symptoms, and socio-emotional disturbances, whereas they were significantly and negatively correlated with the perceived self-efficacy, reappraisal, positive emotions, and mental well-being. Perceived self-efficacy and reappraisal were significantly and positively correlated with mental well-being and

positive emotions while they were significantly negatively correlated with anxiety symptoms and the socio-emotional disturbances.

Support for the proposed relationships among the model's variables was initially sought by undertaking five separate, hierarchical, multiple, linear regression analyses (see Table 11). The effects of stress perceptions on perceived self-efficacy, anxiety symptoms, mental well-being, positive emotions, and socio-emotional disturbances were assessed, including gender as a covariate.

Table 11. Multiple, linear, hierarchical regressions of model's predictor (i.e. stress perceptions) on model's mediator (i.e. perceived self-efficacy) and resilient functioning (i.e. four surrogate mental health measures). Gender was included in the analysis of the complete dataset as a covariate. Regression coefficients, standard errors, t-test statistics, R-squared, Beta standardised regression coefficients, and 95% confidence intervals are reported for the multiple regressions (the results of simple regression analysis with the imputed dataset, see Appendix II, Table 12).

	coefficient	Standard error	df	t	R-squared	Beta	95%CI Lower	95%CI Upper
Level of anxiety symptoms								
Stress perceptions	0.72	0.04	330	17.43***	0.51	0.68	0.64	0.81
gender	1.59	0.60		2.63**		0.10	0.40	2.79
Perceived self-efficacy								
Stress perceptions	-1.06	0.07	434	-14.41***	0.36	-0.57	-1.20	-0.91
gender	-2.02	1.05		-1.91		-0.07	-4.10	0.05
Level of mental well-being								
Stress perceptions	-0.88	0.05	438	-16.15***	0.40	-0.62	-0.99	-0.77
gender	-1.24	0.78		-1.58		-0.06	-2.78	0.29
Positive emotions								
Stress perceptions	-1.26	0.06	378	-20.95***	0.58	-0.72	-1.38	-1.14
gender	-2.56	0.88		-2.90**		-0.10	-4.30	-0.82
Social-emotional disturbances								
Stress perceptions	0.61	0.03	391	16.21***	0.42	0.65	0.53	0.68
gender	-0.04	0.53		-0.09		-0.003	-1.09	0.99

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Stress perceptions were found to be a significant predictor of anxiety symptoms, perceived self-efficacy, mental well-being, positive emotions, and socio- emotional disturbances. Regression coefficients ranged from -1.26 for positive emotions to 0.72 for anxiety symptoms and degrees of freedom ranged from 330 to 438 for the complete dataset. Stress perceptions were found to explain the 51% of the variance of participants' scores in anxiety symptoms, the 36% of the variance of participants' scores in perceived self-efficacy, the 40% of the variance of participants' scores in mental well-being, the 58% of the variance of participants' scores in positive emotions, and 42% of the variance of participants' scores in socio-emotional disturbances. The gender of the participants was

found to significantly predict the outcome variables; however, the inclusion of the gender as an additional predictor did not explain more in the variation of the scores in perceived self-efficacy, anxiety symptoms, mental well-being, social-emotional disturbances, and positive emotions. The inclusion of gender did not change the estimation of the coefficients of determination, with an exception for the positive emotions, where a tiny decrease in R-squared was observed when gender was removed ($R^2 = 0.56$). Five simple linear regression analyses were undertaken with the imputed dataset, giving me similar, a bit inflated yet, regression coefficients (see Appendix II). The findings show that stress perceptions constitute a significant predictor of perceived self-efficacy and resilient functioning. As such, higher scores in stress perceptions predict lower scores in perceived self-efficacy, positive emotions, and mental well-being whereas high stress perceptions predict higher scores in anxiety and socio-emotional disturbances.

6.1.3 Testing for conditional indirect effects at baseline: Path and mediation analyses

Testing for conditional indirect effects presupposes that: i) there is a significant relationship between the independent variable and the dependent variable, ii) a significant relationship between the independent variable and the mediating variable exists, and iii) the mediator must be a significant predictor of the outcome variable in an equation including both the mediator and the independent variable (Baron & Kenny, 1986). In this study, a strong and significant relationship is evident between the independent variable (i.e. stress perceptions) and the dependent variables (i.e. anxiety symptoms, mental well-being, social-emotional disturbances, and positive emotions), a significant relationship between the independent variable and the mediator variable (i.e. perceived self-efficacy) exists, and the mediator variable significantly predicts the outcome variables in an equation including the predictor variable as well. More specifically, perceived self-efficacy was found to significantly predict anxiety symptoms (-0.11, $p \leq 0.001$, 95%CI = -0.17, -0.06), mental well-being (0.44, $p \leq 0.001$, 95%CI = 0.38, 0.50), social-emotional disturbances (-0.16, $p \leq 0.001$, 95%CI = -0.21, -0.11), and positive emotions (0.36, $p \leq 0.001$, 95%CI = 0.28, 0.43). The assumptions for testing perceived self-efficacy as a mediator variable have therefore been met.

The first of my hypotheses stated that a significant amount of the effects of stress perceptions on resilient functioning are being conveyed through perceived self-efficacy. As such, Tables 13 and 15 report the results from the path and mediation analyses which

were undertaken in the complete baseline dataset (for results in the imputed dataset, see Tables 14 and 16, Appendix II). The mediation analysis was conducted, using bootstrapped standard errors and confidence intervals with 500 sample replications. Perceived self-efficacy was found to exert statistically significant indirect effects on the relationships between stress perceptions and anxiety symptoms, stress perceptions and mental well-being, stress perceptions and positive emotions, and stress perceptions and socio-emotional disturbances. As such, a statistically significant amount of the effects of stress perceptions on the outcomes of interest are conveyed through perceived self-efficacy. Analysis of both datasets (i.e. complete and imputed) resulted in identical path coefficients.

Table 13. Separate path analyses tested whether the proportion of the effects of stress perceptions on model's variables are being mediated by perceived self-efficacy in the baseline dataset.

	coefficient	**Standard error**	**obs**	**t**	**Beta**
Perceived self-efficacy					
Stress perceptions	-1.11	0.07	399	-15.19***	-0.60
Levels of mental well-being					
Perceived self-efficacy	0.44	0.02		14.75***	0.57
Stress perceptions	-0.40	0.05		-7.37***	-0.28
Perceived self-efficacy					
Stress perceptions	-1.15	0.08	311	-13.90***	-0.62
Levels of anxiety symptoms					
Perceived self-efficacy	-0.11	0.02		-4.24***	-0.20
Stress perceptions	0.61	0.05		11.91***	0.58
Perceived self-efficacy					
Stress perceptions	-1.17	0.07	350	-15.30***	-0.63
Composite positive emotions score					
Perceived self-efficacy	0.36	0.03		9.81***	0.38
Stress perceptions	-0.89	0.06		-13.09***	-0.51
Perceived self-efficacy					
Stress perceptions	-1.14	0.07	355	-14.69***	-0.61
Social-emotional disturbances					
Perceived self-efficacy	-0.16	0.02		-6.95***	-0.33
Stress perceptions	0.42	0.04		9.61***	0.45

***p≤0.05, ****p≤0.01, *****p≤0.001**

Path coefficients of the relationship between stress perceptions and perceived self-efficacy were ranging from -1.11 for mental well-being to -1.17 for positive emotions. The beta coefficients were ranging from -0.60 to -0.63 regarding the relationship between stress perceptions and self-efficacy. Path coefficients for the relationships between perceived self-efficacy and the outcomes of interest were ranging from -0.11 for the anxiety symptoms to 0.44 for mental well-being while beta coefficients were ranging from -0.33 for the relationship between perceived self-efficacy and socio-emotional disturbances to

0.57 for the relationship between perceived self-efficacy and mental well-being. High stress perceptions predicted lower scores in perceived self-efficacy. Perceived self-efficacy was found to exert negative effects on the levels of anxiety symptoms and socio-emotional disturbances and positive effects on positive emotions and mental well-being. All the indirect effects between model's predictor and outcome variables, being conveyed by perceived self-efficacy, were highly significant ($p \leq 0.001$).

Test 15. Separate mediation analyses using bootstrapped standard errors and confidence intervals tested whether the proportion of stress perceptions on model's response variables are being mediated by the perceived self-efficacy in the baseline dataset. Results from the analysis of the imputed dataset are presented in Appendix II.

	coefficient	Bootstrapped standard error	obs	z	95%CI Lower	Upper
Perceived self-efficacy			311			
Stress perceptions	-1.15	0.07		-14.97***	-1.31	-1.00
Levels of anxiety symptoms						
Perceived self-efficacy	-0.11	0.03		-3.65***	-0.17	-0.05
Stress perceptions	0.61	0.05		11.85***	0.51	0.71
Total effect	0.74	0.03		21.50***	0.67	0.81
Direct effect	0.61	0.05		11.85***	0.51	0.71
Indirect effect	0.13	0.03		3.54***	0.06	0.21
Perceived self-efficacy			399			
Stress perceptions	-1.11	0.07		-15.06***	-1.26	-0.97
Level of mental well-being						
Perceived self-efficacy	0.44	0.03		13.88***	0.37	0.50
Stress perceptions	-0.40	0.05		-7.19***	-0.51	-0.29
Total effect	-0.90	0.04		-18.70***	-0.99	-0.80
Direct effect	-0.40	0.05		-7.19***	-0.51	-0.29
Indirect effect	-0.49	0.05		-9.38***	-0.59	-0.39
Perceived self-efficacy			356			
Stress perceptions	-1.14	0.07		-14.64***	-1.29	-0.99
Level of social-emotional disturbances						
Perceived self-efficacy	-0.16	0.02		-7.16***	-0.21	-0.11
Stress perceptions	0.42	0.04		9.37***	0.33	0.51
Total effect	0.61	0.03		16.32***	0.54	0.68
Direct effect	0.42	0.04		9.37***	0.33	0.51
Indirect effect	0.18	0.03		6.18***	0.12	0.24
Perceived self-efficacy			350			
Stress perceptions	-1.17	0.07		-15.17***	-1.32	-1.02
Level of positive emotions						
Perceived self-efficacy	0.36	0.03		10.23***	0.29	0.42
Stress perceptions	-0.89	0.06		-13.22***	-1.02	-0.75
Total effect	-1.31	0.06		-21.58***	-1.43	-1.19
Direct effect	-0.89	0.06		-13.22***	-1.02	-0.75
Indirect effect	-0.42	0.04		-8.59***	-0.52	-0.32

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Conditional indirect effects conveyed by perceived self-efficacy were observed in the relationships between stress perceptions and mental well-being (-0.49, p≤0.001, 95%CI = -0.59, -0.39), and stress perceptions and positive emotions (-0.42, p≤0.001, 95%CI = -0.52,

-0.32). Conditional indirect effects were observed in the relationships between stress perceptions and anxiety symptoms (0.13, $p \leq 0.001$, 95%CI = 0.06, 0.21), and stress perceptions and socio-emotional disturbances (0.18, $p \leq 0.001$, 95%CI = 0.12, 0.24). As such, perceived self-efficacy acts as a suppressor of the effects of stress perceptions on the outcomes of interest.

Mediation analysis following a structural equation model provided me with the estimates of the total, direct, and indirect effects among stress perceptions, perceived self-efficacy, and the outcome variables. Based on the total, direct, and indirect effects, I calculated the proportion of the total effect which is being indirectly inferred by the mediator variable, the ratio of the indirect to direct effect, and the ratio of the total to direct effect. The proportion of the total effect, being indirectly inferred by the perceived self-efficacy for anxiety symptoms, reached 0.17 at baseline, the ratio of the indirect to direct effect was 0.21, and the ratio of the total to direct effect was 1.21. As such, the 17% of the effect of stress perception on anxiety symptoms was indirectly inferred by the perceived self-efficacy. The indirect effect which were conveyed by perceived self-efficacy was approximately the 1/5 of the direct effect. The proportion of the total effect being indirectly inferred by the perceived self-efficacy for mental well-being reached 0.54 at baseline, the ratio of the indirect to direct effect was 1.22, and the ratio of the total to direct effect was 2.25. As such, 54% of the effect of stress perception on mental well-being was indirectly inferred by the perceived self-efficacy while the indirect effects passed through perceived self-efficacy on mental well-being were approximately 22% more than the direct effects of stress perceptions on mental well-being.

The proportion of the total effect being indirectly inferred by the perceived self-efficacy for social-emotional disturbances reached 0.29 at baseline, the ratio of the indirect to direct effect was 0.42, and the ratio of the total to direct effect was 1.45. As such, the 29% of the effect of stress perceptions on social-emotional disturbances was indirectly inferred by the perceived self-efficacy and these indirect effects reflected approximately the 40% of the direct effects of stress perceptions on the level of social-emotional disturbances. The proportion of the total effect being indirectly inferred by the perceived self-efficacy for positive emotions reached 0.32 at baseline, the ratio of the indirect to direct effect was 0.47, and the ratio of the total to direct effect was 1.47. As such, the 32% of the effect of stress perceptions on positive emotions was indirectly inferred by the perceived self-

efficacy while these indirect effects reflect approximately the 50% of the direct effects of stress perceptions on positive emotions.

6.1.4 Assessing first-stage, moderated-mediation effects at baseline

The second hypothesis of this study was to test whether the relationship between stress perceptions and self-efficacy is being moderated by a fourth variable (i.e. moderator variable). As such, I tested whether the indirect effects passing through self-efficacy are dependent on the levels of the emotion regulation. Four, separate, moderated-mediation analyses following structural equation modelling were undertaken, testing whether the indirect effects of stress perceptions on resilient functioning are being moderated by the use of reappraisal (Table 17). Bootstrapped standard errors and bias-corrected confidence intervals for estimating the conditional indirect effects of perceived self-efficacy were obtained, using 500 sample replications.

Table 17. Moderated-mediation analysis tested whether the indirect effects of stress perceptions on anxiety symptoms passing through perceived self-efficacy are being moderated by the level of reappraisal (baseline). Percentile, bias-corrected confidence intervals of the indirect effects in the presence of the moderator variable are presented.

	coefficient	Standard error	obs	z	95%CI Lower	95%CI Upper
Perceived self-efficacy						
Stress perceptions	-0.85	0.12	261	-6.89***	-1.10	-0.61
Level of reappraisal	0.55	0.20		2.73**	0.15	0.95
Interaction term (moderator)	-0.004	0.009		-0.48	-0.02	0.01
Levels of anxiety total						
Perceived self-efficacy	-0.11	0.03		-3.81***	-0.18	-0.05
Stress perceptions	0.61	0.06		9.01***	0.48	0.74
Level of positive emotions	-0.01	0.10		-0.17	-0.22	0.18
Interaction term (moderator)	-0.001	0.004		-0.24	-0.01	0.008
Use of reappraisal as difference in scores of two subscales(1SD<Mean)	0.102	0.032		3.12**	0.04	0.17
Use of reappraisal as difference in scores of two subscales (mean)	0.106	0.033		3.19***	0.04	0.17
Use of reappraisal as difference in scores of two subscales (1SD>mean)	0.111	0.036		3.02**	0.03	0.18

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Analysis showed that stress perceptions significantly predict perceived self-efficacy (-0.85, p≤0.001, 95%CI = -1.10, -0.61) and anxiety symptoms (0.61, p≤0.001, 95%CI = 0.48, 0.74). Perceived self-efficacy significantly and negatively predicts anxiety symptoms (-0.11, p≤0.001, 95%CI = -0.18, -0.05). Results showed that the level of reappraisal significantly moderates the indirect effects passed through perceived self-efficacy on

anxiety symptoms (path a'). As such, the conditional indirect effects of perceived self-efficacy on anxiety symptoms slightly, statistically significant yet, increase as the use of reappraisal increases. Regression coefficients for conditional indirect effects were ranging from (0.102, p≤0.01, 95%CI = 0.04, 0.17) for the participants with use of reappraisal less than the sample's mean to (0.111, p≤0.001, 95%CI = 0.03, 0.18) for the participants with use of reappraisal more than sample's mean. Analysis revealed that reappraisal significantly and independently predicts the perceived self-efficacy [(0.55, p≤0.01, 95%CI = 0.15, 0.95)]. A post-hoc, hierarchical regression analysis of stress perceptions and reappraisal on anxiety symptoms revealed that the inclusion of reappraisal as a second predictor in my model only slightly improved model's accuracy to predict anxiety symptoms, accounting for an additional 3% of variance in anxiety symptoms ($R^2 = 0.54$, for an overview see Table 11).

The second moderated-mediation analysis tested whether the indirect effects of stress perceptions on mental well-being, which pass through perceived self-efficacy, are being moderated by reappraisal (Table 18). Analysis showed that stress perceptions significantly predicts perceived self-efficacy (-0.75, p≤0.001, 95%CI = -0.95, -0.56) and levels of mental well-being (-0.39, p≤0.001, 95%CI = -0.52, -0.26). Perceived self-efficacy significantly and positively predicts the levels of mental well-being (0.38, p≤0.001, 95%CI = 0.31, 0.45).

TABLE 18. Moderated-mediation analysis tested whether the indirect effects of stress perceptions on mental well-being passing through perceived self-efficacy are being moderated by the level of reappraisal (baseline). Percentile, bias-corrected confidence intervals of the indirect effects in the presence of the moderator variable are presented.

	coefficient	Standard error	obs	z	95%CI	
					Lower	Upper
Perceived self-efficacy						
Stress perceptions	-0.75	0.09	338	-7.70***	-0.95	-0.56
Level of reappraisal	0.72	0.16		4.48***	0.40	1.04
Interaction term (moderator)	-0.01	0.007		-1.31	-0.02	0.005
Level of mental well-being						
Perceived self-efficacy	0.38	0.03		11.21***	0.31	0.45
Stress perceptions	-0.39	0.06		-5.93***	-0.52	-0.26
Level of reappraisal	0.17	0.10		1.65	-0.03	0.37
Interaction term (moderator)	0.002	0.004		0.52	-0.007	0.012
Use of reappraisal as difference in scores of two subscales (1SD<Mean)	-0.29	0.048		-6.05***	-0.38	-0.20
Use of reappraisal as difference in scores of two subscales (mean)	-0.32	0.047		-6.82***	-0.43	-0.23

Use of reappraisal as difference in scores of two subscales (1SD>mean)	-0.35	0.058		-6.14***	-0.49	-0.25

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Results showed that the level of reappraisal significantly moderates the indirect effects passed through perceived self-efficacy on mental well-being. As such, the conditional indirect effects of perceived self-efficacy on mental well-being significantly increase as the use of reappraisal increases. Regression coefficients for conditional indirect effects were ranging from (-0.29, p≤0.001, 95%CI = -0.38, -0.20) for the participants with use of reappraisal less than sample's mean to (-0.35, p≤0.001, 95%CI = -0.49, -0.25) for the participants with use of reappraisal more than sample's mean. Analysis revealed that reappraisal significantly and independently predicts the perceived self-efficacy (0.72, p≤0.001, 95%CI = 0.40, 1.04). A post-hoc, hierarchical regression of stress perceptions and reappraisal on mental well-being revealed that the inclusion of reappraisal as a second predictor in the model improves model's ability, accounting for an additional 11% of variance in mental well-being (R^2 = 0.51, for reference see Table 11).

In the third moderated mediation analysis, I tested whether the indirect effects of stress perceptions on socio-emotional disturbances, which pass through perceived self-efficacy, are being moderated by reappraisal (Table 19). Analysis showed that stress perceptions significantly predicts perceived self-efficacy (-0.83, p≤0.001, 95%CI = -1.05, -0.61) and social emotional disturbances (0.43, p≤0.001, 95%CI = 0.31, 0.54). Perceived self-efficacy significantly and negatively predicts the social-emotional disturbances (-0.14, p≤0.001, 95%CI = -0.19, -0.08).

Table 19. Moderated mediation analysis tested whether the indirect effects of stress perceptions on socio-emotional disturbances, which are passing through perceived self-efficacy, are being moderated by the level of reappraisal use (baseline). Percentile, bias-corrected confidence intervals of the indirect effects in the presence of the moderator variable are presented.

	coefficient	**Standard error**	**obs**	**z**	**95%CI**	
					Lower	**Upper**
Perceived self-efficacy						
Stress perceptions	-0.83	0.11	303	-7.44***	-1.05	-0.61
Level of reappraisal	0.55	0.18		3.03**	0.19	0.91
Interaction term (moderator)	-0.005	0.008		-0.59	-0.02	0.01
Level of social-emotional disturbances						
Perceived self-efficacy	-0.14	0.02		-5.23***	-0.19	-0.08
Stress perceptions	0.43	0.05		7.37***	0.31	0.54
Level of reappraisal	-0.03	0.08		-0.37	-0.20	0.14
Interaction term (moderator)	-0.002	0.004		-0.58	-0.01	0.005

Use of reappraisal as difference in scores of two subscales (1SD<Mean)	0.120	0.02		4.06***	0.06	0.18
Use of reappraisal as difference in scores of two subscales (mean)	0.126	0.02		4.51***	0.07	0.18
Use of reappraisal as difference in scores of two subscales (1SD>mean)	0.130	0.03		4.38***	0.07	0.19

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Results showed that the level of reappraisal significantly moderates the indirect effects passed through perceived self-efficacy on socio-emotional disturbances. As such, the conditional indirect effects of perceived self-efficacy on socio-emotional disturbances significantly increase as the use of reappraisal increases. Regression coefficients for conditional indirect effects were ranging from (0.120, p≤0.001, 95%CI = 0.06, 0.18) for the participants with use of reappraisal lower than sample's mean to (0.130, p≤0.001, 95%CI = 0.07, 0.19) for the participants with use of reappraisal higher than sample's mean. Analysis revealed that reappraisal significantly and independently predicts the perceived self-efficacy (0.55, p≤0.01, 95%CI = 0.19, 0.91). A post-hoc, hierarchical regression of stress perceptions and reappraisal on mental well-being revealed that the inclusion of reappraisal as a second predictor improves model's accuracy in predicting socio-emotional disturbances, accounting for an additional 4% of variance in socio-emotional disturbances (R^2 = 0.46, for reference see Table 11).

In the fourth moderated mediation analysis, I tested whether the indirect effects of stress perceptions on positive emotions, which pass through perceived self-efficacy, are being moderated by reappraisal (Table 20). Analysis showed that stress perceptions significantly predicts perceived self-efficacy (-0.78, p≤0.001, 95%CI = -0.98, -0.57) and positive emotions (-0.86, p≤0.001, 95%CI = -1.03, -0.70). Perceived self-efficacy significantly and positively predicts the positive emotions (0.33, p≤0.001, 95%CI = 0.25, 0.42).

Table 20. Moderated mediation analysis, testing whether the indirect effects of stress perceptions on composite positive emotions scores, which are passing through perceived self-efficacy, are being moderated by the level of reappraisal use. Percentile, bias-corrected confidence intervals of the indirect effects in the presence of the moderator variable are presented.

	coefficient	**Standard error**	**obs**	**z**	**95%CI**	
					Lower	**Upper**
Perceived self-efficacy						
Stress perceptions	-0.78	0.10	290	-7.46***	-0.98	-0.57
Level of reappraisal	0.73	0.17		4.15***	0.38	1.08
Interaction term (moderator)	-0.01	0.008		-1.40	-0.02	0.004
Level of positive emotions						
Perceived self-efficacy	0.33	0.04		7.87***	0.25	0.42
Stress perceptions	-0.86	0.08		-10.39***	-1.03	-0.70

Level of reappraisal	0.08	0.13	0.62	-0.17	0.34
Interaction term (moderator)	0.005	0.006	0.92	-0.006	0.01
Use of reappraisal as difference in scores of two subscales (1SD<Mean)	-0.26	0.05	-5.13***	-0.38	-0.17
Use of reappraisal as difference in scores of two subscales (mean)	-0.29	0.04	-6.09***	-0.40	-0.20
Use of reappraisal as difference in scores of two subscales (1SD>mean)	-0.33	0.05	-5.74***	-0.46	-0.22

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Results showed that the level of reappraisal significantly moderates the indirect effects pass through perceived self-efficacy on positive emotions. Regression coefficients for conditional indirect effects were ranging from (-0.26, p≤0.001, 95%CI = -0.38, -0.17) for the participants with use of reappraisal lower than sample's mean to (-0.33, p≤0.001, 95%CI = -0.46, -0.22) for the participants with use of reappraisal higher than sample's mean. Analysis revealed that reappraisal significantly and independently predicts the perceived self-efficacy (0.73, p≤0.001, 95%CI = 0.38, 1.08). A post-hoc, hierarchical regression of stress perceptions and reappraisal on mental well-being revealed that the inclusion of reappraisal as a second predictor improves model's ability, accounting for an additional 3% of the variance in positive emotions scores (R^2 = 0.61, for reference see Table 11).

The four moderated-mediation analyses presented above, tested the moderating role of emotion regulation as the difference between the participants' scores in reappraisal scale minus their suppression in suppression scale. Additional first stage, moderated-mediation analyses were performed, assessing the moderating effects of each of the emotion regulation strategies (Table 38, Appendix II). As such, I assessed whether the direction and the magnitude of the indirect effects change as a result of the presence of reappraisal or suppression. Results showed that the indirect effects or perceived self-efficacy on anxiety symptoms, mental well-being, and socio-emotional disturbances slightly, significantly yet, increase as the use of suppression increases. The indirect effects of perceived self-efficacy on positive emotions slightly, significantly yet, decrease as the use of suppression increases. The indirect effects of perceived self-efficacy on mental well-being and positive emotions were slightly, significantly yet, increased as the use of reappraisal increases while the indirect effects of perceived self-efficacy on anxiety symptoms and socio-emotional disturbances were stable across the different levels of reappraisal.

Overall, the fluctuations of the indirect effects accounted for by the different levels of the emotion regulation strategies (one SD lower or upper the mean) were similar to the main analysis where the moderator was assessed as the difference in scores between the two subscales. Both emotion regulation strategies, when these were assessed in isolation, did not affect the proportion of indirect effects of perceived self-efficacy on anxiety symptoms and socio-emotional disturbances. On the contrary, the proportion of indirect effects of perceived self-efficacy on mental well-being and positive emotions were increased independently on the use of emotion regulation strategy. This difference in the proportion of the indirect effects, which pass through the perceived self-efficacy, can be accounted for by the effects of emotion regulation strategies in directly predicting mental well-being and positive emotions. It is noteworthy, however, that when the moderating effects of reappraisal were assessed in isolation, the proportion of the indirect effects to mental well-being and positive emotions was lower compared to the proportion of the indirect effects when suppression was assessed in isolation. These findings highlight that the use of reappraisal directly predicts the mental well-being and positive emotions considerably more than suppression does, exerting synergistic to self-efficacy- effects on mental well-being and positive emotions.

6.1.5 Baseline post-hoc analysis

A post-hoc analysis was undertaken at baseline testing whether the level of reappraisal moderates the relationship between stress perceptions and perceived self-efficacy (a' path) and the relationship between the perceived self-efficacy and the outcome variables (b'path). Four separate moderated mediation analyses were conducted for each of the outcomes of interest (for a detailed presentation see Tables 21, 22, 23, & 24, Appendix II). The effects of self-efficacy on anxiety symptoms were found to slightly, significantly yet, increase as the use of reappraisal increases. The coefficients were ranging from [0.09, $p \leq 0.01$, 95%CI = 0.01, 0.16) for reappraisal scores one SD lower than sample's mean) to (0.10, $p \leq 0.001$, 95%CI = 0.04, 0.17) for mean reappraisal scores, and (0.12, $p \leq 0.05$, 95%CI = 0.02, 0.22) for reappraisal scores one SD higher than sample's mean. The indirect effects of the perceived self-efficacy on mental well-being were found to significantly increase as the use of reappraisal increases. The estimations were fluctuating from (-0.24, $p \leq 0.001$, 95%CI = -0.35, -0.14) for reappraisal scores one SD lower than sample's reappraisal mean, to (-0.33, $p \leq 0.001$, 95%CI = -0.42, -0.23) for mean reappraisal scores, and (-0.42, $p \leq 0.001$, 95%CI = -0.56, -0.28) for reappraisal scores 1 SD higher than

sample's mean. In addition, the indirect effects of perceived self-efficacy on socio-emotional disturbances were found to significantly increase as the use of reappraisal increases. The estimations were fluctuating from (0.10, p≤0.01, 95%CI = 0.04, 0.17) for reappraisal scores one SD lower than sample's reappraisal mean score to (0.12, p≤0.001, 95%CI = 0.07, 0.18) for mean reappraisal scores, and (0.15, p≤0.001, 95%CI = 0.07, 0.24) for reappraisal scores one SD higher than sample's mean reappraisal score. The indirect effects of perceived self-efficacy on positive emotions were found to significantly increase as the use of reappraisal increases. The estimations were fluctuating from (-0.23, p≤0.001, 95%CI = -0.36, -0.12) for reappraisal score one SD lower than sample's reappraisal mean to (-0.30, p≤0.001, 95%CI = -0.40, -0.21) for mean reappraisal scores, and (-0.37, p≤0.001, 95%CI = -0.52, -0.24) for reappraisal scores one SD higher than sample's mean.

6.2 Longitudinal analysis

Due to competing activities, there was a high attrition (58.5%) of the school classes participated in the follow-up data collection. As such, only 250 participants participated in the follow-up assessment. There were 19 invalid questionnaires, resulting in 231 participants who entered into the follow-up analysis. Demographic differences between those participants participated in the baseline and those participated in the follow-up were explored by undertaking independent chi-squared t-tests. No significant differences were observed between the participants who missed follow-up and those participating at the follow-up assessment. Participants participating at baseline and those participating at the follow-up were not significantly different in terms of age (χ^2 = 8.95, p = 0.054), gender (χ^2 = 0.74, p = 0.43), ethnicity (χ^2 = 11.49, p = 0.08), and number of siblings (χ^2 = 10.17, p = 0.60); however, the differences in age and ethnicity were statistically marginal. Given, that the possibility of sample bias cannot be excluded, results from the longitudinal analysis should be interpreted under this limitation. Most missing data was observed in the questionnaires assessing anxiety (RCMAS) and socio-emotional disturbances (SDQ). As such, two factorial MANOVAs were run for each outcome in each measure (RCMAS and SDQ) in order to assess whether completers had significantly different scores on model's variables compared to non-completers. Results showed that there were not significant differences between completers and non-completers in any of the response variables (Table 39, Appendix II). I assume therefore that the missing data in these questionnaires can be explained by the ordering of the questionnaires (RCMAS and SDQ were the last

questionnaires in the battery of measures administered to participants). Given that participants in this study were not used to participate in research studies, I can assume that the missing data in these two questionnaires can be attributed to the tiredness of participants and the lack of time.

6.2.1 Descriptive statistics and sample's characteristics

Follow-up sample was representative in terms of gender (Table 25). Approximately, 72% were aged between 13 to 15 years while approximately 94% of participants were students in the 8th, 9th, and 10th grade in school. The greatest percentage of attrition was observed in 10th graders. Most of the participants were White-British and had up to two siblings.

Table 25. Follow-up analysis descriptives

	Follow-up descriptives		
Descriptive variables	**Categories**	**Number**	**Percentage%**
Gender	Male	101	43.48
	Female	130	56.52
Age	12	56	24.24
	13	81	35.06
	14	44	19.05
	15	43	18.61
	16	7	3.03
Ethnicity/racial background	African British	2	0.87
	White British	186	80.52
	Other white background	3	1.30
	Asian background	17	7.36
	Not prefer to say	9	3.89
	Non-respondents	14	6.09
Number of siblings	1	87	37.97
	2	53	23.12
	3	43	18.76
	More than 3	29	12.65
	Non-respondents	19	8.22
Participants' grade in school	8	104	45.02
	9	38	16.45
	10	76	32.90
	11	13	5.63

Table 26 presents participants' means and standard deviations on model's variables. Means were ranging from 8.05 for total positive emotions scores to 66.02 for the total perceived self-efficacy scores while SDs were ranging from 6.20 for total socio-emotional disturbances scores to 12.68 for the total self-efficacy scores. No significant departures of

variables' distributions from normality were observed while data trends were similar between baseline and follow-up assessments.

Table 26. Descriptive statistics of the participants at follow-up

Descriptive statistics of follow-up sample				
Measures	**Mean**	**Standard dev. (SD)**	**95%CI**	
			Lower	**Upper**
Stress perceptions	16.69	6.26	4.42	28.95
Perceived Self-efficacy	66.02	12.68	41.16	90.87
Emotion regulation strategies (total composite score)	9.01	8.77	-8.17	26.19
Level of anxiety symptoms	14.75	7.77	1.61	29.97
Social emotional disturbances	13.04	6.20	0.88	25.19
- *Emotional symptoms*	3.58	2.81	3.29	3.88
- *Conduct problems*	2.57	2.02	2.36	2.79
- *Hyperactivity/inattention*	4.51	2.39	4.26	4.76
- *Peer relationship problems*	2.44	1.97	2.24	2.65
- *Prosocial behaviour*	7.02	2.15	6.79	7.24
- *Externalising symptoms (conduct problems & hyperactivity/inattention)*	7.07	3.79	6.66	7.47
- *Internalising symptoms (emotional & peer relationship problems)*	5.97	4.06	5.53	6.40
Positive & negative emotions total composite score	8.05	12.12	-15.70	31.80
Mental well-being	45.09	9.17	27.11	63.06

Seven independent, pair-sample, unrelated-group, post-hoc t-tests were conducted, testing the gender differences on model's variables at follow-up (Table 27, Appendix II). Female participants were found to score significantly worse on all model's variables compared to male participants except of emotion regulation. Mean differences were ranging from 2.82 for socio-emotional disturbances to 7.10 for anxiety. Due to the increased risk for Type I

error, a set of MANOVA was run before conducting the post-hoc, t-tests and gave the same results. The possible effect of time on gender differences was assessed by undertaking an independent, mixed, two-by-two-between-within, repeated measure design (Table 28, Appendix II). The between-subject factor had two levels (male and female) and the within-subject factor had two levels (baseline and follow-up assessment). Participants' mean differences on model's variables were not significantly different as a result of time. The interaction term between group (gender) and level of assessment (baseline to follow-up) was non-significant for anxiety symptoms [Wald χ^2 = (1, N = 276) = 2.86, p = 0.09], mental well-being [Wald χ^2 = (1, N = 276) = 0.04, p = 0.83], stress perceptions [Wald χ^2 = (1, N = 276) = 1.94, p = 0.16], total positive emotions score [Wald χ^2 = (1, N = 276) = 2.68, p = 0.10], socio-emotional disturbances [Wald χ^2 = (1, N = 276) = 0.22, p = 0.63], perceived self-efficacy [Wald χ^2 = (1, N = 276) = 0.04, p = 0.85], and total reappraisal score [Wald χ^2 = (1, N = 276) = 0.88, p = 0.34]. In addition, the response rate was similar across the genders. The greatest proportion of missing values in female participants was observed in the RCMAS (39.2%) while the lower percentage was observed in the PSS (4.61%). The greatest proportion of missing values in male participants was observed in the RCMAS and SDQ (36%) while the lower percentage was observed in the PSS (8%). Given that the response rate is comparable across the two genders, I can assume that the gender differences observed on model's variables are not biased.

6.2.2 Longitudinal, first-stage, moderated-mediation analyses

The third and the fourth objectives of this study were to investigate whether the mediating and moderating role of perceived self-efficacy and emotion regulation respectively hold across 6-month follow-up. As such, four separate moderated-mediation analyses following structural equation modelling were undertaken. These analyses tested whether the mediating effects passing through perceived self-efficacy are being moderate by the use of reappraisal at follow-up (Tables 29, 30, 31, and 32). Bootstrapped standard errors and bias-corrected confidence intervals for estimating the mediating effects of perceived self-efficacy were obtained, using 500 sample replications.

Table 29. Longitudinal, first-stage, moderated mediation analysis (outcome variable: anxiety symptoms). Percentile, bias-corrected confidence intervals of the mediating effects in the presence of the moderator variable are presented.

	coefficient	Standard error	obs	z	95%CI Lower	95%CI Upper
Stress perceptions (follow-up)						

Stress perceptions (baseline)	0.60	0.06	224	9.15***	0.47	0.73
Perceived self-efficacy (follow-up)						
Stress perceptions (follow-up)	-1.17	0.15		-7.46***	-1.47	-0.86
Stress perceptions (baseline)	0.36	0.20		1.77	-0.03	0.75
Perceived self-efficacy (baseline)	0.48	0.08		5.52***	0.31	0.65
Anxiety symptoms (follow-up)						
Perceived self-efficacy (follow-up)	-0.15	0.05		-3.01**	-0.25	-0.05
Stress perceptions (baseline)	0.23	0.11		1.93	-0.004	0.46
Perceived self-efficacy (baseline)	0.10	0.06		1.44	-0.03	0.23
Anxiety symptoms (baseline)	0.45	0.10		4.25***	0.24	0.67
LR test of model vs. saturated: chi2(3) = 6.13, Prob > chi2 = 0.1053						
Use of reappraisal as difference in scores of two subscales (1SD<Mean)	0.118	0.050		2.32*	0.047	0.25
Use of reappraisal as difference in scores of two subscales (mean)	0.114	0.048		2.34*	0.046	0.23
Use of reappraisal as difference in scores of two subscales (1SD>mean)	0.111	0.054		2.04*	0.036	0.25

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Longitudinal, first-stage, moderated mediation, analysis showed that the mediating effects of perceived self-efficacy at follow-up were slightly, significantly yet, decreased as the use of reappraisal increases, moderating the a path and giving estimations of (0.118, $p \leq 0.05$, 95%CI = 0.047, 0.25) for reappraisal scores one SD under sample's mean reappraisal score, (0.114, $p \leq 0.05$, 95%CI = 0.046, 0.23) for reappraisal scores at sample's mean reappraisal score, and (0.111, $p \leq 0.05$, 95%CI = 0.036, 0.25) for reappraisal scores one SD over than sample's mean reappraisal score. Perceived self-efficacy was found to significantly mediate the relationship between stress perceptions and anxiety symptoms at follow-up, exerting suppressing effects on both stress perceptions and anxiety symptoms. The proportion of the total effect mediated at the follow-up reached 0.23 of the total effects while the ratio of the indirect effect to direct effect and the ratio of the total to direct effect were 0.30 and 1.32 respectively. That practically means that the 23% of the total effect of stress perceptions on the anxiety symptoms was mediated by the follow-up perceived self-efficacy.

The second moderated mediation analysis tested whether the indirect effects of perceived self-efficacy on mental well-being are being moderated longitudinally at the first path by the use of reappraisal.

Table 30. Longitudinal, first-stage, moderated mediation analysis (outcome variable: mental well-being). Percentile, bias-corrected confidence intervals of the mediating effects in the presence of the moderator variable are presented.

	coefficient	Standard error	obs	z	95%CI Lower	95%CI Upper
Stress perceptions (follow-up)						
Stress perceptions (baseline)	0.59	0.06	233	9.24***	0.46	0.71
Perceived self-efficacy (follow-up)						
Stress perceptions (follow-up)	-1.11	0.15		-7.15***	-1.42	-0.81
Stress perceptions (baseline)	0.29	0.20		1.48	-0.09	0.68
Perceived self-efficacy (baseline)	0.47	0.08		5.39***	0.30	0.64
Mental well-being (follow-up)						
Perceived self-efficacy (follow-up)	0.39	0.05		7.88***	0.29	0.49
Stress perceptions (baseline)	-0.12	0.10		-1.13	-0.33	0.08
Perceived self-efficacy (baseline)	-0.16	0.07		-2.13*	-0.31	-0.01
Mental well-being (baseline)	0.47	0.07		6.36***	0.32	0.61
LR test of model vs. saturated: chi2(3) = 4.22, Prob > chi2 = 0.2390						
Use of reappraisal as difference in scores of two subscales (1SD<Mean)	-0.29	0.07		-3.98***	-0.45	-0.17
Use of reappraisal as difference in scores of two subscales (mean)	-0.31	0.06		-4.94***	-0.45	-0.21
Use of reappraisal as difference in scores of two subscales (1SD>mean)	-0.32	0.07		-4.23***	-0.51	-0.20

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Longitudinal, first-stage, moderated mediation, analysis showed that the mediating effects of the perceived self-efficacy on mental well-being at follow-up were significantly increase as the use of reappraisal increases, moderating the a path and giving estimations of (-0.29, $p \leq 0.001$, 95%CI = -0.45, -0.17) for reappraisal scores one SD under sample's mean reappraisal scores, (-0.31, $p \leq 0.001$, 95%CI = -0.45, -0.21) for reappraisal scores at sample's mean, and (-0.32, $p \leq 0.001$, 95%CI = -0.51, -0.20) for reappraisal scores one SD over the sample's reappraisal mean. Perceived self-efficacy was found to significantly mediate the relationship between stress perceptions and mental well-being at follow-up,

exerting suppressing effects on stress perceptions and boosting effects on mental well-being. The proportion of the total effect mediated at the follow-up reached 0.61 of the total effect while the ratio of the indirect effect to direct effect and the ratio of the total to direct effect were 1.62 and 2.65 respectively. That practically means that the 61% of the total effect of stress perceptions on the anxiety symptoms at follow-up was mediated by the follow-up perceived self-efficacy.

Analysis showed that stress perceptions at baseline significantly predict stress perceptions at follow-up (0.59, $p \leq 0.001$, 95%CI = 0.46, 0.71) while stress perceptions at follow-up and self-efficacy at baseline significantly predict perceived self-efficacy at follow-up giving estimations of (-1.11, $p \leq 0.001$, 95%CI = -1.42, -0.81) and (0.47, $p \leq 0.001$, 95%CI = 0.30, 0.64) respectively. Perceived self-efficacy at follow-up and mental well-being at baseline were found to significantly predict mental well-being at follow-up, giving estimations of (0.39, $p \leq 0.001$, 95%CI = 0.29, 0.49) and (0.47, $p \leq 0.001$, 95%CI = 0.32, 0.61) respectively. Analysis showed that the a_1 path (stress perceptions at baseline predicting perceived self-efficacy at follow-up) was non-significant [0.29, $p > 0.05$, 95%CI = -0.09, 0.68], whereas the b_1 path (perceived self-efficacy at baseline predicting mental well-being at follow-up) was significant, giving an estimation of [-0.16, $p \leq 0.05$, 95%CI = -0.31, 0.01].

The third longitudinal, moderated mediation analysis tested whether the mediating effects of perceived self-efficacy on socio-emotional disturbances are being moderated by the use of reappraisal.

Table 31. Longitudinal, first-stage, moderated mediation analysis (outcome variable: socio-emotional disturbances). Percentile, bias-corrected confidence intervals of the mediating effects in the presence of the moderator variable are presented.

	coefficient	Standard error	obs	z	95%CI	
					Lower	Upper
Stress perceptions (follow-up)						
Stress perceptions (baseline)	0.60	0.06	232	9.39***	0.47	0.73
Perceived self-efficacy (baseline)						
Stress perceptions (follow-up)	-1.13	0.15		-7.22***	-1.44	-0.82
Stress perceptions (baseline)	0.34	0.19		1.75	-0.04	0.74
Perceived self-efficacy (baseline)	0.49	0.08		6.05***	0.33	0.65
Socio-emotional disturbances (follow-up)						

Perceived self-efficacy (follow-up)	-0.23	0.04	-4.98***	-0.32	-0.14
Stress perceptions (baseline)	0.19	0.08	2.19*	0.02	0.36
Perceived self-efficacy (baseline)	0.16	0.05	2.84**	0.05	0.28
Socio-emotional disturbances (baseline)	0.37	0.09	3.96***	0.18	0.55
LR test of model vs. saturated: chi2(3) = 9.45, Prob > chi2 = 0.0239					
Use of reappraisal as difference in scores of two subscales (1SD<Mean)	0.11	0.042	2.85**	0.06	0.24
Use of reappraisal as difference in scores of two subscales (mean)	0.13	0.046	2.85**	0.06	0.25
Use of reappraisal as difference in scores of two subscales (1SD>mean)	0.14	0.058	2.49*	0.05	0.30

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Longitudinal moderated mediation, first-stage, analysis showed that the mediating effects of perceived self-efficacy at follow-up were slightly, significantly yet, increasing as the use of reappraisal increases, moderating the a path and giving estimations of (0.11, $p \leq 0.01$, 95%CI = 0.06, 0.24) for reappraisal scores one SD under sample's reappraisal mean, (0.13, $p \leq 0.01$, 95%CI = 0.06, 0.25) for reappraisal scores at sample's reappraisal mean, and (0.14, $p \leq 0.05$, 95%CI = 0.05, 0.30) for reappraisal scores one SD over sample's reappraisal mean. Perceived self-efficacy was found to significantly mediate the relationship between stress perceptions and socio-emotional disturbances, exerting suppressing effects both on stress perceptions and socio-emotional disturbances. The proportion of the total effect mediated at the follow-up reached 0.43 of the total effects while the ratio of the indirect effect to direct effect and the ratio of the total to direct effect were 0.77 and 1.77 respectively. That practically means that the 43% of the total effect of stress perceptions on socio-emotional disturbances at follow-up was mediated by the follow-up perceived self-efficacy.

Analysis showed that stress perceptions at baseline significantly predicted stress perceptions at follow-up (0.50, $p \leq 0.001$, 95%CI = 0.47, 0.73) while perceived self-efficacy at baseline and stress perceptions at follow-up significantly predict perceived self-efficacy at follow-up, giving estimations of (0.49, $p \leq 0.001$, 95%CI = 0.33, 0.65) and (-1.13, $p \leq 0.001$, 95%CI = -1.44, -0.82) respectively. Perceived self-efficacy at follow-up and socio-emotional disturbances at baseline were found to significantly predict socio-emotional disturbances at follow-up, giving estimations of (-0.23, $p \leq 0.001$, 95%CI = -0.32, -0.14) and (0.37, $p \leq 0.001$, 95%CI = 0.18, 0.55) respectively. Analysis showed that

the a_1 path (stress perceptions at baseline predicting perceived self-efficacy at follow-up) was non-significant (0.34, $p > 0.05$, 95%CI = -0.04, 0.74), whereas the b_1 path (perceived self-efficacy at baseline predicting socio-emotional disturbances at follow-up) was found to be significant (0.16, $p \leq 0.01$, 95%CI = 0.05, 0.28).

The fourth, longitudinal, moderated mediation analysis tested whether the mediating effects of perceived self-efficacy on positive emotions are being moderated at the first path by reappraisal.

Table 32. Longitudinal, first-stage, moderated mediation analysis (outcome variable: positive emotions). Percentile, bias-corrected confidence intervals of the mediating effects in the presence of the moderator variable are presented.

	coefficient	Standard error	obs	z	95%CI	
					Lower	Upper
Stress perceptions (follow-up)						
Stress perceptions (baseline)	0.59	0.06	232	9.10***	0.46	0.72
Perceived self-efficacy (follow-up)						
Stress perceptions (follow-up)	-1.14	0.15		-7.27***	-1.45	-0.83
Stress perceptions (baseline)	0.35	0.20		1.73	-0.04	0.74
Perceived self-efficacy (baseline)	0.47	0.08		5.51***	0.30	0.64
Total positive emotions (follow-up)						
Perceived self-efficacy (follow-up)	0.50	0.08		5.82***	0.33	0.67
Stress perceptions (baseline)	-0.19	0.19		-1.03	-0.57	0.17
Perceived self-efficacy (baseline)	-0.29	0.11		-2.66**	-0.51	-0.07
Total positive emotions (baseline)	0.38	0.10		3.81***	0.18	0.58
LR test of model vs. saturated: chi2(3) = 5.72, Prob > chi2 = 0.1258						
Use of reappraisal as difference in scores of two subscales (1SD<Mean)	-0.33	0.09		-3.55***	-0.54	-0.17
Use of reappraisal as difference in scores of two subscales (mean)	-0.35	0.09		-3.92***	-0.56	-0.20
Use of reappraisal as difference in scores of two subscales (1SD>mean)	-0.37	0.10		-3.39**	-0.63	-0.18

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

The longitudinal, moderated mediation analysis showed that the mediating effects of perceived self-efficacy were slightly, significantly yet, increase as the use of reappraisal increases, moderating the a path and giving estimations of (-0.33, $p \leq 0.001$, 95%CI = 0.06, 0.24) for reappraisal scores one SD under sample's reappraisal mean, (-0.35, $p \leq 0.001$, 95%CI = -0.56, -0.20) for reappraisal scores at sample's reappraisal mean, and (-0.37, $p \leq 0.01$, 95%CI = -0.63, -0.18) for reappraisal scores one SD over sample's reappraisal mean. Perceived self-efficacy was found to significantly mediate the

relationship between stress perceptions and positive emotions at follow-up, exerting suppressing effects on stress perceptions and boosting effects on positive emotions. The proportion of the total effect mediated at the follow-up reached 0.48 of the total effects while the ratio of the indirect effect to direct effect and the ratio of the total to direct effect were 0.95 and 1.95 respectively. This practically means that the 48% of the total effect of stress perceptions on positive emotions at follow-up was mediated by the perceived self-efficacy observed at follow-up.

Stress perceptions at baseline significantly predicted stress perceptions at follow-up (0.59, $p \leq 0.001$, 95%CI = 0.46, 0.72) while stress perceptions at follow-up and perceived self-efficacy at baseline significantly predict perceived self-efficacy at follow-up, giving estimations of (-1.14, $p \leq 0.001$, 95%CI = -1.45, -0.83) and (0.47, $p \leq 0.001$, 95%CI = 0.30, 0.64) respectively. Perceived self-efficacy at follow-up, and positive emotions at baseline significantly predict positive emotions at follow-up, giving estimations of (-0.29, $p \leq 0.01$, 95%CI = -0.51, -0.07) and (0.38, $p \leq 0.001$, 95%CI = 0.18, 0.58) respectively. The a_1 path (stress perceptions at baseline predicting perceived self-efficacy at follow-up) was found non-significant (0.35, $p > 0.05$, 95%CI = -0.04, 0.74), whereas the b_1 path (perceived self-efficacy at baseline predicting positive emotions at follow-up) was significant (-0.29, $p \leq 0.01$, 95%CI = -0.51, -0.07).

An additional first stage, moderated-mediation analysis, was performed, assessing the moderating effects of each emotion regulation strategy longitudinally (Table 38, Appendix II). As such, eight additional analyses tested whether the direction and the magnitude of the indirect effects change as a result of the presence of reappraisal or suppression. The results showed that the indirect effects of perceived self-efficacy on mental well-being, socio-emotional disturbances, and positive emotions decreased as the use of suppression increased. On the contrary, the indirect effects of perceived self-efficacy on mental well-being, socio-emotional disturbances, and positive emotions increased as the use of reappraisal increases. The indirect effects of perceived self-efficacy on anxiety remained stable independent on the use of emotion regulation strategy. Similar to the baseline analysis, the proportion of the mediating effects got larger at follow-up independently on the use of emotion regulation strategy. The magnitude of the changes in the mediating effects of perceived self-efficacy accounted for by the presence of emotion regulation strategies were similar to the baseline. These findings highlight that greater use of suppression leads to decrease of the mediating effects of self-efficacy on mental well-

being, socio-emotional disturbances, and positive emotions, whereas greater use of reappraisal increases the mediating effects of self-efficacy on mental well-being, socio-emotional disturbances, and positive emotions.

The fifth objective of this study was to assess whether stress perceptions and self-efficacy at baseline predict self-efficacy and resilient functioning respectively at follow-up. Analysis showed that stress perceptions at baseline significantly predict stress perceptions at follow-up (0.60, $p \leq 0.001$, 95%CI = 0.47, 0.73) while perceived self-efficacy at baseline and stress perceptions at follow-up significantly predict perceived self-efficacy at follow-up, giving estimations of (0.48, $p \leq 0.001$, 95%CI = 0.31, 0.65) and (-1.17, $p \leq 0.001$, 95%CI = -1.47, -0.86) respectively. In addition, self-efficacy at follow-up and anxiety symptoms at baseline significantly predict anxiety symptoms at follow-up, giving estimations of (-0.15, $p \leq 0.01$, 95%CI = -0.25, -0.05) and (0.45, $p \leq 0.001$, 95%CI = 0.24, 0.67) respectively. In the autoregressive panel models, we can assess longitudinal mediation by testing the a_1 (predictor at baseline predicting mediator at follow-up) and b_1 (mediator variable at baseline predicting outcome variable at follow-up) paths which show longitudinal mediation as the other paths indicate contemporaneous relationships. Analysis showed that the a_1 path (stress perceptions at baseline predicting perceived self-efficacy at follow-up) and the b_1 path (perceived self-efficacy at baseline predicting anxiety symptoms at follow-up) were non-significant, giving estimations of (0.36, $p > 0.05$, 95%CI = -0.03, 0.75) and (0.10, $p > 0.05$, 95%CI = -0.03, 0.23) respectively.

6.2.3 Assessing goodness of fit of the autoregressive, panel models

Global fit testing was assessed for the four autoregressive, panel models (Table 33). Values for the exact-fit hypothesis (chi-squared, χ^2), the Steiger–Lind Root Mean Square Error of Approximation (RMSEA), and measures of approximate fit indexes, such as the Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), the p of Close Fit (Pclose), the comparative fit index (CFI), and the Tucker Lewis Index (TLI) were reported for each autoregressive panel model. The Standardized Root Mean Square Residual (SRMR) was calculated by using Mata function in Stata. Mata function calculates the SRMR by comparing the expected covariance from a saturated model to that of the model of interest and it takes account non-complete data. The autoregressive panel models were overidentified, recursive-type, bow-free patterns models with six observed variables, 21 observations, 12 estimated parameters, and 9 degrees of freedom. For the models targeting anxiety symptoms, positive emotions, and mental well-being, the chi-squared

values were ranging from 4.21 to 6.13 with p values ranging from 0.10 to 0.23. Models' p values were considerably over statistical significance threshold of .05. The absence, therefore, of statistical significance indicates that there is no significant difference between the covariances predicted by the model and the data, given the parameters' estimates and population's covariance matrix (Kline, 2016). The non-significant, chi-squared values support the autoregressive models of three of my outcomes. Non-significant chi-squared values provide some preliminary evidence for supporting the models; however, this should be interpreted with caution, given the large correlations among the observed variables.

Table 33. Values of the global fit testing of the longitudinal, first-stage, mediation models

Fit statistic	Values (outcome: anxiety symptoms)	Values (outcome: mental well-being)	Values (outcome: socio-emotional disturbances)	Values (outcome: positive emotions)
Chi2	6.134	4.217	9.449	5.724
p	0.105	0.239	0.024	0.126
rmsea	0.068	0.042	0.096	0.063
90% ci lower	0.00	0.00	0.031	0
Upper	0.146	0.125	0.169	0.140
Pclose	0.272	0.462	0.104	0.311
AIC	5580.282	6299.681	5797.072	6179.332
BIC	5662.162	6382.506	5879.793	6262.054
CFI	0.989	0.997	0.978	0.991
TLI	0.957	0.986	0.910	0.962
SRMR	0.087	0.140	0.109	0.104
CD	0.648	0.680	0.623	0.598

Approximate fit indexes are continuous measures assessing the model-data correspondence, consisting of scales assessing the "badness-of-fit'' statistics and scales assessing the "goodness-of-fit" statistics (Kline, 2016). Approximate fit indexes include Absolute fit indexes, Incremental (relative, comparative) fit indexes, Parsimony-adjusted Indexes, and Predictive fit indexes (Kline, 2016). In my three autoregressive panel models, the RMSEA values were ranging from 0.042 to 0.068. RMSEA is an absolute fit index where a value of zero indicates the best fit. Values of RMSEA indicate the departure of the models from close to approximate fit. It has been suggested that RMSEA values over .10 indicate a severe problem (Brown & Cudeck, 1993), however there is not a universally accepted criterion. The three autoregressive panel models, which tested anxiety, mental well-being, and positive emotions, passed the exact fit test ($p > 0.05$, $e_L = 0$), and the close-fit test ($p_{\varepsilon_0.05} > .05$); however, they failed the not-close-fit test ($\varepsilon_U.05$) and the poor-fit test ($\varepsilon_U.10$). The CFI values is a goodness-of-fit measures where a value of 1.0 indicates the best result. The CFI compares the amount of departure from close fit for the researcher's model against that of the independence (null) model (Kline, 2016). CFI values were ranging for the three models from 0.989 to 0.997. These values indicate that my models

are 98 to 99% better than the baseline model. The failure to meet the not-close-fit test and the poor-fit test can be attributed to the low power which works against to the proposed models. I can assume that a larger sample size could permit me to obtain more precise results, leading to more confident assumptions regarding models' fit.

6.2.4 Post-hoc, follow-up analyses

A series of post-hoc analysis was conducted, exploring whether the level of reappraisal moderates both the relationship between the stress perceptions and perceived self-efficacy (a' path) and the relationship between the perceived self-efficacy and the outcome variables (b'path). Four separate, longitudinal moderated mediation analyses were conducted for each of the outcomes of interest (Tables 34, 35, 36, 37, Appendix II). Briefly, stress perceptions and reappraisal were found to significantly predict perceived self-efficacy while stress perceptions and perceived self-efficacy were found to significantly predict anxiety symptoms. Both interaction terms (predictor X moderator, a' path) and (mediator X moderator, b' path) did not significantly predict anxiety symptoms. The mediating effects of the perceived self-efficacy on anxiety symptoms were found to slightly, significantly yet, increase when participants have an average reappraisal attitude (0.11, $p \leq 0.05$, 95%CI = 0.01, 0.21). However, the mediating effects of self-efficacy were not significantly increased or decreased when participants use a lower or higher than sample's mean reappraisal attitude. In the context of mental well-being, stress perceptions and reappraisal were found to significantly and independently predict perceived self-efficacy while stress perceptions, perceived self-efficacy, and reappraisal were found to significantly predict mental well-being at follow-up. Both interaction terms in both paths did not significantly affect mental well-being. The mediating effects of the perceived self-efficacy were found to slightly, significantly yet, decrease as the use of reappraisal increases. For reappraisal scores one SD lower than sample's reappraisal mean, the estimation was (-0.31, $p \leq 0.001$, 95%CI = -0.49, -0.18). At the level of sample's mean reappraisal score, the estimation was (-0.30, $p \leq 0.001$, 95%CI = -0.45, -0.20) while for reappraisal scores one SD over sample's reappraisal mean, the estimation was (-0.30, $p \leq 0.001$, 95%CI = -0.53, -0.16).

In the context of socio-emotional disturbances, stress perceptions and reappraisal were found to significantly and independently predict perceived self-efficacy while stress perceptions, perceived self-efficacy, and reappraisal were found to significantly predict socio-emotional disturbances. Both interaction terms for both paths did not significantly

affect perceived self-efficacy and socio-emotional disturbances. The mediating effects of the perceived self-efficacy were found to slightly, significant yet, decrease as the use of reappraisal increases for those participants who experienced reappraisal one SD lower than sample's mean (0.14, $p \leq 0.01$, 95%CI = 0.04, 0.23) and those with average use of reappraisal (0.12, $p \leq 0.01$, 95%CI = 0.03, 0.21). In the context of positive emotions, stress perceptions and reappraisal were found to significantly and independently predict perceived self-efficacy while stress perceptions and perceived self-efficacy were found to significantly predict positive emotions. The interaction term of the b path (mediator X moderator) was found to slightly, significantly yet, affect positive emotions (-0.01, $p \leq 0.05$, 95%CI = -0.03, 0). The mediating effects of the perceived self-efficacy were found to significantly decrease as the use of reappraisal increases: (-0.44, $p \leq 0.001$, 95%CI = -0.67, -0.21) for reappraisal scores one SD lower than sample's reappraisal mean and (-0.34, $p \leq 0.001$, 95%CI = -0.51, -0.17) at sample's mean reappraisal.

6.3 Concluding Remarks

The above findings supported my research hypotheses, providing evidence regarding the validity of my model in predicting resilient functioning:

- The first and the third objective of this study was to assess the mediating role of perceived self-efficacy at baseline and follow-up respectively. Perceived self-efficacy was found to be a significant mediator of the relationship of stress perceptions and resilient functioning. Perceived self-efficacy was found to exert mediating effects on resilient functioning, affecting all the four outcome measures both at baseline and follow-up. The mediating effects of perceived self-efficacy got bigger in magnitude while they had the same direction at follow-up. Perceived self-efficacy acts as suppressor of stress perceptions and negatively predicts anxiety and socio-emotional disturbances. In addition, perceived self-efficacy was found to positively predict positive emotions and mental well-being.
- The second and the fourth objectives of this study were to assess the possible moderated-mediation relationship among stress perceptions, perceived self-efficacy, and emotion regulation at baseline and 6-month follow-up respectively. Moderated-mediation analysis supported my hypothesis regarding the role of emotion regulation in moderating the relationship between stress perceptions and self-efficacy. As such, the higher the use of reappraisal, the more effects of stress perceptions to mental well-being, socio-emotional disturbances, and positive

emotions, pass through perceived self-efficacy. This was not the case, however, for the anxiety symptoms. The analysis showed that in the context of anxiety symptoms, the greater the use of reappraisal, the less effects of stress perceptions on anxiety symptoms are being mediated by perceived self-efficacy, with these effects, albeit statistically significant, to be of low magnitude.

- The fifth objective was to assess whether this novel, conceptual model can prospectively predict resilient functioning. As such, the panel, auto-regressive analysis tested whether stress perceptions and self-efficacy at baseline predict self-efficacy and resilient functioning respectively at follow-up. Perceived self-efficacy at baseline was found to significantly predict mental well-being, socio-emotional disturbances, and positive emotions at follow-up while stress perceptions at baseline were found to significantly predict socio-emotional disturbances at follow-up. In addition, the baseline scores of model's variables significantly predicted participants' scores on the same variables at follow-up. These findings provide me with sufficient evidence to partially support the predictive validity of this novel, conceptual model. Perceived self-efficacy causally mediates the relationships between stress perceptions and positive emotions, stress perceptions and socio-emotional disturbances, and stress perceptions and mental well-being while stress perceptions can prospectively predict socio-emotional disturbances stress perceptions in future. Global fit testing values provided me with evidence supporting the fit of the above models; however, causal assumptions should be cautiously interpreted, due to the lack of power at follow-up and the pseudo-longitudinal design of this study.
- Post-hoc, moderated mediation analysis showed that the moderating effects of reappraisal on resilient functioning were inconsistent and of low magnitude when these effects were tested on both indirect paths. When the two emotion regulation strategies were tested in isolation, high use of reappraisal was found to increase the mediating effects of self-efficacy to three of the four indicators of resilient functioning (mental well-being, socio-emotional disturbances, and positive emotions) while high use of suppression was found to decrease the mediating effects of self-efficacy on the same outcomes.

CHAPTER 7
DISCUSSION

7.1 Discussion of the main findings

This study investigated the validity of a novel, conceptual, strength-based model in predicting resilient functioning in a UK-based sample of adolescent students. The findings supported my hypotheses regarding the validity of this model to predict resilient functioning in UK-based, adolescent students. Perceived self-efficacy was found to be a crucial mediator between stress perceptions and resilient functioning while emotion regulation was found to moderate the relationship between stress perceptions and perceived self-efficacy. Moderated-mediation analysis showed that the mediating effects of perceived self-efficacy were dependent on the use of emotion regulation, with the mediating effects getting larger as the use of reappraisal increases. Longitudinal analysis partially supported the causal assumptions underpinning this conceptual model. Stress perceptions and perceived self-efficacy at baseline were found to predict stress perceptions and self-efficacy at follow-up. Stress perceptions at baseline were also found to predict socio-emotional disturbances at follow-up while perceived self-efficacy at baseline was found to prospectively mediate the relationships between stress perceptions and mental well-being, stress perceptions and socio-emotional disturbances, and stress perceptions and positive emotions.

These findings highlight the causal role of perceived self-efficacy in leading to resilient functioning within the context of non-specific, daily stressors. These findings also underscored that the mediating effects of self-efficacy are getting stronger in those adolescents who make use more of reappraisal as an emotion regulation strategy. Significant differences between the scores of two genders were observed in all model's variables. Female adolescents were found to have significantly worse mental health and lower subjective well-being compared to their male counterparts both at baseline and follow-up while time was not accounting for these differences. Female adolescents were found to be significantly more prone compared to male ones to perceive external events as stressful while they were found to experience significantly more anxiety symptoms and socio-emotional disturbances compared to their male counterparts.

7.1.1 Perceived self-efficacy: a key mediator for achieving resilient functioning

This study showed that increased stress perceptions causes socio-emotional disturbances and leads to greater sensitivity in perceiving external events as stressful. Indeed, greater sensitivity in perceiving daily hassles as threatening has been found to increase the likelihood for developing anxiety, obsessive-compulsive, panic, depressive, and major depressive disorders prospectively (Asselmann et al., 2017). These findings show that multiple, minor, daily hassles can cumulatively build a stress load which in turn exerts detrimental effects on adolescents' mental health. Daily hassles commonly identified within the school context, such as interpersonal problems with peers and unsuccessful attainment of personal and social goals, can have severe repercussions on adolescents' mental health and functioning. These findings stress the need to target maladaptive appraisals early in adolescence before mental health problems emerge. This study also showed that specific intra-individual protective factors, such as self-efficacy and reappraisal, can synergistically decrease the effects of stress, leading to resilient functioning. This study showed that perceived self-efficacy is a crucial mediator underpinning the relationship between stress perceptions and resilient functioning. As such, perceived self-efficacy was highlighted as a causal antecedent of resilient functioning in adolescents. This study adds to the literature regarding the effects of self-efficacy on resilient functioning, given that the role of self-efficacy has mostly been tested within the context of specific stressors. The finding of this study is in line with recent findings which have shown that generic self-efficacy can exert mediating effects between environment-interpersonal variables (e.g. strength-based parenting) and mood disorders (Che et al., 2017; Loton & Waters, 2017; Steca et al., 2014).

Longitudinal analysis showed that the mediating effects of perceived self-efficacy get larger with time, predicting mental well-being, socio-emotional disturbances, and positive emotions. These findings show that the effects of perceived self-efficacy tailor adolescents' behavioural and emotional repertoires, decreasing their sensitivity to daily stressors. Universal, prevention programmes could benefit from targeting malleable secondary appraisals, such as self-efficacy, early in adolescence, assisting adolescents on establishing an adaptive appraisal profile which in turn will lead to beneficial cognitive and behavioural outcomes. Given the dynamic neurobiological and cognitive processes underpinning adolescence (Southwick & Charney, 2012), it can be assumed that exercising self-efficacy in key emotional, academic, and social tasks in adolescence could exert wider

effects on individuals' cognitive skills. Training of self-efficacy through scenario-based learning activities could promote the adoption of a positive-biased, appraisal style, facilitating adolescents to use their behavioural skills effectively. An adaptive, appraisal style will permit individuals to use their emotional resources effectively, increasing their coping capacity. Given the overlap between some key secondary appraisals, such as self-efficacy and optimism (Carver & Scheier, 2014), it can be anticipated that training adolescents to exercise self-efficacy beliefs on key developmental tasks will activate an upward spiral of complementary motivational and protective factors, such as optimism, boosting their resilient functioning within stress. Another interesting fact emerged from the longitudinal analysis was that the use of self-efficacy was prospectively increasing. Although the timeframe between the two measurements is relatively short, I cannot overlook that participants are within a dynamic phase of lifespan where cognitive and emotional patterns are changing rapidly. Secondary appraisals, such as self-efficacy, are driven by personality factors, intellectual ability, cognitive control, and emotional maturation (John & Eng, 2014). Given the rapid cognitive changes taking place within adolescence, it is highly likely these cognitive changes to affect the trajectory of secondary appraisals (e.g. self-efficacy) (Neacsiu, Bohus, & Linehan, 2014). As such, the increase of the mean total self-efficacy score in this study could be accounted for by participants' capacity to better use their secondary appraisals. Given, however, that the increase of total self-efficacy scores was marginal, I cannot exclude the possibility that part of this increase has been accounted for by variations in participants' scores on the other measures between baseline and follow-up (e.g. lower scores in RCMAS and SDQ at follow-up and higher scores in PANAS and WEMWBS at follow-up).

7.1.2 Positive reappraisal and resilient functioning: A promising pathway for boosting self-efficacy

This study showed that emotion regulation moderates the relationship between stress perceptions and self-efficacy. As such, the mediating effects of perceived self-efficacy get larger as the use of reappraisal increases. These findings support recent hypotheses which posit cognitive emotion regulation as a crucial pathway for achieving resilient functioning and optimal mental health within stress (Heleniak, Jenness, Stoep, McCauley, & McLaughlin, 2015; Kalisch et al., 2015). The findings of this study can be interpreted via the lens of a cognitive-behavioural approach which posits that reappraisal triggers a cognitive shift which in turn leads to a less threatening representation of the environmental

input (Gross, 2014). This cognitive shift has not only implications on how the individual appraises the environmental input but also affects individuals' emotional states at the very first place. Emotional states play a critical role in selecting, using and maintaining reappraisal within specific contexts which in turn facilitate individuals' decision-making. Thus, reappraisal as a dynamic cognitive emotion regulation strategy seems to operate in a fourfold, cyclic way: i) altering individuals' appraisal style and facilitating less threatening representations to enact, ii) improving the emotional states by decreasing the symptoms of discomfort and dysphoria, iii) triggering an upward spiral of positive emotions and subjective well-being, and iv) improved emotional states promote decision-making via higher order cognitive functions (e.g. executive function, engagement-disengagement processing, self-control) (Grecucci & Sanfey, 2014; Gross, 2014; Sheppes, 2014; Waugh, 2004). Given that reappraisal could modulate daily decision making (Grecucci & Sanfey, 2014), it can be hypothesised that individuals, who use reappraisal regularly, are more prone to use secondary appraisals, such as self-efficacy.

Indeed, it has only been recently that positive reappraisal has been tested within the context of resilience. Positive reappraisal has been associated with lower sensitivity to depressive symptoms, greater tolerance in perceiving external stimuli as threatening, and increased quality of life (Banyard, Hamby, & Grych, 2017; Kudinova, James, & Gibb, 2018; Shapero, Stange, McArthur, Abramson, & Alloy, 2018). This study provides evidence regarding the role of positive reappraisal in boosting intra-individual protective factors such as self-efficacy. As such, this study adds to the literature on how positive emotion regulation strategies affect resilience-oriented protective factors and positive indicators of mental health. This is particularly important for developing strength-based resilience interventions, given that most of the research school prevention has tested emotion regulation strategies (e.g. catastrophizing) in relation to negative indicators of mental health (e.g. depression) (Berto et al., 2017; Elhai, Hall, Claycomb Erwin, 2018; Ferrer, Green, Oh, Hennessy, & Dwyer, 2017; Palmer, Oosterhoff, Bower, Kaplow, & Alfano, 2018). This study illuminated the process under which reappraisal interacts with self-efficacy in an adolescent population, leading to resilient functioning. This study stresses the need to disentangle the testing of positive emotion regulation strategies from the testing of negative emotion regulation strategies, given that it is highly likely for positive and negative emotion regulation strategies to follow distinct and different pathways.

Reappraisal was found to be a promising pathway to target in universal prevention. Indeed, CBT-based interventions, which have targeted emotion regulation strategies, have been found effective to decrease internalising and externalising symptoms in parents and offsprings with mental health problems (Thornback & Muller, 2015). However, the promising findings of my study should be interpreted cautiously. The reason to do so, is because the mediating effects of self-efficacy on mental well-being, socio-emotional disturbances, and positive emotions got only slightly increased as a result of reappraisal's increase. Although these effects are statistical significant, their clinical significance could be questioned. There are two reasons which may explain these small effect sizes. First, the sample in this study consisted of participants which were drawn from a universal population. Given that it is more likely for participants coming from targeted populations to have established a negative-biased cognitive pattern, it is assumed that they could be more prone to use more and at a greater extent negative emotion regulation strategies. As such, the role of emotion regulation strategies could be better captured in a targeted sample. Second, the total score of reappraisal in the main analysis was assessed as the difference of participants' scores in reappraisal subscale minus their scores in suppression subscale. When the emotion regulation strategies were tested in isolation, the fluctuations of mediating effects were still significant and slightly bigger in magnitude. It can be assumed therefore that assessing the total emotion regulation score as the difference between the two subscales may have obscured the true effects of each emotion regulation strategy. The reason, however, for assessing the total score as a difference between the two subscales' scores in the main analysis was because individuals in early and mid-adolescence have not formed a stagnant pattern of emotion regulation strategies yet. It has been documented that the formation of a specific emotion regulation repertoire is achieved through mid-to-late adolescence while emotion regulation strategies are most effectively used in early adulthood (Desatnik et al., 2017; Theurel & Gentaz, 2018). Given that it is highly likely for both suppressing and reappraisal emotion regulation strategies to co-exist at this developmental stage, participants' score in emotion regulation was assessed as a continuous outcome subtracting the total suppression score from the total reappraisal score. The fact that adolescents have not developed a stagnant emotion regulation profile at this stage and the assessment of emotion regulation as the difference between the two subscales in this study may explain the small effect sizes. Another reason which might

explain the small effects of the emotion regulation strategies in this study is the non-clinical sample which was recruited in this study.

The moderating effects of reappraisal and suppression were also assessed in isolation (Table 38, Appendix II), aiming to test whether the direction and magnitude of the moderating effects are differentiated according to what emotion regulation strategy is used each time. When the moderating effects of each regulation strategy were tested in isolation, the coefficients of the mediating effects were much larger compared to the coefficients observed in the main analysis. This can be accounted for by the small, significant yet, direct effects of both emotion regulation strategies on self-efficacy. When reappraisal was assessed in isolation, the findings showed that increases in the use of reappraisal prospectively increased the mediating effects of perceived self-efficacy on mental well-being, socio-emotional disturbances, and positive emotions. When suppression was tested in isolation, it was found that increases of suppression decreased the mediating effects of perceived self-efficacy on mental well-being, socio-emotional disturbances, and positive emotions. There were no large differences in magnitude of the effects between the two emotion regulation strategies. These moderating effects, albeit statistically significant, were of low magnitude. However, these findings underscore the role of reappraisal in boosting the mediating effects of self-efficacy. These findings provide evidence on how self-efficacy works within the context of adaptive emotion regulation strategies, such as reappraisal, uncovering part of the process under which protective factors (e.g. reappraisal and high self-efficacy) increase resilient functioning.

The moderating effects of emotion regulation in increasing the mediating effects of self-efficacy were not replicated within the context of anxiety symptoms. Contrary to my hypothesis, longitudinal analysis showed that the greater the use of reappraisal, the lower the mediating effects passing through self-efficacy to anxiety symptoms. When the two emotion regulation strategies were tested in isolation, increases in suppression were associated with decreases in the mediating effects of self-efficacy while self-efficacy remained stable when reappraisal increased. These findings are intriguing in the sense that reappraisal was found to increase the mediating effects of self-efficacy on socio-emotional disturbances. Given that the construct of socio-emotional disturbances, as this was assessed by SDQ, has a large overlap with anxiety symptoms, it would be expected that the direction of the moderating effects would be the same. However, these findings may

indicate that different underpinning processes occur between stress perceptions and anxiety symptoms. As such, self-efficacy may not be the key pathway leading to anxiety symptoms within the context of non-specific stressors at this developmental stage. It should also be noted that this study focused only on two emotion regulation strategies. Although preliminary evidence suggests that positive reappraisal downregulates anxiety in adolescents (Theurel & Gentaz, 2018), it has been posited that avoidance could play a central role in the proliferation of anxiety symptoms (Beckers & Craske, 2017). Avoidance could be the causal antecedent of distorted threat appraisals or the outcome of a decreased cognitive regulation flexibility, leading to habitual use of avoidance behaviours and increasing anxiety (Arnaudova et al., 2017).

The pathways under which avoidance affects resilient functioning yet remain to unfold. One of the suggested pathways under which avoidance perpetuates anxiety symptoms, is by undermining individuals' ability to flexibly regulate their own cognitive and emotional resources (Arnaudova et al., 2017). Indeed, it has been recently posited that resilient functioning presupposes the flexible use of both proactive and reactive emotion regulation strategies and not merely the use of proactive emotion regulation strategies (e.g. positive reappraisal) (Bonanno & Burton, 2013; Koole, Schwager, & Rothermund, 2015). Although it is out of the scope of this thesis, it could be individuals' regulation flexibility to use either proactive (e.g. positive reappraisal) or reactive (e.g. suppression and avoidance) emotion regulation strategies which may increase resilient functioning. Given that the selection of the most appropriate emotion regulation strategy is dependent on the type of stressor (e.g. intensity and duration of the stressor) and the context where these stressors emerge (e.g. emotional and motivational states) (Freund & Staudinger, 2015; Sheppes et al., 2014), it could be individuals' ability to develop multiple, scenario-sensitive, emotion regulation repertoires which will be used according to the environmental conditions. Alongside to the role of avoidance and emotion regulation inflexibility, increased anxiety sensitivity has been posited as another pathway which inhibits resilient functioning (Waters & Craske, 2016), by proliferating the anxiety symptoms through the systematic avoidance of environmental cues which are perceived as threatening (Lebowitz, Leckman, Silvermn, & Felman, 2016; Lebowitz, Shic, Campbell, & MacLeod, 2015).

Longitudinal post-hoc analysis (Tables 34, 35, 36, & 37, Appendix II) showed smaller-in-magnitude and inconsistent-in-direction effects of total emotion regulation score in moderating the indirect paths between stress perceptions and resilient functioning. Reappraisal was found to significantly moderate the relationship between stress perceptions and anxiety only at one level while it significantly moderated the relationship between stress perceptions and mental well-being. Increases in the use of reappraisal were found to lead to decreased mediating effects of self-efficacy on socio-emotional disturbances, and positive emotions. Contrary to the findings of main analysis, post-hoc analysis revealed that reappraisal decreases the mediating effects of perceived self-efficacy. The inconsistent effects of reappraisal observed in the post-hoc analysis can be attributed to a range of reasons. First, emotion regulation strategies involve several, sequential, high-order, cognitive processes related to the generation, implementation and maintenance of a regulatory strategy in the face of a stressor (Kalisch, 2009). These cognitive processes precede the secondary appraisals, such as self-efficacy, something which may explain the moderating effects of emotion regulation in the first path of the model. The use of secondary appraisals (e.g. self-efficacy), however, activate an array of self-regulatory processes which could possibly substitute the effects of emotion regulation on resilient functioning. Second, emotion regulation has been associated with delayed gratification (DG) ability (e.g. limited cognitive control) in children and adolescents. Negative affective states have been associated to poor DG performance, whereas positive affect has been hypothesised to serve as a facilitator of DG (Luerssen & Ayduk, 2014). It could be hypothesised therefore that positive emotional states boost cognitive control which in turn promotes self-efficacy, dissipating the effects of emotion regulation (path b'). As such, individuals with high cognitive control might be in less need to reappraise a stressful situation, given that they could be more capable to use adaptive secondary appraisals (e.g. high self-efficacy, sense of mastery) which in turn promote the use of adaptive coping strategies. Third, emotion regulation strategies have been found to promote executive function skills (e.g. effortful control) which are related to a range of motivational and behavioural factors (e.g. behavioural planning) (Eisenberg, Hofer, Sulik, & Spinrad, 2014). For instance, children low in effortful control have been found to experience difficulties in emotional processing and modulate negative emotions (Eisenberg et al., 2010). It could be hypothesised therefore that the repetitive exercise of effortful control renders individuals more capable to deal with everyday stressors without being in need to reappraise the environmental input. Fourth, it is well-known that

individual resources (e.g. social networking) and assets (e.g. IQ) play a critical role in the processes underpinning resilient functioning (John & Eng, 2014). Individual assets (e.g. IQ, cognitive control) can facilitate secondary appraisals to be enacted (John & Eng, 2014). It can be hypothesised therefore that individuals with high IQ and cognitive control could flexibly exercise a wide range of secondary appraisals (e.g. self-efficacy) according to context and time. The repetitive exercise of self-efficacy could lead to an automatic, adaptive pattern of selective attention which in turn could lead to a less threatening representation of stressful stimuli. As such, individuals who have established an adaptive pattern of selective attention may not be in need to reappraise, as the representations of environmental input are a priori less threatening. Although it is out of the scope of this thesis, the correlation between routine patterns of selective attention and repetitive use of self-efficacy could be particularly important in the context of anxiety prevention. The reason is that the overgeneralisation of conditioned fear and generalised deficits on the extinction of conditioned fear have been proposed as key pathways under which anxiety symptoms are perpetuating (Duits et al., 2015; Dunsmoor & Paz, 2015). As such, training individuals to exercise self-efficacy beliefs from an early stage could lead them to develop an adaptive pattern of selective attention which will filter the environmental input efficiently.

7.2 Implications for practice and research

The findings of this study have implications for practice and research. This conceptual model uncovers part of the process under which self-efficacy and emotion regulation work within the context of non-specific stressors, leading to resilient functioning. These findings provide the evidence base for informing the development of novel, universal, resilience interventions. The findings of this thesis also stress the need to undertake further research. Future research will promote our understanding regarding the pathways underpinning stress and resilient functioning, by targeting other protective factors and complementary indicators of resilient functioning.

7.2.1 Implications for practice

Universal, school-based interventions can target whole classes of students irrespective of their risk and/or predisposition to mental health problems or disorders, eliminating the stigmatisation from participating and facilitating the inclusion of significant others, such as teachers and parents. As such, universal, school-based interventions are well-suited for

providing a first preventive line against the everyday stressors, offering a cost-efficient and sustainable option for mental health promotion (Stallard et al., 2014). The findings of this study can inform the development of novel interventions. Both self-efficacy and emotion regulation have been highlighted as key protective factors underpinning resilient functioning, buffering negative emotions and internalising behaviours (Finlon et al., 2015; Li & Yang, 2015). Self-efficacy in adolescents has been targeted by several health behaviour programmes (Prestwich et al., 2014) while emotion regulation strategies have been highlighted as a proximal target for school-based, mental health interventions (Modecki et al., 2017). Future interventions could therefore benefit from targeting self-efficacy and emotion regulation strategies as key markers of resilient functioning in universal contexts. It is suggested, however, that the predictive validity of this model should be tested within a feasibility study first.

The findings of this thesis also underscore that interventions following a strength-based approach could be effective in universal student populations. Positive-oriented outcomes, such as subjective well-being, coping capacity, and flourishing can exert counterbalancing effects on stress and socio-emotional disturbances. This thesis highlighted that positive-oriented, psychological outcomes are more proximal targets for universal interventions. Resilience interventions, following a CBT approach, have been feasibly implemented in schools; however, the disease-oriented scope has been accounted for their limited effectiveness and applicability. As such, the content of CBT interventions should be modified. This conceptual model can be used as the basis for CBT interventions to target protective factors which may promote subjective well-being. This conceptual model could also inform the development of novel SEL interventions. Most of the SEL interventions have followed a strength-based approach; however, their scope is broad, targeting several outcomes ranging from academic achievement to health-risk behaviours. It is suggested that SEL programmes would be a more appropriate type of interventions to be implemented as universal interventions within schools. However, their effectiveness could be increased by adopting a narrower focus, focusing on positive-oriented indicators of mental health. Future SEL programmes, which will target emotion regulation and self-efficacy, could promote adolescents' mental health and school's mental health capital. This conceptual model could also inform the development of novel, self-affirmation interventions. Self-affirmation interventions have been found effective in modifying health-risk behaviours (Churchill, Jessop, Green, & Harris, 2018; Fox, Harris, & Jessop,

2017). Self-affirmation interventions have followed a strength-based approach and they can be smoothly incorporated into school curricula. The experimental manipulations, which are embedded within self-affirmation interventions, could target resilience-oriented, protective factors in relation to specific stressors commonly identified in schools. In addition, these experimental manipulations could better capture adolescents' interests, retaining their motivation to participate. The findings of this conceptual model can also be incorporated into socio-psychological interventions. Socio-psychological interventions target a specific mechanism of change, they are brief in delivery, precise and stealthy in content while they involve scenario-based activities which can retain participants' motivation (Brummelman & Walton, 2015). As such, the mechanism represented in study's conceptual model can be used as the basis for future socio-psychological interventions, facilitating their implementation within whole-school approaches.

7.2.2 Implications for research

This model highlighted how two key protective factors (i.e. self-efficacy and emotion regulation) interact, leading to resilient functioning within stress contexts. Secondary appraisals, such as self-efficacy, empathy, and optimism, have been found to decrease the likelihood for developing mental health disorders (Asselmann et al., 2017; Carver, 2014; Carver & Scheier, 2015; Chang, Reddan, Ashar, Eisenbarth, & Wager, 2015). However, the limited research on how different secondary appraisal are interacting has constrained our understanding regarding the underpinning pathways of resilient functioning. This study showed that different pathways underpin the relationships among stress, positive, and negative indicators of mental health. As such, future research should test whether other secondary appraisals mediate the relationship between stress and resilient functioning, identifying those protective factors which are more effective in increasing positive indicators of mental health (Chang, Reddan, Ashar, Eisenbarth, & Wager, 2015; Juslin, 2015). This conceptual model followed a strength-based approach, including subjective well-being as an indicator of resilient functioning. However, individuals' ability to develop and maintain interpersonal relationships has been highlighted as a core element of resilient functioning. Interpersonal skills have been found to promote effective regulation within adversity while social support has been found to suppress the effects of emotion dysregulation on maladaptive behaviours (Mo, Chan, Chan, & Lau, 2018).

It would be critical for future research to include measures of interpersonal relationships, and/or social, and negotiation skills, as indicators of the resilient functioning, testing how protective factors affect those variables.

This study also found that emotion regulation increases the effects that self-efficacy exerts on resilient functioning. Given that the use of emotion regulation strategies is context- and age-dependent, there is also the need to explore the trajectories that different emotion regulation strategies follow throughout adolescence. Multi-wave, longitudinal designs using multi-level modelling techniques can delineate the trajectories of different protective factors, highlighting the multiple pathways leading to resilience. In addition, this model found that reappraisal does not boost the effects of self-efficacy in the context of anxiety. Future research can therefore investigate the role of different emotion regulation strategies (e.g. avoidance) in proliferating anxiety symptoms. In the light of recent hypotheses regarding the beneficial role of cognitive flexibility in regulating emotional resources, future experimental research could also shed light on how cognitive flexibility counterbalance the detrimental effects of stress. For instance, cognitive engagement with stressful tasks in high self-efficacy individuals leads to anxiety and increased perceptions of stress (Lopez-Perez, 2018). It would be vital therefore to investigate under which circumstances adaptive emotion regulation strategies, such as reappraisal, may have adverse effects on resilient functioning. This study also found that stress perceptions impede adolescents' resilient functioning, predisposing them to develop a negative appraisal profile. However, it has been recently posited that negative appraisals could possibly exert counter effects on emotion regulation under specific contexts (Feund et al., 2015; Koole et al., 2015). As such, future experimental research could explore under which contexts and when in adolescence, negative appraisals could have a beneficial impact in emotion regulation.

7.3. Strengths and limitations of this study

This study has several strengths. First, the development of this conceptual model was strongly theoretically- and evidence-based. It is theoretically-based because its inception was based on a set of well-demarcated frameworks. It is also evidence-based because its operationalisation has been based in sound psychological theories and in the outcomes of my systematic reviews, adding to the the methodological clarity within resilience research. Second, the operationalisation of the resilient functioning in this model has followed a

strength-based approach, capturing aspects of subjective well-being and flourishing alongside measures of mental health problems. This is in line with recent trends in resilience literature while a strength-based approach accommodates better the needs and characteristics of universal adolescent populations. Third, the use of surrogate mental health measures as indicators of mental health highlights the causal pathways underpinning the relationship between stress and mental health, facilitating the interpretation and reproducibility of the findings. Fourth, this study assessed resilient functioning within a longitudinal design, conforming to the governmental and public health policies. Fifth, this conceptual model confers to our understanding regarding the underpinning mechanisms between stress and resilient functioning in adolescents, fostering the dissemination of the research findings into practice. These findings stress the need to shift the focus of universal prevention, following a more strength-based approach. To the best of my knowledge, this is the first, prospective, cohort study which tests the predictive validity of a strength-based, theory-driven, resilience model, in a universal, UK-based, adolescent population.

Inevitably, this study has some limitations. First, a large attrition between the baseline and follow-up was evident. Results of the longitudinal analysis should be interpreted cautiously, given that the analysis was underpowered. Second, this study followed a prospective, observational design with two waves (i.e. pseudo-longitudinal design). This design does not permit to detect causal relationships for all the variables, given that some of the associations are being tested in a contemporaneous way. Longitudinal designs with more follow-up assessments will be more valid for testing causal relationships among the variables of this model. A multi-wave longitudinal design will be more appropriate for illuminating the trajectories of protective factors and their possibly cascading effects on resilient functioning at later developmental stages. Third, the operationalisation of the resilient functioning in this conceptual model does not include variables of social skills. However, adolescents' ability to develop interpersonal relationships and dealing with social challenges effectively constitute a critical factor for achieving resilient functioning. It will be vital therefore for future studies to investigate how interpersonal and social skills affect the positive indicators of mental health, buffering the effects of stress. Fourth, the predictor variable of this model was measured by the PSS. The PSS has strong psychometric properties and it is more reliable in capturing stress appraisals than life-event questionnaires. The PSS had been originally validated in high-school and undergraduates

but it has also been used with slightly younger populations (Antonson, Thorsen, Sundquist, & Sundquist, 2018; McGlumphy, Shaver, Ajibewa, & Hasson, 2018). Given that our population was slightly younger than the population in which the PSS has been originally validated, participants' scores on PSS should be interpreted under this limitation. Fifth, the results of this study should be interpreted cautiously, given the limited representativeness of the data. The reason is that the school academy, which participated in this study, was self-enrolled. As such, the findings of this study should be interpreted under this limitation, given that my sample may not be representative of the UK adolescent population in terms of demographic characteristics and SES.

Sixth, the data in this study was collected by school teachers both at baseline and follow-up while the researcher (A.B.) was not present. Although I had established a regular contact with the headteachers and I was receiving updates regarding the data collection, most of the teachers, who collected the data, had not attended the training session that I delivered at baseline. Training sessions were delivered to 2 headteachers and 3 teachers which were present. The training sessions had to do with the nature of the questionnaires, guidelines on how they should be filled in and how the teachers should respond to potential questions from students. It can be anticipated therefore that teachers did not follow a standardised manual for collecting data; as such, a high degree of variation in data collection between different classes could be evident (e.g. some teachers could have been more supportive than others). It should be also acknowledged that the absence of a standardised manual for collecting data may have led to social-desirability bias (King & Bruner, 1999). Seventh, the same self-report measures were used in this study both at baseline and follow-up. Given that the participants knew in advance that they will be tested in the same questionnaires, I cannot exclude the possibility that this might have increased the spurious method-specific variance. Spurious method-specific variance can bias the results by inflating or deflating the relationships among the observed variables (Schaller, Patil, & Malhotra, 2015). Eighth, the use of SDQ in this study could be problematic. SDQ has been broadly used as a screening tool assessing students with mental health issues; however, its clinical utility and sensitivity to identify children at risk of mental health problems have been found to be limited in community samples (Vaz et al., 2016). As such, the use of SDQ for assessing socio-emotional disturbances in this study might has been problematic, given the low positive predictive value in capturing children with high socio-emotional disturbances. Ninth, the generalisability of my

conceptual model in other cultural and geographical contexts is limited. The reason is that resilient functioning is context and cultural-sensitive. As such, there is not a single set of indicators of resilient functioning that can be used among different cultures and geographical contexts. In this study, the conceptualisation of resilient functioning accommodates the Western-living countries' values and social norms.

7.4 Concluding remarks

This study provides evidence regarding the validity of a novel, conceptual model in predicting resilient functioning in a population of UK-based adolescents. This model highlights part of the process under which self-efficacy and emotion regulation interact, leading to resilient functioning. These findings have important implications for research and practice. This thesis identified two main gaps regarding the implementation of resilience-based interventions in schools. First, there is a lack of theoretical basis to inform the development of effective and feasible universal, resilience-based interventions. The meta-analytic review showed that most of the universal, resilience-based, prevention interventions have borrowed the theoretical underpinnings by the targeted interventions. As such, the theoretical underpinnings of universal interventions have not been supported by empirical research and do not accommodate the characteristics and needs of universal populations. The absence of evidence stresses the need to re-consider the structure and content of such interventions in order to capture the needs of universal populations.

Second, there is a lack of implementation research on how universal interventions work. The lack of evaluative research on how adolescents perceive these interventions has hindered the dissemination of research findings into practice. This thesis adds to the literature by being the first study which explored adolescents' perceptions from participating in universal school-based programmes. The systematic evaluation of their experiences highlighted common themes which in turn led to the development of a novel, theoretical-based, conceptual model. This conceptual model represents complex relationships between protective factors and stress, given that universal resilience interventions seek to target multiple levels of intervention and multiplicative mechanisms of change. Finally, this thesis underscores how the findings of this model can inform future research and practice.

References

Abela, J. R. Z., & Hankin, B. L. (2008). In J. R. Z. Abela, & B. L. Hankin (Eds.), Handbook of depression in children and adolescents (pp. 35-78). New York, USA: Guilford Press.

Abramson, L. Y., Moffitt, T. E., Silva, P. A., McGee, R., & Angell, K. E. (1998). Development of depression from preadolescence to young adulthood: Emerging gender differences in a 10-year longitudinal study. *Journal of Abnormal Psychology, 107*(1), 128.

Abramson, L. Y., Metalsky, G. I., & Alloy, L. B. (1989). Hopelessness depression: A theory-based subtype of depression. *Psychological Review, 96*(2), 358-372.

Abramson, L. Y., Seligman, M. E. P., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87*(1), 49-74.

Ahlen, J., Lenhard, F., & Ghaderi, A. (2015). Universal prevention for anxiety and depressive symptoms in children: A meta-analysis of randomized and cluster-randomized trials. *The Journal of Primary Prevention, 36*(6), 387–403.

Aldao, A., Jazaieri, H., Goldin, P. R., & Gross, J. J. (2014). Adaptive and maladaptive emotion regulation strategies: Interactive effects during CBT for social anxiety disorder. *Journal of Anxiety Disorders, 28*(4), 382-389.

Allison, P. D. (2001). Missing Data. [E-reader Version]. Retrieved from http://dx.doi.org/10.4135/9781412985079

Angst, J., Rössler, W., Ajdacic-Gross, V., Angst, F., Wittchen, H. U., Lieb, R., ... & Andrade, L. H. (2018). Differences between unipolar mania and bipolar-I disorder: Evidence from nine epidemiological studies. *Bipolar disorders*.

Antonovsky, A. (1996). The salutogenic model as a theory to guide health promotion. *Health promotion international, 11*(1), 11-18.

Antonson, C., Thorsén, F., Sundquist, J., & Sundquist, K. (2018). Upper secondary school students' compliance with two Internet-based self-help programmes: a randomised controlled trial. *European child & adolescent psychiatry*, *27*(2), 191-200.

APA, (2014). The road to resilience. Retrieved from http://www.apa.org/helpcenter/road-resilience.aspx

Arbesman, M., Bazyk, S., & Nochajski, S. M. (2013). Systematic review of occupational therapy and mental health promotion, prevention, and intervention for children and youth. *American Journal of Occupational Therapy, 67*(6), 120-130.

Armstrong, R., Waters, E., & Doyle, J. (2008). Reviews in public health and health promotion. In J. P. T. Higgins, & S. Green (Eds.), Cochrane handbook for systematic reviews of interventions Cochrane book series (pp. 593e606). Chichester, UK: Wiley-Blackwell.

Arnaudova, I., Kindt, M., Fanselow, M., & Beckers, T. (2017). Pathways towards the proliferation of avoidance in anxiety and implications for treatment. *Behaviour research and therapy, 96*, 3-13.

Arora, P. G., Baker, C. N., Marchette, L. K., & Stark, K. D. (2017). Components analyses of a school-based cognitive behavioral treatment for youth depression. *Journal of Clinical Child & Adolescent Psychology, 16*, 1–14.

Asselmann, E., Wittchen, H. U., Lieb, R., Perkonigg, A., & Beesdo-Baum, K. (2017). Incident mental disorders in the aftermath of traumatic events: A prospective-longitudinal community study. *Journal of affective disorders, 227*, 82-89.

Auerbach, R. P., Ho, M. H., & Kim, J. C. (2014). Identifying cognitive and interpersonal predictors of adolescent depression. *Journal of Abnormal Child Psychology, 42*, 913-924. http://dx.doi.org/10.1007/s10802-013-9845-6.

Bandura, A. (1997). Self-efficacy: The exercise of control. Macmillan.

Banyard, V., Hamby, S., & Grych, J. (2017). Health effects of adverse childhood events: Identifying promising protective factors at the intersection of mental and physical well-being. *Child abuse & neglect, 65*, 88-98.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology, 51*(6), 1173.

Bastounis, A., Callaghan, P., Lykomitrou, F., Aubeeluck, A., & Michail, M. (2017). Exploring Students' Participation in Universal, Depression and Anxiety, Prevention Programmes at School: A Meta-aggregation. *School Mental Health, 9*(4), 372-385.

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.

Beaudry, M. B., Swartz, K., Miller, L., Schweizer, B., Glazer, K., & Wilcox, H. (2019). Effectiveness of the Adolescent Depression Awareness Program (ADAP) on depression literacy and mental health treatment. *Journal of school health*.

Beck, A. T. (1979). Cognitive therapy and the emotional disorders. New York, USA: Penguin.

Beckers, T., & Craske, M. G. (2017). Avoidance and decision making in anxiety: An introduction to the special issue. *Behaviour research and therapy, 96*, 1.

Benight, C. C., & Bandura, A. (2004). Social cognitive theory of posttraumatic recovery: The role of perceived self-efficacy. *Behaviour research and therapy, 42*(10), 1129-1148.

Benight, C. C. & Cieslak, R. (2011). Cognitive factors and resilience: how self-effi cacy contributes to coping with adversities Resilience in the face of stress: emotion regulation as a protective factorI n S. M. Southwick, B. T. Litz, D. Charney, M. J. Friedman (Eds.). (2011). Resilience and Mental Health: Challenges Across the Lifespan. PP. 45-55

Bertó, C., Ferrin, M., Barberá, M., Livianos, L., Rojo, L., & García-Blanco, A. (2017). Abnormal emotional processing in maltreated children diagnosed of Complex Posttraumatic Stress Disorder. *Child abuse & neglect, 73*, 42-50.

Blakemore, S. J., & Mills, K. L. (2014). Is adolescence a sensitive period for sociocultural processing?. *Annual review of psychology, 65*, 187-207.

Block, J. H., & Block, J. (1980). In W. A. Collins, (Ed.). Development of Cognition, Affect, and Social Relations: The Minnesota Symposia on Child Psychology (Vol. 13). (pp. 39-55). Psychology Press.

Bonanno, G. A. (2004). Loss, trauma, and human resilience: have we underestimated the human capacity to thrive after extremely aversive events? *Am Psychol, 59*(1), 20-28. doi: 10.1037/0003-066X.59.1.20

Bonanno, G. A., & Burton, C. L. (2013). Regulatory flexibility: An individual differences perspective on coping and emotion regulation. *Perspectives on Psychological Science, 8*(6), 591-612.

Bonanno, G. A., & Diminich, E. D. (2013). Annual Research Review: Positive adjustment to adversity--trajectories of minimal-impact resilience and emergent resilience. *J Child Psychol Psychiatry, 54*(4), 378-401. doi: 10.1111/jcpp.12021

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). Introduction to meta-analysis. Chichester, UK: Wiley.

Bos, E. H., Snippe, E., de Jonge, P., & Jeronimus, B. F. (2016). Preserving subjective wellbeing in the face of psychopathology: buffering effects of personal strengths and resources. *PloS one, 11*(3), e0150867.

Bradshaw, C. P., Bottiani, J. H., Osher, D., & Sugai, G. (2013). The Integration of Positive Behavioural Interventions and Supports and Social and Emotional Learning. In M.D. Weist, N. A. Lever, C. P. Bradshaw, & J. S. Owens (Eds.). Handbook of school mental health: Research, training, practice, and policy. Springer Science & Business Media.

Bronfenbrenner, U. (1986). Ecology of the family as a context for human development: Research perspectives. *Developmental psychology, 22*(6), 723.

Browne MW, Cudeck R. Alternative Ways of Assessing Model Fit. In: Bollen K, Long J, editors. Testing Structural Equation Models. Sage; Newbury Park, CA: 1993. pp. 136–162.

Brummelman, E., & Walton, G. M. (2015). "If you want to understand something, try to change it": Social-psychological interventions to cultivate resilience. *Behavioral and Brain Sciences, 38*.

Brunwasser, S. M., & Garber, J. (2016). Programs for the prevention of youth depression: Evaluation of efficacy, effectiveness, and readiness for dissemination. *Journal of Clinical Child & Adolescent Psychology, 45*(6), 763–783.

Brunwasser, S. M., Gillham, J. E., & Kim, E. S. (2009). A meta-analytic review of the Penn resiliency program's effect on depressive symptoms. *Journal of Consulting and Clinical Psychology, 77*, 1042-1054. http://dx.doi.org/10.1037/a0017671.

Calear, A. L., & Christensen, H. (2010). Systematic review of school-based prevention and early intervention programs for depression. *Journal of Adolescence, 33*, 429-438. http://dx.doi.org/10.1016/j.adolescence.2009.07.004.

Calvo, M. G., & Gutierrez-Garcıa, A. (2016). Cognition and Stress. In G. Fink, (Ed.). Stress: Concepts, Cognition, Emotion, and Behavior: Handbook of Stress Series (Vol. 1). Academic Press. PP. 139-145

Carver, C. S. (1998). Resilience and Thriving: Issues, Models and Linkages. *Journal of Social Issues, 54*(2), 245-266.

Carver, C. S. (2014). Optimism. In Encyclopedia of quality of life and well-being research (pp. 4500-4503). Springer, Dordrecht.

Carver, C. S., & Scheier, M. F. (2014). Dispositional optimism. *Trends in cognitive sciences, 18*(6), 293-299.

Carver, C. S., & Scheier, M. F. (2015): Rediscovering confidence as a mechanism and optimism as a construct. [Peer commentary on "A conceptual framework for the neurobiological study of resilience, "by R. Kallisch & M. B. Muller] Behavioural and Brain Sciences, p. 25-26, doi:10.1017/S0140525X1400082X, e92

Freund, M. A. & Staudinger, M. U. (2015). The value of "negative" appraisals for resilience. Is positive (re)appraisal always good and negative always bad? [Peer commentary on "A conceptual framework for the neurobiological study of resilience, "by R. Kallisch & M. B. Muller] Behavioural and Brain Sciences, p. 29-30. doi:10.1017/S0140525X1400082X, e92

Chang, L. J., Reddan, M., Ashar, Y. K., Eisenbarth, H., & Wager, T. D. (2015). The challenges of forecasting resilience. [Peer commentary on "A conceptual framework for the neurobiological study of resilience, "by R. Kallisch & M. B. Muller] Behavioural and Brain Sciences, p.36-37. doi:10.1017/S0140525X1400082X, e92 *Behavioral and Brain Sciences, 38*.

Chaplin, T. M., Gillham, J. E., Reivich, K., Elkon, A. G., Samuels, B., Freres, D. R., et al. (2006). Depression prevention for early adolescent girls: A pilot study of all girls versus co-ed groups. *The Journal of Early Adolescence, 26*(1), 110-126.

Che, D., Hu, J., Zhen, S., Yu, C., Li, B., Chang, X., & Zhang, W. (2017). Dimensions of emotional intelligence and online gaming addiction in adolescence: The indirect effects of two facets of perceived stress. *Frontiers in psychology, 8*, 1206.

Chen, H., Sun, H., & Dai, J. (2017). Peer support and adolescents' physical activity: the mediating roles of self-efficacy and enjoyment. *Journal of pediatric psychology, 42*(5), 569-577.

Chmitorz, A., Kunzler, A., Helmreich, I., Tüscher, O., Kalisch, R., Kubiak, T., ... & Lieb, K. (2017). Intervention studies to foster resilience–A systematic review and proposal for a resilience framework in future intervention studies. *Clinical psychology review*, 1.

Churchill, S., Jessop, D. C., Green, R., & Harris, P. R. (2018). Self-affirmation improves self-control over snacking among participants low in eating self-efficacy. *Appetite, 123*, 264-268.

Cicchetti, D., & Lynch, M. (1993). Toward an ecological/transactional model of community violence and child maltreatment: Consequences for children's development. *Psychiatry, 56*(1), 96-118.

Cicchetti, D., & Schneider-Rosen, K. (1986). An organizational approach to childhood depression. Depression in young people: *Developmental and clinical perspectives,* 71-134.

Clarke, A., Friede, T., Putz, R., Ashdown, J., Martin, S., Blake, A., ... & Stewart-Brown, S. (2011). Warwick-Edinburgh Mental Well-being Scale (WEMWBS): validated for teenage school students in England and Scotland. A mixed methods assessment. *BMC Public Health, 11*(1), 487.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of health and social behavior*, 385-396.

Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the US In S. Spacapam & S. Oskamp (Eds.), The social psychology of health: Claremont symposium on applied social psychology (pp. 31-67).

Cole, D. A., & Maxwell, S. E. (2003). Testing mediational models with longitudinal data: questions and tips in the use of structural equation modeling. *Journal of abnormal psychology, 112*(4), 558.

Contopoulos-Ioannidis, G. D., Gilbody, M. S., Trikalinos, T. A., Churchill, R., Wahlbeck, K., & Ioannidis, J. P. A. (2005). Comparison of large versus smaller randomized trials for mental health-related interventions. *The American Journal of Psychiatry, 162*(3), 578-584.

Cook, C. R., Frye, M., Slemrod, T., Lyon, A. R., Renshaw, T. L., & Zhang, Y. (2015). An integrated approach to universal prevention: Independent and combined effects of PBIS and SEL on youths' mental health. *School Psychology Quarterly, 30*(2), 166.

Coverdale, G. E., & Long, A. F. (2015). Emotional wellbeing and mental health: An exploration into health promotion in young people and families. *Perspectives in Public Health, 135*(1), 27–36.

Daly, B. P., Nicholls, E., Aggrarwall, R., & Sander, M. (2013). Promoting Social Competence and Reducing Behaviour Problems in At-Risk Students: Implementation and Efficacy of Universal and Selective Prevention Programmes in Schools. In M.D. Weist, N. A. Lever, C. P. Bradshaw, & J. S. Owens (Eds.). Handbook of school mental health: Research, training, practice, and policy. Springer Science & Business Media.

Dantzer, R. (2016). Behavior: Overview. In G. Fink, G. (Ed.). Stress: Concepts, Cognition, Emotion, and Behavior: Handbook of Stress Series (Vol. 1). Academic Press. PP 57-63

Davydov, D. M., Stewart, R., Ritchie, K., & Chaudieu, I. (2010). Resilience and mental health. *Clin Psychol Rev, 30*(5), 479-495. doi: 10.1016/j.cpr.2010.03.003

Derdikman-Eiron, R. U. T. H., Indredavik, M. S., Bratberg, G. H., Taraldsen, G., Bakken, I. J., & Colton, M. (2011). Gender differences in subjective well-being, self-esteem and psychosocial functioning in adolescents with symptoms of anxiety and depression: Findings from the Nord-Trøndelag health study. Scandinavian *Journal of Psychology, 52*(3), 261-267.

Deeks, J. J., Higgins, J. R. T., & Altman, D. G. (2008). Analysing data and undertaking meta-analyses. In J. P. T. Higgins, & S. Green (Eds.), Cochrane handbook for systematic reviews of interventions Cochrane book series (pp. 244-296). Chichester, UK: Wiley-Blackwell.

De Loach McCutcheon, K., George, W. M., Mancil, E., Taylor, K. L., Paternite, C., & Weist, D. M. (2014). Partnering with youth in school mental health: Recommendations from students. In M. D. Weist, N. A.

Lever, P. C. Bradshaw, & J. S. Owens (Eds.), Handbook of school mental health, research, training, practice, and policy (pp. 185–193). New York: Springer.

Desatnik, A., Bel-Bahar, T., Nolte, T., Crowley, M., Fonagy, P., & Fearon, P. (2017). Emotion regulation in adolescents: An ERP study. *Biological psychology, 12*9, 52-61.

Department of Health and Department of Education, (2017). Transforming Children and Young People's Mental Health Provision: a Green Paper. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664855/Transforming_children_and_young_people_s_mental_health_provision.pdf

Desrosiers, A., Vine, V., Klemanski, D. H., & Nolen-Hoeksema, S. (2013). Mindfulness and emotion regulation in depression and anxiety: common and distinct mechanisms of action. *Depression and anxiety*, *30*(7), 654-661.

Dray, J., Bowman, J., Campbell, E., Freund, M., Wolfenden, L., Hodder, R. K., ... & Small, T. (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*.

Duits, P., Cath, D. C., Lissek, S., Hox, J. J., Hamm, A. O., Engelhard, I. M., ... & Baas, J. M. (2015). Updated meta-analysis of classical fear conditioning in the anxiety disorders. *Depression and anxiety*, *32*(4), 239-253.

Dunsmoor JE, Paz R. Fear generalization and anxiety: behavioral and neural mechanisms. *Biological Psychiatry* 2015; 78: 336–43.

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development, 82*, 405-432. http://dx.doi.org/10.1111/j.1467-8624.2010.01564.

Egger M, Smith, GD., Schneider, M., & Minder, C. (1997) Bias in metaanalysis detected by a simple, graphical test. *BMJ 315*(7109):629– 634. https://doi.org/10.1136/bmj.315.7109.629

Elias, M. J., Zins, J. E., Weissberg, R. P., Frey, K. S., Greenberg, M. T., Haynes, N. M. et al. (1997). Promoting social and emotional learning: Guidelines for educators. Alexandria, VA: Association for Supervision and Curriculum Development

Eisenberg, N., Hofer, C., Sulik, M. J., & Spinrad, T. L. (2014). Self-regulation, effortful control, and their socioemotional correlates.

Eisenberg, N., Spinrad, T. L., & Eggum, N. D. (2010). Emotion-related self-regulation and its relation to children's maladjustment. *Annual review of clinical psychology, 6*, 495-525.

Elhai, J. D., Hall, B. J., & Erwin, M. C. (2018). Emotion regulation's relationships with depression, anxiety and stress due to imagined smartphone and social media loss. *Psychiatry research, 261*, 28-34.

Ellis, A. (1962). Reason and emotion in psychotherapy. Oxford, UK: Lyle Stuart.

Enders, C. K. (2010). Applied missing data analysis. Guilford press.

Enders, C. K., Fairchild, A. J., & MacKinnon, D. P. (2013). A Bayesian approach for estimating mediation effects with missing data. *Multivariate behavioral research, 48*(3), 340-369.

Enns, J., Holmqvist, M., Wener, P., Halas, G., Rothney, J., Schultz, A., et al. (2016). Mapping interventions that promote mental health in the general population: A scoping review of reviews. *Preventive Medicine, 87*, 70-80. http://dx.doi.org/10.1016/j.ypmed.2016.02.022.

Extremera, N., Quintana-Orts, C., Mérida-López, S., & Rey, L. (2018). Cyberbullying victimization, self-esteem and suicidal ideation in adolescence: does emotional intelligence play a buffering role?. *Frontiers in psychology, 9*, 367.

Farrell, L. J., & Barrett, P. M. (2007). Prevention of childhood emotional disorders: Reducing the burden of suffering associated with anxiety and depression. *Child and Adolescent Mental Health, 12*(2), 58–65. https://doi.org/10.1111/j.1475-3588.2006.00430.x.

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*, 388e398. http://dx.doi.org/10.1016/s2215-0366(14)70357-8.

Feder, A., Haglund, M., Wu, G., Southwick, S. M., & Charney, D. S. (2013). The neurobiology of resilience. In D. S. Charney, J. D. Buxbaum, P. Sklar, & E. J. Nestler (Eds.), Neurobiology of mental illness (pp. 1144-1170). New York, NY, US: Oxford University Press.

Ferrer, R. A., Green, P. A., Oh, A. Y., Hennessy, E., & Dwyer, L. A. (2017). Emotion suppression, emotional eating, and eating behavior among parent–adolescent dyads. *Emotion, 17*(7), 1052.

Field, A. (2005). Discovering statistics using SPSS (2005) London. England: SAGE.

Fink, E., Patalay, P., Sharpe, H., Holley, S., Deighton, J., & Wolpert, M. (2015). Mental health difficulties in early adolescence: A comparison of two crosssectional studies in England from 2009 to 2014. *Journal of Adolescent Health, 56*, 502e507. http://dx.doi.org/10.1016/j.jadohealth.2015.01.023.

Finlon, K. J., Izard, C. E., Seidenfeld, A., Johnson, S. R., Cavadel, E. W., Ewing, E. S. K., & Morgan, J. K. (2015). Emotion-based preventive intervention: Effectively promoting emotion knowledge and adaptive behavior among at-risk preschoolers. *Development and psychopathology, 27*(41), 1353-1365.

Fisak, B. J., Jr., Richard, D., & Mann, A. (2011). The prevention of child and adolescent anxiety: A meta-analytic review. *Prevention Science, 12*, 255-268. http:// dx.doi.org/10.1007/s11121-011-0210-0.

Folkman, S., & Moskowitz, J. T. (2004). Coping: Pitfalls and promise. Annu. Rev. Psychol., 55, 745-774.

Folkman, S., & Moskowitz, J. T. (2000). Positive affect and the other side of coping. *American psychologist, 55*(6), 647.

Ford, B. Q., Lwi, S. J., Gentzler, A. L., Hankin, B., & Mauss, I. B. (2018). The cost of believing emotions are uncontrollable: Youths' beliefs about emotion predict emotion regulation and depressive symptoms. *Journal of Experimental Psychology: General, 147*(8), 1170.

Fox, K. J., Harris, P. R., & Jessop, D. C. (2017). Experimentally manipulated self-affirmation promotes reduced alcohol consumption in response to narrative information. *Annals of Behavioral Medicine, 51*(6), 931-935.

Fredrickson, B. L. (2004). The broaden-and-build theory of positive emotions. Philosophical Transactions of the Royal Society B: *Biological Sciences, 359*(1449), 1367.

Fredrickson, B. L., & Branigan, C. (2005). Positive emotions broaden the scope of attention and thought-action repertoires. *Cognition & emotion, 19*(3), 313-332.

Fredrickson, B. L., & Joiner, T. (2002). Positive emotions trigger upward spirals toward emotional well-being. *Psychological science, 13*(2), 172-175.

Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological science, 18*(3), 233-239.

Garber, J., Brunwasser, S. M., Zerr, A. A., Schwartz, K. T., Sova, K., & Weersing, V. R. (2016). Treatment and prevention of depression and anxiety in youth: Test of cross-over effects. *Depression and Anxiety, 33*(10), 939–959.

Garmezy, N. (1985). Stress-resistant children: The search for protective factors. *Recent research in developmental psychopathology, 4*, 213-233.

Garmy, P., Berg, A., & Clausson, E. K. (2015). A qualitative study exploring adolescents' experiences with a school-based mental health program. *BMC Public Health, 15*(1), 1074.

Garnefski, N., Legerstee, J., Kraaij, V., Kommer, T. V. D., & Teerds, J. A. N. (2002). Cognitive coping strategies and symptoms of depression and anxiety: a comparison between adolescents and adults. *Journal of adolescence, 25*, 9.

Gillham, J. E., Brunwasser, S. M., & Freres, D. R. (2008). Preventing depression in early adolescence: The Penn resiliency program. In J. R. Z. Abela, & B. L. Hankin (Eds.), Handbook of depression in children and adolescents (pp. 309-333). New York, USA: Guilford Press.

Gillham, J. E., & Reivich, K. (2004). Cultivating optimism in childhood and adolescence. *The Annals of the American Academy of Political and Social Science, 591*,146-163. http://dx.doi.org/10.1177/0002716203260095.

Gillham, J. E., Reivich, K. J., Freres, D. R., Chaplin, T. M., Shatte, A. J., Samuels, B., et al. (2007). School-based prevention of depressive symptoms: A randomized controlled study of the effectiveness and specificity of the Penn Resiliency program. *Journal of Consulting and Clinical Psychology, 75*(1), 9-19.

Gillham, J. E., Reivich, K. J., Jaycox, L. H., & Seligman, M. E. (1995). Prevention of depressive symptoms in schoolchildren: Two-year follow-up. *Psychological science, 6*(6), 343-351.

Glantz, M. D., & Sloboda, Z. (2002). Analysis and reconceptualization of resilience. M. D. Glantz, D. ,Meyer, & Z. Sloboda. In Resilience and development (pp. 109-126). Springer, Boston, MA.

Goodman, R. (2001). Psychometric properties of the strengths and difficulties questionnaire. *Journal of the American Academy of Child & Adolescent Psychiatry, 40*(11), 1337-1345.

Goodman, R. (1997). The Strengths and Difficulties Questionnaire: a research note. *Journal of child psychology and psychiatry, 38*(5), 581-586.

Goodman, R., Ford, T., Simmons, H., Gatward, R., & Meltzer, H. (2000). Using the Strengths and Difficulties Questionnaire (SDQ) to screen for child psychiatric disorders in a community sample. *The British Journal of Psychiatry, 177*(6), 534-539.

Gore, F. M., Bloem, P. J., Patton, G. C., Ferguson, J., Joseph, V., Coffey, C., et al. (2011). Global burden of disease in young people aged 10–24 years: A systematic analysis. *The Lancet, 377*(9783), 2093–2102.

Grecucci, A. & Sanfey, G. A. (2014). Emotion Regulation and Decision-Making. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 3-20). New York, NY, US: Guilford Press.

Greenberg, M. T., Weissberg, R. P., O'brien, M. U., Zins, J. E., Fredericks, L., Resnik, H., et al. (2003). Enhancing school-based prevention and youth development through coordinated social, emotional, and academic learning. *American Psychologist, 58*(6–7), 466.

Gross, J. J. (2014). Emotion regulation: Conceptual and empirical foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 3-20). New York, NY, US: Guilford Press.

Gross, J. J. (1999). Emotion and emotion regulation. Handbook of personality: *Theory and research, 2*, 525-552.

Gross, J. J. (1998). The emerging field of emotion regulation: an integrative review. *Review of general psychology, 2(*3), 271.

Grubbs, K. M., Cheney, A. M., Fortney, J. C., Edlund, C., Han, X., Dubbert, P., ... & Sullivan, J. G. (2015). The role of gender in moderating treatment outcome in collaborative care for anxiety. *Psychiatric Services, 66*(3), 265-271.

Gullone, E., & Taffe, J. (2012). The Emotion Regulation Questionnaire for Children and Adolescents (ERQ–CA): A psychometric evaluation. *Psychological assessment, 24*(2), 409.

Guyatt, G. H., Oxman, A. D., Vist, G. E., Kunz, R., Falck-Ytter, Y., Alonso-Coello, P., et al. (2008). GRADE: An emerging consensus on rating quality of evidence and strength of recommendations. *The BMJ, 336*, 924-926. http://dx.doi.org/10.1136/bmj.39489.470347.

Hamilton, K., Warner, L. M., & Schwarzer, R. (2017). The role of self-efficacy and friend support on adolescent vigorous physical activity. *Health Education & Behavior, 44*(1), 175-181.

Hankin, B. L., Abramson, L. Y., Moffitt, T. E., Silva, P. A., McGee, R., & Angell, K. E. (1998). Development of depression from preadolescence to young adulthood: Emerging gender differences in a 10-year longitudinal study. *Journal of Abnormal Psychology, 107*(1), 128.

Hannes, K., & Pearson, A. (2012). Obstacles to the implementation of evidence-based practice in Belgium: A worked example of meta-aggregation. In K. Hannes & C. Lockwood (Eds.), Synthesizing qualitative research: Choosing the right approach (pp. 21–40). New York: Wiley.

Hart, A., & Heaver, B. (2013). Evaluating resilience-based programs for schools using a systematic consultative review. *Journal of Child and Youth Development, 1*(1), 27-53.

Hayes, Andrew F. (2013). Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach. New York, NY: The Guilford Press

Heleniak, C., Jenness, J. L., Vander Stoep, A., McCauley, E., & McLaughlin, K. A. (2016). Childhood maltreatment exposure and disruptions in emotion regulation: A transdiagnostic pathway to adolescent internalizing and externalizing psychopathology. *Cognitive therapy and research, 40*(3), 394-415.

Hetrick, S. E., Cox, G. R., Fisher, C. A., Bhar, S. S., Rice, S. M., Davey, C. G., et al. (2015a). Back to basics: could behavioural therapy be a good treatment option for youth depression? A critical review. *Early Intervention in Psychiatry, 9*(2), 93–99.

Hetrick, S. E., Cox, G., & Merry, S. (2015b). Where to go from here? An exploratory meta-analysis of the most promising approaches to depression prevention programs for children and adolescents. *International Journal of Environmental Research Public Health, 12*(5), 4758.

Hetrick, S. E., Cox, G. R., Witt, K. G., Bir, J. J., & Merry, S. N. (2016). Cognitive behavioural therapy (CBT), third-wave CBT and interpersonal therapy (IPT) based interventions for preventing depression in children and adolescents. The Cochrane Library.

Higgins, J. P. T., & Altman, D. G. (2008). Assessing risk of bias in included studies. In J. P. T. Higgins, & S. Green (Eds.), Cochrane handbook for systematic reviews of interventions Cochrane book series (pp. 188-242). Chichester, UK: Wiley-Blackwell.

Higgins, J. P. T., Altman, D. G., Gotzsche, P. C., Juni, P., Moher, D., & Oxman, A. D. (2011). The Cochrane collaboration's tool for assessing risk of bias in randomised trials. *The BMJ, 343*. http://dx.doi.org/10.1136/bmj.d5928.

Higgins, J. R. T., Deeks, J. J., & Altman, D. G. (2008). Special topics in statistics. In J. P. T. Higgins, & S. Green (Eds.), Cochrane handbook for systematic reviews of interventions Cochrane book series (pp. 493-497). Chichester, UK: Wiley-Blackwell.

Hoagwood, K. E., Serene Olin, S., Kerker, B. D., Kratochwill, T. R., Crowe, M., & Saka, N. (2007). Empirically based school interventions targeted at academic and mental health functioning. *Journal of Emotional and Behavioral Disorders, 15*(2), 66-92.

Holmes, E. A., Ghaderi, A., Harmer, C. J., Ramchandani, P. G., Cuijpers, P., Morrison, A. P., ... & Moulds, M. L. (2018). The Lancet Psychiatry Commission on psychological treatments research in tomorrow's science. *The Lancet Psychiatry, 5*(3), 237-286.

Horowitz, J. L., & Garber, J. (2006). The prevention of depressive symptoms in children and adolescents: A meta-analytic review. *Journal of Consulting and Clinical Psychology, 74*, 401-415. http://dx.doi.org/10.1037/0022-006X.74.3.401.

Horowitz, J. L., Garber, J., Ciesla, J. A., Young, J. F., & Mufson, L. (2007). Prevention of depressive symptoms in adolescents: A randomized trial of cognitive behavioral and interpersonal prevention programs. *Journal of Consulting and Clinical Psychology, 75*(5), 693-706.

Howell, D. C. (2012). Statistical methods for psychology. Cengage Learning.

Huppert, F. (2014). The State of Wellbeing Science: Concepts, Measures, Interventions, and Policies. In F. Huppert & C. L. Cooper. (Eds.). Interventions and Policies to Enhance Wellbeing: A Complete Reference Guide, (Volume VI) John Wiley & Sons: UK

Huppert, F. A., & So, T. T. (2013). Flourishing across Europe: Application of a new conceptual framework for defining well-being. *Social indicators research, 110*(3), 837-861.

Ialongo, N., Poduska, J., Werthamer, L., & Kellam, S. (2001). The distal impact of two first-grade preventive interventions on conduct problems and disorder in early adolescence. *Journal of Emotional & Behavioral Disorders, 9,* 146–161.

Jackson, N., Waters, E., Guidelines for Systematic Reviews in Health, P., & Public Health, T. (2005). Criteria for the systematic review of health promotion and public health interventions. *Health Promotion International, 20*, 367-374. http://dx.doi.org/10.1093/heapro/dai022.

Jané-Llopis, E., Anderson, P., & Herrman, H. (2014). Mental health and wellbeing at the top of the global agenda. Wellbeing: A complete reference guide, 1-12.

Jaycox, L. H., Reivich, K. J., Gillham, J. E., & Seligman, M. E. (1994). Prevention of depressive symptoms in school children. *Behavior Research and Therapy, 32*(8), 801-816.

Joanna Briggs Institute. (2014). Joanna Briggs Institute reviewers' manual 2014 edition [Internet]. Adelaide: JBI [cited 2015 May 15].

John, A., Glendenning, A. C., Marchant, A., Montgomery, P., Stewart, A., Wood, S., ... & Hawton, K. (2018). Self-harm, suicidal behaviours, and cyberbullying in children and young people: systematic review. *Journal of medical internet research, 20*(4).

Jones, P. B. (2013). Adult mental health disorders and their age at onset. *The British Journal of Psychiatry, 54*, 5-10. http://dx.doi.org/10.1192/bjp.bp.112. 119164.

Jones, S. M., Brown, J. L., & Lawrence Aber, J. (2011). Two-year impacts of a universal school-based social-emotional and literacy intervention: An experiment in translational developmental research. *Child Development, 82*, 533-554. http://dx.doi.org/10.1111/j.1467-8624.2010.01560.

Joseph, J. (2013). Resilience as embedded neoliberalism: a governmentality approach. *Resilience, 1*(1), 38-52.

Juslin, P. N. (2015). Resilience: Mediated by not one but many appraisal mechanisms. [Peer commentary on "A conceptual framework for the neurobiological study of resilience, "by R. Kallisch & M. B. Muller], *Behavioral and Brain Sciences*, 33-34.

Kalisch, R. (2009). The functional neuroanatomy of reappraisal: time matters. *Neuroscience & Biobehavioral Reviews, 33*(8), 1215-1226.

Kalisch, R., Baker, D. G., Basten, U., Boks, M. P., Bonanno, G. A., Brummelman, E., ... & Geuze, E. (2017). The resilience framework as a strategy to combat stress-related disorders. *Nature human behaviour, 1*(11), 784.

Kalisch, R., Müller, M. B., & Tüscher, O. (2015). A conceptual framework for the neurobiological study of resilience. *Behavioral and Brain Sciences*, 38.

Kaplan, H. B. (2002). Toward an understanding of resilience. M. D. Glantz & L. J. Johnson (Ed.). In Resilience and development (pp. 17-83). Springer, Boston, MA.

Karatsoreos, I. N., & McEwen, B. S. (2013). Annual research review: The neurobiology and physiology of resilience and adaptation across the life course. *Journal of Child Psychology and Psychiatry, 54*(4), 337-347.

Kessler, R. C., Avenevoli, S., & Ries Merikangas, K. (2001). Mood disorders in children and adolescents: An epidemiologic perspective. *Biological Psychiatry,49*(12), 1002-1014.

Kessler, R. C., Petukhova, M., Sampson, N. A., Zaslavsky, A. M., & Wittchen, H. U. (2012). Twelve-month and lifetime prevalence and lifetime morbid risk of anxiety and mood disorders in the United States. *International journal of methods in psychiatric research, 21*(3), 169-184.

Keyes, C. L. (2013). Promoting and protecting positive mental health: Early and often throughout the lifespan. In Mental well-being (pp. 3-28). Springer, Dordrecht.

Keyes, C. L. (2007). Promoting and protecting mental health as flourishing: A complementary strategy for improving national mental health. *American psychologist, 62*(2), 95.

Kieling, C., Baker-Henningham, H., Belfer, M., Conti, G., Ertem, I., Omigbodun, O., et al. (2011). Child and adolescent mental health worldwide: Evidence for action. *Lancet Infectious Diseases, 378*, 1515-1525. http://dx.doi.org/10.1016/S0140-6736(11)60827-1.

Kindt, K. C., Kleinjan, M., Janssens, J. M., & Scholte, R. H. (2014). Evaluation of a school-based depression prevention program among adolescents from low income areas: A randomized controlled effectiveness trial. *International Journal of Environmental Research and Public Health*, *11*(5), 5273-5293.

King, M. F., & Bruner, G. C. (2000). Social desirability bias: A neglected aspect of validity testing. *Psychology & Marketing*, *17*(2), 79-103.

Kline, R. B. (2016). Principles and practice of structural equation modeling. (4th Ed). Guilford publications.

Koole, S. L., Schwager, S., & Rothermund, K. (2015). Resilience is more about being flexible than about staying positive. [Peer commentary on "A conceptual framework for the neurobiological study of resilience, "by R. Kallisch & M. B. Muller], *Behavioral and Brain Sciences,Behavioral and Brain Sciences*, 38-39.

Kovacs, M. (1985). The children's depression, inventory (CDI). Psychopharmacology Bulletin, 21(4), 995-998.

Kraag, G., Zeegers, M. P., Kok, G., Hosman, C., & Abu-Saad, H. H. (2006). School programs targeting stress management in children and adolescents: A meta-analysis. *Journal of School Psychology, 44*, 449e472. http://dx.doi.org/10.1016/j.jsp.2006.07.001.

Krull, J. L., Cheong, J. W., Fritz, M. S., & MacKinnon, P. D. (2016). In D. Cicchetti, D. (Ed.3). *Developmental psychopathology, theory and method* (Vol. 1). John Wiley & Sons. 922-975

Krumpfer, L. K. (1999). Factors and Processes Contributing to Resilience: The Resilience Framework. In M. D. Glantz, & J. L. Johnson (Ed.). *Resilience and Development: Positive Life Adaptations*. (pp. 179-224). Kluwer Publishing: NY

Kudinova, A. Y., James, K., & Gibb, B. E. (2017). Cognitive reappraisal and depression in children with a parent history of depression. *Journal of abnormal child psychology*, 1-8.

Kumpfer, K. L. (2002). Factors and processes contributing to resilience. In Resilience and development (pp. 179-224). Springer, Boston, MA.

Kvist Lindholm, S., & Zetterqvist Nelson, K. (2015). "Apparently I've Got Low Self-Esteem": Schoolgirls' perspectives on a schoolbased public health intervention. *Children and Society*, *29*(5), 473–483.

Lakdawalla, Z., Hankin, B. L., & Mermelstein, R. (2007). Cognitive theories of depression in children and adolescents: A conceptual and quantitative review. *Clinical Child and Family Psychology Review*, *10*(1), 1-24.

Langley, A. K., Nadeem, E., Kataoka, S. H., Stein, B. D., & Jaycox, L. H. (2010). Evidence-based mental health programs in schools: Barriers and facilitators of successful implementation. *School Mental Health, 2*(3), 105–113.

Laschinger, H. K. S., Borgogni, L., Consiglio, C., & Read, E. (2015). The effects of authentic leadership, six areas of worklife, and occupational coping self-efficacy on new graduate nurses' burnout and mental health: A cross-sectional study. *International journal of nursing studies, 52*(6), 1080-1089.

Laurent, J., Catanzaro, S. J., Joiner Jr, T. E., Rudolph, K. D., Potter, K. I., Lambert, S., ... & Gathright, T. (1999). A measure of positive and negative affect for children: scale development and preliminary validation. *Psychological assessment, 11*(3), 326.

Lazarus, R. S. (1999). The cognition-emotion debate: A bit of history. *Handbook of cognition and emotion, 5*(6), 3-19.

Lazarus, R. C., & Folkman, S. (1984). STRESS, APPRAISAL, AND COPING. New York, NY: Springer Publishing Company, Inc.

Lebowitz, E. R., Leckman, J. F., Silverman, W. K., & Feldman, R. (2016). Cross-generational influences on childhood anxiety disorders: pathways and mechanisms. *Journal of Neural Transmission, 123*(9), 1053-1067.

Lebowitz, E. R., Shic, F., Campbell, D., MacLeod, J., & Silverman, W. K. (2015). Avoidance moderates the associations between mothers' and children's fears: findings from a novel motion-tracking behavioral assessment. *Depression and anxiety, 32*(2), 91-98.

Lewin, S., Glenton, C., & Oxman, A. D. (2009). Use of qualitative methods alongside randomised controlled trials of complex healthcare interventions: methodological study. *BMJ*, 339, 3496.

Lewitus, G. M., & Schwartz, M. (2009). Behavioral immunization: immunity to self-antigens contributes to psychological stress resilience. *Mol Psychiatry, 14*(5), 532-536. doi: 10.1038/mp.2008.103

Lewinsohn, P. M., Gotlib, I. H., Lewinsohn, M., Seeley, J. R., & Allen, N. B. (1998). Gender differences in anxiety disorders and anxiety symptoms in adolescents. *Journal of abnormal psychology, 107*(1), 109.

Li, C. (2013). Little's test of missing completely at random. The Stata Journal, 13(4), 795-809.

Li, Y., Xu, Y., & Chen, Z. (2015). Effects of the behavioral inhibition system (BIS), behavioral activation system (BAS), and emotion regulation on depression: A one-year follow-up study in Chinese adolescents. *Psychiatry research, 230*(2), 287-293.

Little, T. D., Lang, K. M., Wu, W., & Rhemtulla, M. (2016). Missing data. In D. Cicchetti, D. (Ed.3). Developmental psychopathology, theory and method (Vol. 1). John Wiley & Sons. Developmental psychopathology, 760-796.

Lockwood, C., Munn, Z., & Porritt, K. (2015). Qualitative research synthesis: Methodological guidance for systematic reviewers utilizing meta-aggregation. *International Journal of Evidence-Based Healthcare, 13*(3), 179–187.

López-Pérez, B. (2018). Should I just listen to you or change your mind too? Target's perceived efficacy of agents' interpersonal affect improvement strategies. *British Journal of Psychology, 109*(2), 341-361.

Loton, D. J., & Waters, L. E. (2017). The Mediating Effect of Self-Efficacy in the Connections between Strength-Based Parenting, Happiness and Psychological Distress in Teens. *Frontiers in psychology, 8*, 1707.

Luecken, L. J., & Roubinov, D. S. (2012). Pathways to lifespan health following childhood parental death. *Social and Personality Psychology Compass, 6*(3), 243–257.

Luerssen, A., & Ayduk, O. (2014). The role of emotion and emotion-regulation in the ability to delay gratification. In Gross. (Ed.) Handbook of emotion regulation, 111-125.

Luthar, S. S. (1993). Annotation: Methodological and Conceptual Issues in Research on Childhood Resilience. *Journal of Child Psychology and Psychiatry, 34*(4), 441-453.

Luthar, S. S., & Cicchetti, D. (2000a). The construct of resilience: Implications for interventions and social policies. *Developmental Psychopathology*, 12.

Luthar, S. S., Cicchetti, D., & Becker, B. (2000b). Research on Resilience: Response to Commentaries. *Child Dev, 71*(3), 573-575.

Luthar, S. S., Sawyer, J. A., & Brown, P. J. (2006). Conceptual issues in studies of resilience: past, present, and future research. *Ann N Y Acad Sci, 1094*, 105-115. doi: 10.1196/annals.1376.009

MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annu. Rev. Psychol., 58*, 593-614.

Macklem, G. L. (2014). Preventive mental health at school: Evidence based services for students (pp. 1–16). Newton, Massachusetts: Springer.

Masten, A. S. (2014a). Global perspectives on resilience in children and youth. *Child Dev, 85*(1), 6-20. doi: 10.1111/cdev.12205

Masten, A. S. (2014b). Invited commentary: Resilience and positive youth development frameworks in developmental science. *J Youth Adolesc, 43*(6), 1018-1024. doi: 10.1007/s10964-014-0118-7

Masten, A. S. (2014c). ORDINARY MAGIC. Resilience in Development. New York, NY: Gilford Press.

Masten, A. S. (2013). Risk and resilience in development. In P. D. Zelazo (Ed.), Oxford library of psychology. The Oxford handbook of developmental psychology, Vol. 2. Self and other (pp. 579-607). New York, NY, US: Oxford University Press.

Masten, A. S. (2011). Resilience in children threatened by extreme adversity: frameworks for research, practice, and translational synergy. *Dev Psychopathol, 23*(2), 493-506. doi: 10.1017/S0954579411000198

Masten, A. S., Best, K. M., & Garmezy, N. (1990). Resilience and development: Contributions from the study of children who overcome adversity. *Development and psychopathology, 2*(4), 425-444.

Masten, A. S., & Coatsworth, J. D. (1998). The Development of Competence in Favorable and Unfavorable Environments Lessons From Research on Successful Children. *American Psychologist, 53*(2), 205-220.

Masten, A. S., & Powell, J. L. (2003). A Resilience Framework for Research, Policy and Practice. In S. S. Luthar (Eds.), Resilience and Vulnerability: Adaptation in the Context of Childhood Adversities (pp. 1-26). New York: Cambridge University Press. http://dx.doi.org/10.1017/CBO9780511615788.003

Masten, A. S., & Reed, M. G. J. (2002). In S. J. Lopez & C. R. Snyder (Eds.) *Resilience in development. The Oxford Handbook of Positive Psychology*, 74-88. Oxford University Press: NY

Masten, A. S., Monn, A. R., & Supkoff, L. M. (2011). Responding to challenges across the lifespan. In Southwick, S. M., Litz, B. T., Charney, D., & edited, M. J. F. (Ed.). *Resilience and Mental Health: Challenges Across the Lifespan*. Cambridge University Press, New York.

Masten, A. S., & Narayan, A. J. (2012). Child development in the context of disaster, war, and terrorism: Pathways of risk and resilience. *Annual review of psychology, 63*.

Masten, A. S., & Wright, M. O. (2010). Resilience over the lifespan: Developmental perspectives on resistance, recovery, and transformation (pp. 213–237). New York, NY: Guilford.

Masten, A. S., & Obradovic, J. (2006). Competence and resilience in development. *Ann N Y Acad Sci, 1094*, 13-27. doi: 10.1196/annals.1376.003

Masten, A. S., & Obradovic, J. (2008). Disaster Preparation and Recovery: Lessons from Research on *Resilience in Human Development. Ecology and Society, 13*(9).

Matson, J. L., Rotatori, A. F., & Helsel, W. J. (1983). Development of a rating scale to measure social skills in children: The Matson Evaluation of Social Skills with Youngsters (MESSY). *Behavior Research and Therapy, 21*(4), 335-340.

Matthews, T., Danese, A., Wertz, J., Odgers, C. L., Ambler, A., Moffitt, T. E., & Arseneault, L. (2016). Social isolation, loneliness and depression in young adulthood: a behavioural genetic analysis. *Social psychiatry and psychiatric epidemiology, 51*(3), 339-348.

Mayorga, N. A., Jardin, C., Bakhshaie, J., Garey, L., Viana, A. G., Cardoso, J. B., & Zvolensky, M. (2018). Acculturative stress, emotion regulation, and affective symptomology among Latino/a college students. *Journal of counseling psychology, 65*(2), 247.

McCrone, P. R., Dhanasiri, S., Patel, A., Knapp, M., & Lawton-Smith, S. (2008). Paying the price: the cost of mental health care in England to 2026. King's Fund.

McCrory, E., De Brito, S. A., & Viding, E. (2012). The link between child abuse and psychopathology: a review of neurobiological and genetic research. *Journal of the Royal Society of Medicine, 105*(4), 151-156.

McEwen, B. S. (1998). Stress, adaptation, and disease: Allostasis and allostatic load. *Annals of the New York academy of sciences, 840*(1), 33-44.

McGlumphy, K. C., Shaver, E. R., Ajibewa, T. A., & Hasson, R. E. (2018). Perceived stress predicts lower physical activity in African-American boys, but not girls. *American journal of health behavior, 42*(2), 93-105.

McLaughlin, K. A., & King, K. (2015). Developmental trajectories of anxiety and depression in early adolescence. *Journal of Abnormal Child Psychology, 43*(2), 311–323.

Merikangas, K. R., He, J. P., Burstein, M., Swendsen, J., Avenevoli, S., Case, B., ... & Olfson, M. (2011). Service utilization for lifetime mental disorders in US adolescents: results of the National Comorbidity Survey–Adolescent Supplement (NCS-A). *Journal of the American Academy of Child & Adolescent Psychiatry, 50*(1), 32-45.

Merikangas, K. R., He, J. P., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., et al. (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 and Adolescent Psychiatry, 49*, 980-989. http://dx.doi.org/10.1016/j.jaac.2010.05.017.

Merry, S. N., Hetrick, S. E., Cox, G. R., Brudevold-Iversen, T., Bir, J. J., & McDowell, H. (2012). Cochrane review: Psychological and educational interventions for preventing depression in children and adolescents. Evidence-Based Child Health: *A Cochrane Review Journal, 7*, 1409-1685. http://dx.doi.org/10.1002/ebch.1867.

Mo, P. K., Chan, V. W., Chan, S. W., & Lau, J. T. (2018). The role of social support on emotion dysregulation and Internet addiction among Chinese adolescents: A structural equation model. *Addictive behaviors, 82*, 86-93.

Modecki, K. L., Zimmer-Gembeck, M. J., & Guerra, N. (2017). Emotion regulation, coping, and decision making: Three linked skills for preventing externalizing problems in adolescence. *Child Development, 88*(2), 417–426.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Annals of Internal Medicine, 151*(4), 264-269.

Moore, G. F., Audrey, S., Barker, M., Bond, L., Bonell, C., Hardeman, W., et al. (2015). Process evaluation of complex interventions: Medical Research Council guidance. *BMJ*, 350, h1258.

Moore, K. A., Lippman, L., & Brown, B. (2004). Indicators of child well-being: The promise for positive youth development. *The Annals of the American Academy of Political and Social Science, 591*(1), 125-145.

Mufson, L., Dorta, K. P., Moreau, D., & Weissman, M. M. (2011). Interpersonal psychotherapy for depressed adolescents. New York: Guilford Press.

Munn, Z., Porritt, K., Lockwood, C., Aromataris, E., & Pearson, A. (2014). Establishing confidence in the output of qualitative research synthesis: the ConQual approach. *BMC Medical Research Methodology, 14*(1), 108.

Muris, P. (2001). A brief questionnaire for measuring self-efficacy in youths. *Journal of Psychopathology and behavioral Assessment, 23*(3), 145-149.

Neacsiu, D. A., Bohus, M., & Linehan, M. M. (2014). Dialectical Behavior Therapy: An Intervention for Emotion Dysregulation. In In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 3-20). New York, NY, US: Guilford Press.

Neil, A. L., & Christensen, H. (2009). Efficacy and effectiveness of school-based prevention and early intervention programs for anxiety. *Clinical Psychology Review, 29*, 208-215. http://dx.doi.org/10.1016/j.cpr.2009.01.002.

NHS England, (2013). Future in mind Promoting, protecting and improving our children and young people's mental health and wellbeing. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/414024/Childrens_Mental_Health.pdf

Nolen-Hoeksema, S. (2001). Gender differences in depression. *Current Directions in Psychological Science, 10*(5), 173–176.

Nolen-Hoeksema, S., & Aldao, A. (2011). Gender and age differences in emotion regulation strategies and their relationship to depressive symptoms. *Personality and individual differences, 51*(6), 704-708.

Nolen-Hoeksema, S., Girgus, S. J., & Seligman, M. E. (1992). Predictors and consequences of childhood depressive symptoms: A 5-year longitudinal study. *Journal of Abnormal Psychology, 101*(3), 405-422.

Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *Am J Community Psychol, 41*(1-2), 127-150. doi: 10.1007/s10464-007-9156-6

NVivo. (2012). Qualitative data analysis Software. QSR International Pty Ltd. Version 10.

Offord, D. R., Kraemer, H. C., Kazdin, A. E., Jensen, P. S., & Harrington, R. (1998). Lowering the burden of suffering from child psychiatric disorder: Trade-offs among clinical, targeted, and universal interventions. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*(7), 686-694.

Patel, V. & Anna Goodman, A. (2007). Researching protective and promotive factors in mental health. *International Journal of Epidemiology, 36*(4), 703 707, https://doi.org/10.1093/ije/dym147

O'Connor, D., Green, S., & Higgins, J. P. T. (2008). Defining the review question and developing criteria for including studies. In J. P. T. Higgins, & S. Green (Eds.), Cochrane handbook for systematic reviews of interventions Cochrane book series (pp. 188-242). Chichester, UK: Wiley-Blackwell.

Okado, Y., & Bierman, K. L. (2015). Differential risk for late adolescent conduct problems and mood dysregulation among children with early externalizing behavior problems. *Journal of abnormal child psychology, 43*(4), 735-747.

Ortner, C. N. M., Briner, E. L., & Marjanovic, Z. (2017). Believing is doing: Emotion regulation beliefs are associated with emotion regulation behavioral choices and subjective well-being. *Europe's journal of psychology, 13*(1), 60.

Palmer, C. A., Oosterhoff, B., Bower, J. L., Kaplow, J. B., & Alfano, C. A. (2018). Associations among adolescent sleep problems, emotion regulation, and affective disorders: Findings from a nationally representative sample. *Journal of psychiatric research, 96*, 1-8.

Pattison, C., & Lynd-Stevenson, R. M. (2001). The prevention of depressive symptoms in children: The immediate and long-term outcomes of a schoolbased program. *Behaviour Change, 18*(2), 92-102.

Patton, G. C., Coffey, C., Romaniuk, H., Mackinnon, A., Carlin, J. B., Degenhardt, L., ... & Moran, P. (2014). The prognosis of common mental disorders in adolescents: a 14-year prospective cohort study. *The Lancet, 383*(9926), 1404-1411

Patton, G. C., Sawyer, S. M., Santelli, J. S., Ross, D. A., Afifi, R., Allen, N. B., ... & Kakuma, R. (2016). Our future: a Lancet commission on adolescent health and wellbeing. *The Lancet, 387*(10036), 2423-2478.

Plass-Christl, A., Otto, C., Klasen, F., Wiegand-Grefe, S., Barkmann, C., Hölling, H., ... & Ravens-Sieberer, U. (2017). Trajectories of mental health problems in children of parents with mental health problems: results of the BELLA study. *European child & adolescent psychiatry*, 1-10.

Prestwich, A., Kellar, I., Parker, R., MacRae, S., Learmonth, M., Sykes, B., ... & Castle, H. (2014). How can self-efficacy be increased? Meta-analysis of dietary interventions. *Health Psychology Review, 8*(3), 270-285.

Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate behavioral research, 42*(1), 185-227.

Quayle, D., Dziurawiec, S., Roberts, C., Kane, R., & Ebsworthy, G. (2001). The effect of an optimism and lifeskills program on depressive symptoms in preadolescence. *Behaviour Change, 18*(4), 194-203.

Rahman, M. A., Todd, C., John, A., Tan, J., Kerr, M., Potter, R., ... & Brophy, S. (2018). School achievement as a predictor of depression and self-harm in adolescence: linked education and health record study. *The British Journal of Psychiatry, 212*(4), 215-221.

Reivich, K., & Gillham, J. (2003). Learned optimism: The measurement of explanatory style. Positive psychological assessment: A handbook of models and measures, 57-74.

Review Manager (RevMan) [Computer program]. Version 5.3. Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2014.

Reynolds, C. R. (1980). Concurrent validity of What I Think and Feel: The Revised Children's Manifest Anxiety Scale. *Journal of Consulting and Clinical Psychology, 48*(6), 774.

Reynolds, C. R., & Richmond, B. O. (1997). What I think and feel: A revised measure of children's manifest anxiety. *Journal of abnormal child psychology, 25*(1), 15-20.

Reynolds, C. R., & Richmond, B. O. (1979). Factor structure and construct validity of 'what i think and feel': The revised children's manifest anxiety scale. *Journal of Personality Assessment, 43*(3), 281-283.

Reynolds, C. R., & Richmond, B. O. (1978). What I think and feel: A revised measure of children's manifest anxiety. *Journal of abnormal child psychology, 6*(2), 271-280.

Roberts, C. M. (2006). Embedding mental health promotion programs in school contexts: The Aussie optimism program. *International Society for the Study of Behavior Newsletter, 2*(50), 1-4.

Roberts, C. M., Kane, R., Bishop, B., Cross, D., Fenton, J., & Hart, B. (2010). The prevention of anxiety and depression in children from disadvantaged schools. *Behavior Research and Therapy, 48*, 68-73. http://dx.doi.org/10.1016/j.brat.2009.09.002.

Rooney, R., Hassan, S., Kane, R., Roberts, C. M., & Nesa, M. (2013). Reducing depression in 9-10 year old children in low SES schools: A longitudinal universal randomized controlled trial. *Behavior Research and Therapy, 51*, 845-854. http://dx.doi.org/10.1016/j.brat.2013.09.005.

Rooney, R., Roberts, C. M., Kane, R., Pike, L., Winsor, A., White, J., et al. (2006). The prevention of depression in 8- to 9- year-old children: A pilot study. *Australian Journal of Guidance and Counselling, 16*(1), 76-90.

Rosenbaum, M., & Ronen, T. (2013). Emotional well-being and self-control skills of children and adolescents: The Israeli perspective. In C. L. M. Keyes (Ed.). Mental well-being (pp. 209-229). Springer, Dordrecht.

Rovine, J. M., & Molenaar, C. M. P. (2016). Person-specific approaches to the modelling of the intraindividual variation in developmental psychopathology. In D. Cicchetti, D. (Ed.3). Developmental psychopathology, theory and method (Vol. 1). John Wiley & Sons. Developmental psychopathology, 846-855.

Rubin, D. B. (1996). Multiple imputation after 18+ years. Journal of the American statistical Association, 91(434), 473-489.

Rutter, M. (2013). Annual Research Review: Resilience--clinical implications. *Journal of Child Psychology and Psychiatry, 54*(4), 474-487. doi: 10.1111/j.1469-7610.2012.02615.x

Rutter, M. (2012). Resilience as a dynamic concept. *Development and Psychopathology, 24*(2), 335-344. doi:10.1017/S0954579412000028

Rutter, M. (2007). Psychopathological development across adolescence. *Journal of Youth and Adolescence, 36*(1), 101–110.

Rutter, M. (2006). Implications of resilience concepts for scientific understanding. *Ann N Y Acad Sci, 1094*, 1-12. doi: 10.1196/annals.1376.002

Sai, L., Luo, S., Ward, A., & Sang, B. (2016). Development of the tendency to use emotion regulation strategies and their relation to depressive symptoms in Chinese adolescents. *Frontiers in psychology, 7*, 1222.

Sandler, I.,Wolchik, S. A., Cruden, G., Mahrer, N. E., Ahn, S., Brincks, A., et al. (2014). Overview of meta-analyses of the prevention of mental health, substance use, and conduct problems. *Annual Review of Clinical Psychology, 10*, 243-273.

Sawyer, M. G., Harchak, T. F., Spence, S. H., Bond, L., Graetz, B., Kay, D., et al. (2010). School-based prevention of depression: A 2-year follow-up of a randomized controlled trial of the beyondblue schools research initiative. *Journal of Adolescent Health, 47*, 297-304. http://dx.doi.org/10.1016/j.jadohealth. 2010.02.007.

Schaller, T. K., Patil, A., & Malhotra, N. K. (2015). Alternative Techniques for Assessing Common Method Variance: An Analysis of the Theory of Planned Behavior Research. *Organizational Research Methods, 18*(2), 177–206. https://doi.org/10.1177/1094428114554398

Schmidt, V. A. (2016). The roots of neo-liberal resilience: Explaining continuity and change in background ideas in Europe's political economy. *The British Journal of Politics and International Relations, 18*(2), 318-334.

Schwinn, T. M., Hopkins, J. E., & Schinke, S. P. (2016). Developing a web-based intervention to prevent drug use among adolescent girls. *Research on social work practice, 26*(1), 8-13.

Schäfer, J. Ö., Naumann, E., Holmes, E. A., Tuschen-Caffier, B., & Samson, A. C. (2017). Emotion regulation strategies in depressive and anxiety symptoms in youth: A meta-analytic review. *Journal of youth and adolescence, 46*(2), 261-276.

Seligman, M. E. P., Castellon, C., Cacciola, J., Schulman, P., Luborsky, L., Ollove, M., et al. (1988). Explanatory style change during cognitive therapy for unipolar depression. *Journal of Abnormal Psychology, 97*(1), 13-18.

Seligman, M. E. P., Kaslow, N. J., Alloy, L. B., Peterson, C., Tanenbaum, R. L., & Abramson, L. Y. (1984). Attributional style and depressive symptoms among children. *Journal of Abnormal Psychology, 93*(2), 235-238.

Shapero, B. G., Abramson, L. Y., & Alloy, L. B. (2016). Emotional reactivity and internalizing symptoms: Moderating role of emotion regulation. *Cognitive therapy and research, 40*(3), 328-340.

Shapero, B. G., Stange, J. P., McArthur, B. A., Abramson, L. Y., & Alloy, L. B. (2018). Cognitive reappraisal attenuates the association between depressive symptoms and emotional response to stress during adolescence. *Cognition and Emotion*, 1-12.

Sheffield, J. K., Kowalenko, N., Davis, A., Spence, S. H., Rapee, R. M., Wignall, A., et al. (2006). Evaluation of universal, indicated, and combined cognitive-behavioral approaches to the prevention of depression among adolescents. *Journal of Consulting and Clinical Psychology, 74*(1), 66-79.

Sheppes, G., Scheibe, S., Suri, G., Radu, P., Blechert, J., & Gross, J. J. (2014). Emotion regulation choice: A conceptual framework and supporting evidence. *Journal of Experimental Psychology: General, 143*(1), 163.

Shochet, I. M., Dadds, M. R., Holland, D., Whitefield, K., Harnett, P. H., & Osgarby, S. M. (2001). The efficacy of a universal school-based program to prevent adolescent depression. *Journal of Clinical Child Psychology, 30*, 303-315. http://dx.doi.org/10.1207/S15374424JCCP3003_3.

Shochet, I. M., Montague, R., Smith, C., & Dadds, M. (2014). A qualitative investigation of adolescents' perceived mechanisms of change from a universal school-based depression prevention program. *International Journal of Environmental Research and Public Health, 11*, 5541e5554. http://dx.doi.org/10.3390/ijerph110505541.

Siegrist, J. (2016). Effort-Reward Imbalance Model. In G. Fink, (Ed.). Stress: Concepts, Cognition, Emotion, and Behavior: Handbook of Stress Series (Vol. 1). Academic Press. PP. 81-86.

Skryabina, E., Morris, J., Byrne, D., Harkin, N., Rook, S., & Stallard, P. (2016). Child, teacher and parent perceptions of the FRIENDS classroom-based Universal Anxiety Prevention Programme: A qualitative study. *School Mental Health, 8*(4), 486–498.

Sniehotta, F. F., Scholz, U., & Schwarzer, R. (2005). Bridging the intention–behaviour gap: Planning, self-efficacy, and action control in the adoption and maintenance of physical exercise. *Psychology & Health, 20*(2), 143-160.

Southwick, S. M., Bonanno, G. A., Masten, A. S., Panter-Brick, C., & Yehuda, R. (2014). Resilience definitions, theory, and challenges: interdisciplinary perspectives. *Eur J Psychotraumatol, 5*. doi: 10.3402/ejpt.v5.25338

Southwick, S. M., & Charney, D. S. (2012). The science of resilience: implications for the prevention and treatment of depression. *Science, 338*(6103), 79-82.

Southwick, S. M., Vythilingam, M., & Charney, D. S. (2005). The psychobiology of depression and resilience to stress: implications for prevention and treatment. *Annu. Rev. Clin. Psychol., 1*, 255-291.

Spence, S. H. (1998). A measure of anxiety symptoms among children. *Behavior Research and Therapy, 36*(5), 545-566.

Spence, S. H., Sheffield, J. K., & Donovan, C. L. (2003). Preventing adolescent depression: An evaluation of the problem solving for life program. *Journal of Consulting and Clinical Psychology, 71*(1), 3-13.

Spielberger, C. D., Sydeman, S. J., Owen, A. E., & Marsh, B. J. (1999). Measuring anxiety and anger with the state-trait anxiety inventory (STAI) and state-trait anger expression inventory (STAXI). In M. E. Maurish (Ed.), The use of psychological testing for treatment planning and outcome assessment (pp. 993-1021). New Jersey, USA: Lawrence Erlbaum.

Stallard, P., Phillips, R., Montgomery, A. A., Spears, M., Anderson, R., Taylor, J., et al. (2013). A cluster randomised controlled trial to determine the clinical effectiveness and cost-effectiveness of classroom-based cognitive-behavioural therapy (CBT) in reducing symptoms of depression in high-risk adolescents. *Health Technology Assessment, 17*(47), 1–109.

Stallard, P., Simpson, N., Anderson, S. et al. (2008). The FRIENDS emotional health prevention programme12 month follow-up of a universal UK school based trial*Eur Child Adolesc Psychiatry 17*. https://doi.org/10.1007/s00787-007-0665-5

Stallard, P., Simpson, N., Anderson, S., Hibbert, S., & Osborn, C. (2007). The FRIENDS emotional health programme: Initial findings from a school-based project. *Child and Adolescent Mental Health, 12*(1), 32-37.

Stallard, P., Skryabina, E., Taylor, G., Phillips, R., Daniels, H., Anderson, R., et al. (2014). Classroom-based cognitive behaviour therapy (FRIENDS): A cluster randomised controlled trial to prevent anxiety in children through education in schools (PACES). *The Lancet Psychiatry, 1*(3), 185-192.

Stallard, P., Velleman, R., Langsford, J., & Baldwin, S. (2001). Coping and psychological distress in children involved in road traffic accidents. *British Journal of Clinical Psychology, 40*(2), 197-208.

StataCorp. 2017. Stata Statistical Software: Release 15. College Station, TX: StataCorp LP.

Steca, P., Abela, J. R. Z., Monzani, D., Greco, A., Hazel, N. A., & Hankin, B. L. (2014). Cognitive vulnerability to depressive symptoms in children: The protective role of self-efficacy beliefs in a multi-wave longitudinal study. *Journal of Abnormal Child Psychology, 42*, 137-148. http://dx.doi.org/10.1007/s10802-013- 9765-5.

Steptoe, A. & Pool, L. (2016). Control and Stress. In G. Fink, (Ed.). Stress: Concepts, Cognition, Emotion, and Behavior: Handbook of Stress Series (Vol. 1). Academic Press. (pp: 73-79).

Stice, E., Shaw, H., Bohon, C., Marti, C. N., & Rohde, P. (2009). A meta-analytic review of depression prevention programs for children and adolescents: Factors that predict magnitude of intervention effects. *Journal of Consulting and Clinical Psychology, 77*, 486-503. http://dx.doi.org/10.1037/a0015168.

Stockings, E. A., Degenhardt, L., Dobbins, T., Lee, Y. Y., Erskine, H. E., Whiteford, H. A., et al. (2016). Preventing depression and anxiety in young people: A review of the joint efficacy of universal, selective and indicated prevention. *Psychological Medicine, 46*(01), 11–26.

Tak, Y. R., Lichtwarck-Aschoff, A., Gillham, J. E., Van Zundert, R. M., & Engels, R. C. (2015). Universal school-based depression prevention 'Op Volle Kracht': A longitudinal cluster randomized controlled trial. *Journal of Abnormal Child Psychology, 44*, 949-961. http://dx.doi.org/10.1007/s10802-015-0080-1.

Tak, Y. P., Van Zundert, R. M. P., Kuijpers, R. C.W. M., Van Vlokhoven, B. S., Rensink, H. F.W., & Engels, R. C. M. E. (2012). A randomized controlled trial testing the effectiveness of a universal school-based depression prevention program 'Op Volle Kracht' in The Netherlands. *BMC Public Health, 12*(21), 1-9.

Taylor, J. A., Phillips, R., Cook, E., Georgiou, L., Stallard, P., & Sayal, K. (2014). A qualitative process evaluation of classroom-based cognitive behaviour therapy to reduce adolescent depression. *International Journal of Environmental Research and Public Health, 11*(6), 5951-5969.

Teubert, D., & Pinquart, M. (2011). A meta-analytic review on the prevention of symptoms of anxiety in children and adolescents. *Journal of Anxiety Disorders, 25*(1046), 59.

Thapar, A., Collishaw, S., Pine, D. S., & Thapar, A. K. (2012). Depression in adolescence. *The Lancet, 379*(9820), 1056-1067.

Theurel, A., & Gentaz, E. (2018). The regulation of emotions in adolescents: Age differences and emotion-specific patterns. *PloS one, 13*(6).

Thornback, K., & Muller, R. T. (2015). Relationships among emotion regulation and symptoms during trauma-focused CBT for school-aged children. *Child abuse & neglect, 50*, 182-192.

Tomyn, J. D., Fuller-Tyszkiewicz, M., Richardson, B., & Colla, L. (2016). A comprehensive evaluation of a universal school-based depression prevention program for adolescents. *Journal of Abnormal Child Psychology*, 1-13. http://dx.doi.org/10.1007/s10802-016-0136-x.

Tong, A., Flemming, K., McInnes, E., Oliver, S., & Craig, J. (2012). Enhancing transparency in reporting the synthesis of qualitative research: ENTREQ. *BMC Medical Research Methodology, 12*(1), 181.
Trompeter, N., Bussey, K., & Fitzpatrick, S. (2017). Cyber victimization and internalizing difficulties: the mediating roles of coping self-efficacy and emotion dysregulation. *Journal of abnormal child psychology*, 1-11.

Troy, A. S. & Mauss, I. B. (2011). Resilience in the face of stress: emotion regulation as a protective factor. In S. M. Southwick, B. T. Litz, D. Charney, & M. J. Friedman (Ed.). Resilience and Mental Health: Challenges Across the Lifespan. (pp. 30-44).

Tugade, M. M., & Fredrickson, B. L. (2004). Resilient individuals use positive emotions to bounce back from negative emotional experiences. *Journal of personality and social psychology, 86*(2), 320.

Tugade, M. M., Fredrickson, B. L., & Feldman Barrett, L. (2004). Psychological resilience and positive emotional granularity: Examining the benefits of positive emotions on coping and health. *Journal of personality, 72*(6), 1161-1190.

Turner, I., Reynolds, K. J., Lee, E., Subasic, E., & Bromhead, D. (2014).Well-being, school climate, and the social identity process: A latent growth model study of bullying perpetration and peer victimization. *School Psychology Quarterly, 29*, 320-335. http://dx.doi.org/10.1037/spq0000074.

Ungar, M. (2012). Social ecologies and their contribution to resilience. In The social ecology of resilience (pp. 13-31). Springer, New York, NY.

Ungar, M., Ghazinour, M., & Richter, J. (2013). Annual research review: What is resilience within the social ecology of human development? *Journal of child psychology and psychiatry, 54*(4), 348-366.

van der Cruijsen, R., Murphy, J., & Bird, G. (2019). Alexithymic traits can explain the association between puberty and symptoms of depression and anxiety in adolescent females. *PloS one, 14*(1), e0210519.

Van Droogenbroeck, F., Spruyt, B., & Keppens, G. (2018). Gender differences in mental health problems among adolescents and the role of social support: results from the Belgian health interview surveys 2008 and 2013. *BMC psychiatry, 18*(1), 6.

Vaz, S., Cordier, R., Boyes, M., Parsons, R., Joosten, A., Ciccarelli, M., Falkmer, M., & Falkmer, T. (2016). Is using the strengths and difficulties questionnaire in a community sample the optimal way to assess mental health functioning?. *PloS one, 11*(1), e0144039.

Vittinghoff, E., Sen, Ś., & McCulloch, C. E. (2009). Sample size calculations for evaluating mediation. *Statistics in Medicine, 28*(4), 541-557.

Vos, T., Barber, R. M., Bell, B., Bertozzi-Villa, A., Biryukov, S., Bolliger, I., ... & Duan, L. (2015). Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet, 386*(9995), 743-800.

Wahl, M. S., Adelson, J. L., Patak, M. A., Possel, P., & Hautzinger, M. (2014). Teachers or psychologists: Who should facilitate depression prevention programs in schools? *International Journal of Environmental Research and Public Health, 11*, 5294e5316. http://dx.doi.org/10.3390/ijerph110505294.

Waters, A. M., & Craske, M. G. (2016). Towards a cognitive-learning formulation of youth anxiety: A narrative review of theory and evidence and implications for treatment. *Clinical psychology review, 50*, 50-66.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of personality and social psychology, 54*(6), 1063.

Waugh, C. E. (2014). The Regulatory Power of Positive Emotions in Stress: A Temporal-Functional Approach. In M. Kent, M. C. Davis, & J. W. Reich (Ed.). *The resilience handbook: Approaches to stress and trauma*. Routledge. pp. 73-85

Waugh, C. E., Fredrickson, B. L., & Taylor, S. F. (2008). Adapting to life's slings and arrows: Individual differences in resilience when recovering from an anticipated threat. *J Res Pers, 42*(4), 1031-1046. doi: 10.1016/j.jrp.2008.02.005

Weare, K., & Nind, M. (2014). Promoting Mental Health and Wellbeing in Schools. In F. A. Huppert & C. L. Cooper (Ed.), Wellbeing: A complete reference guide, interventions and policies to enhance wellbeing (pp. 93–140). Hoboken: Wiley.

Weersing, V. R., Shamseddeen, W., Garber, J., Hollon, S. D., Clarke, G. N., Beardslee, W. R., et al. (2016). Prevention of depression in at-risk adolescents: Predictors and moderators of acute effects. *Journal of the American Academy of Child and Adolescent Psychiatry, 55*, 219-226. http://dx.doi.org/10.1016/j.jaac.2015.12.015.

Werner-Seidler, A., Perry, Y., Calear, A. L., Newby, J. M., & Christensen, H. (2017). School-based depression and anxiety prevention programs for young people: A systematic review and meta-analysis. *Clinical Psychology Review, 51*, 30–47.

Whiteford, H. A., Degenhardt, L., Rehm, J., Baxter, A. J., Ferrari, A. J., Erskine, H. E., ... & Burstein, R. (2013). Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *The Lancet, 382*(9904), 1575-1586.

Williams, J., & MacKinnon, D. P. (2008). Resampling and distribution of the product methods for testing indirect effects in complex models. *Structural Equation Modeling, 15*(1), 23-51.

Woods, H. C., & Scott, H. (2016). Sleepy teens: social media use in adolescence is associated with poor sleep quality, anxiety, depression and low self-esteem. *Journal of Adolescence, 51*, 41-49.

Woodward, L. J., & Fergusson, D. M. (2001). Life course outcomes of young people with anxiety disorders in adolescence. *Journal of the American Academy of Child and Adolescent Psychiatry, 40*(9), 1086e1093.

World Health Organisation & Mathers, C. (2017). Global strategy for women's, children's and adolescents' health (2016-2030). Retrieved from http://www.who.int/life-course/partners/global-strategy/globalstrategyreport2016-2030-lowres.pdf

World Health Organisation. (2014). Mental Health: A State of Well-being. Retrieved from http://www.who.int/features/factfiles/mental_health/en/

World Health Organization. (2013). Mental health action plan 2013–2020: Report of the World Health Organization. Geneva.

World Medical Association. (2013). World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. *JAMA, 310*(20), 2191.

World Health Organization. (2005). Promoting mental health: Concepts, emerging evidence, practice: Report of the World Health Organization. Geneva, Switzerland.

Wright, M. O. D., & Masten, A. S. (2015). Pathways to resilience in context. In Youth resilience and culture (pp. 3-22). Springer, Dordrecht.

Wright, M. O. D., Masten, A. S., & Narayan, A. J. (2013). Resilience processes in development: Four waves of research on positive adaptation in the context of adversity. In S. Goldstein & R. B. Brooks (Ed.). Handbook of resilience in children (pp. 15-37). Springer, Boston, MA.

Yehuda, (2014): Enhancing resilience before the trauma [Peer commentary on “Resilience definitions, theory, and challenges: interdisciplinary perspectives,” by S. S. Southwick, G. A. Bonanno, A. S. Masten, C. Panter-Brick, & R. Yehuda]. European Jurnal of Psychotraumatology, 5, 449-453. https://www.tandfonline.com/toc/zept20/current#Resilience%20and%20Trauma

Yen, C. F., Huang, M. F., Kim, Y. S., Wang, P. W., Tang, T. C., Yeh, Y. C., ... & Yang, P. (2013). Association between types of involvement in school bullying and different dimensions of anxiety symptoms

and the moderating effects of age and gender in Taiwanese adolescents. *Child abuse & neglect, 37*(4), 263-272.

Young, J. F., Kranzler, A., Gallop, R., & Mufson, L. (2012). Interpersonal psychotherapy-adolescent skills training: Effects on school and social functioning. *School mental health, 4*(4), 254-264.

Zhao, Y., & Zhao, G. (2015). Emotion regulation and depressive symptoms: Examining the mediation effects of school connectedness in Chinese late adolescents. *Journal of Adolescence, 40*, 14–23.

APPENDICES

Appendix I

Table 1. Overview of characteristics and quality assessment of the included studies (systematic review and meta-analysis of PRP and PRP-derivatives)

Study	Programme	Design	Age group, (m)	n	Control group	Intervention			Primary Outcome	Secondary Outcomes	Quality Assessment[a,b]					
						Content	Leaders	Sessions			A	B	C	D	E	F
Chaplin et al. (2006)	PRP	RCT	11-14, (12.16)	103	NI	CB & PS	Teachers & MHPs	12	Depression	Hopelessness, Explanatory style (assessing the negative events)	W	S	W	M	S	W
											Overall rating: Weak					
Gillham et al. (2007)	PRP	Cluster RCT	11-13, (12.13)	463	NI	CB & PS	Teachers & MHPs	12	Depression	Clinical depressive symptoms	S	S	M	M	S	W
											Overall rating: Moderate					
Kindt, Kleinjan, Janssens, & Scholte (2014)	OVK	Cluster RCT	11-16, (13.42)	1343	NI	CB & PS	Teachers	16	Depression	Clinical depressive symptoms, OVK-specific variables	S	S	S	M	S	M
											Overall rating: Strong					
Pattison & Lynd-Stevenson (2001)	PPP	RCT	9-12, (10.44)	66	AC & NI	CB & PS	MHPs	10	Depression	Anxiety, Cognitive style, Social skills	W	S	W	M	S	M
											Overall rating: Weak					
Quayle, Dziurawiec, Roberts, Kane, & Ebsworthy (2001)	OLP	RCT	11-12, (NR)	47	WL	CB & PS	MHPs	8	Depression	Explanatory style, Loneliness, Self-worth	M	S	W	M	S	W
											Overall rating: Weak					
Roberts et al. (2010)	AOP	Cluster RCT	11-13, (11.99)	496	AC	SLS & OTS	Teachers	20	Depression	Anxiety, Explanatory style, Social skills, Internalizing & externalizing problems	M	S	M	M	S	M
											Overall rating; Strong					

										(parental measure)	
Rooney, Hassan, Kane, Roberts, & Nesa (2013)	AOP-PTS	Cluster RCT	8-10, (8.75)	910	NI	CB & SB	Teachers	10	Depression	Anxiety Explanatory style, Major depressive disorder & dysthymia, Social-emotional skills (parental measure)	S S S M S S Overall rating: Strong
Rooney et al. (2006)	PTP	Cluster RCT	8-9, (9.08)	136	NI	CB	MHP	8	Depression	Anxiety, Explanatory style, Major depressive disorder & dysthymia	M S W M S M Overall rating: Moderate
Tak, Lichtwarck-Aschoff, Gillham, Van Zundert, & Engels (2015)	OVK	Cluster RCT	13.91, (NR)	1390	NI	CB & PS	MHPs	16	Depression, clinical depressive symptoms	Anxiety, Hopelessness, Happiness, Life satisfaction, Optimism, Coping, Self-efficacy, Academic achievement, Health-risk behaviours, OVK-specific variables	S S S M S M Overall rating: Strong

Note: AC = Active control, AOP = Aussie Optimism Programme, AOP-PTS = Aussie Optimism Programme-Positive Thinking Skills, CB = Cognitive-Behavioural, NI = Non-intervention, MHPs = Mental health professionals, *n* = Sample size, NI = Non-intervention, NR = Non-reported, OLP = Optimism Lifeskills Programme, OTS = Optimistic Thinking Skills, OVK = 'Op Volle Kracht', PPP = Penn Prevention Programme, PRP = Penn Resiliency Programme, PS = Problem-Solving, PTP = Positive Thinking Skills, SB = Social-Behavioural, SLS = Social Life Skills, WL = Waiting-list

[a]Quality of evidence was assessed by the six components of the Quality Assessment Tool for Quantitative Studies. Each letter in the heading denotes each category.

A = Selection Bias

B = Study Design

C = Confounders

D = Blinding

E = Data Collection Methods

F = Withdrawals & Drop-outs

[b]Each letter below denotes the ratings for the included studies in each category.

S = Strong

M = Moderate

W = Weak

Figure 2a: Funnel and counter funnel plots, assessing publication bias.

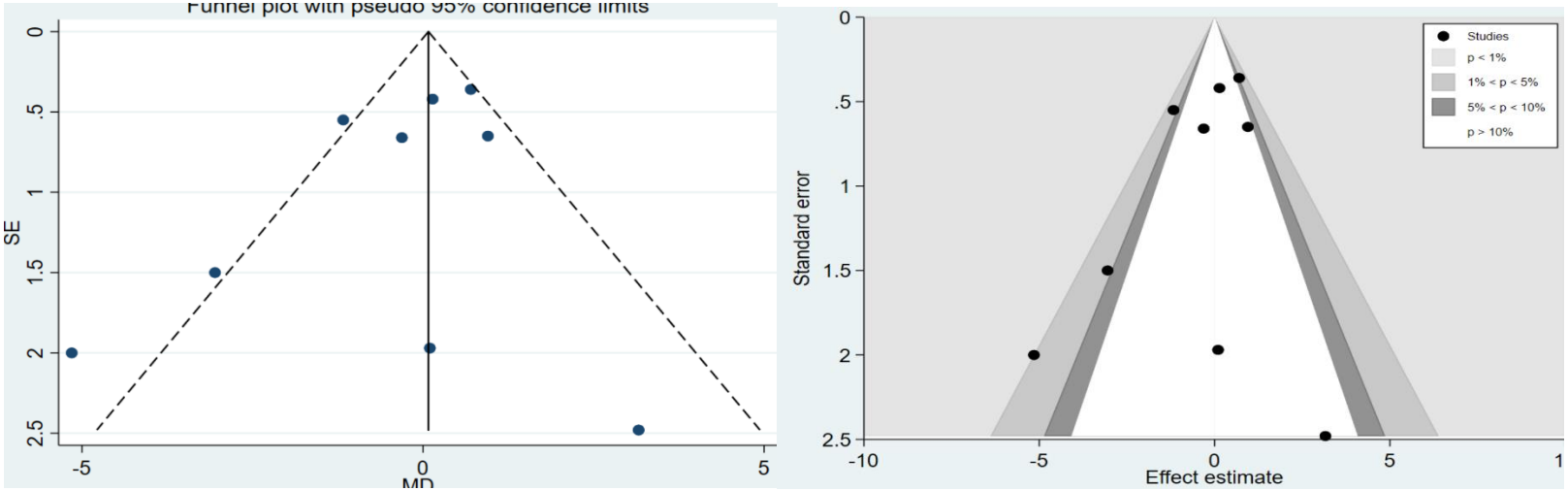


Figure 2b: Output from Egger's test assessing small-study effect in the main analysis.

Number of studies	9					
Std_effect	Coefficient	Stand. error	t	p>|t|	95%CI	
Slope	.75	0.66	1.13	0.29	-.82	2.32
Bias	-1.24	1.05	-1.19	0.27	-3.73	1.23
						p = 0.274

Figure 3. Risk of bias assessment and summary of risk of bias graph of the included studies. Green & red dots denote ratings of low and high risk of bias respectively. Empty cells denote unclear risk of bias (systematic review and meta-analysis of PRP and PRP-derivatives)

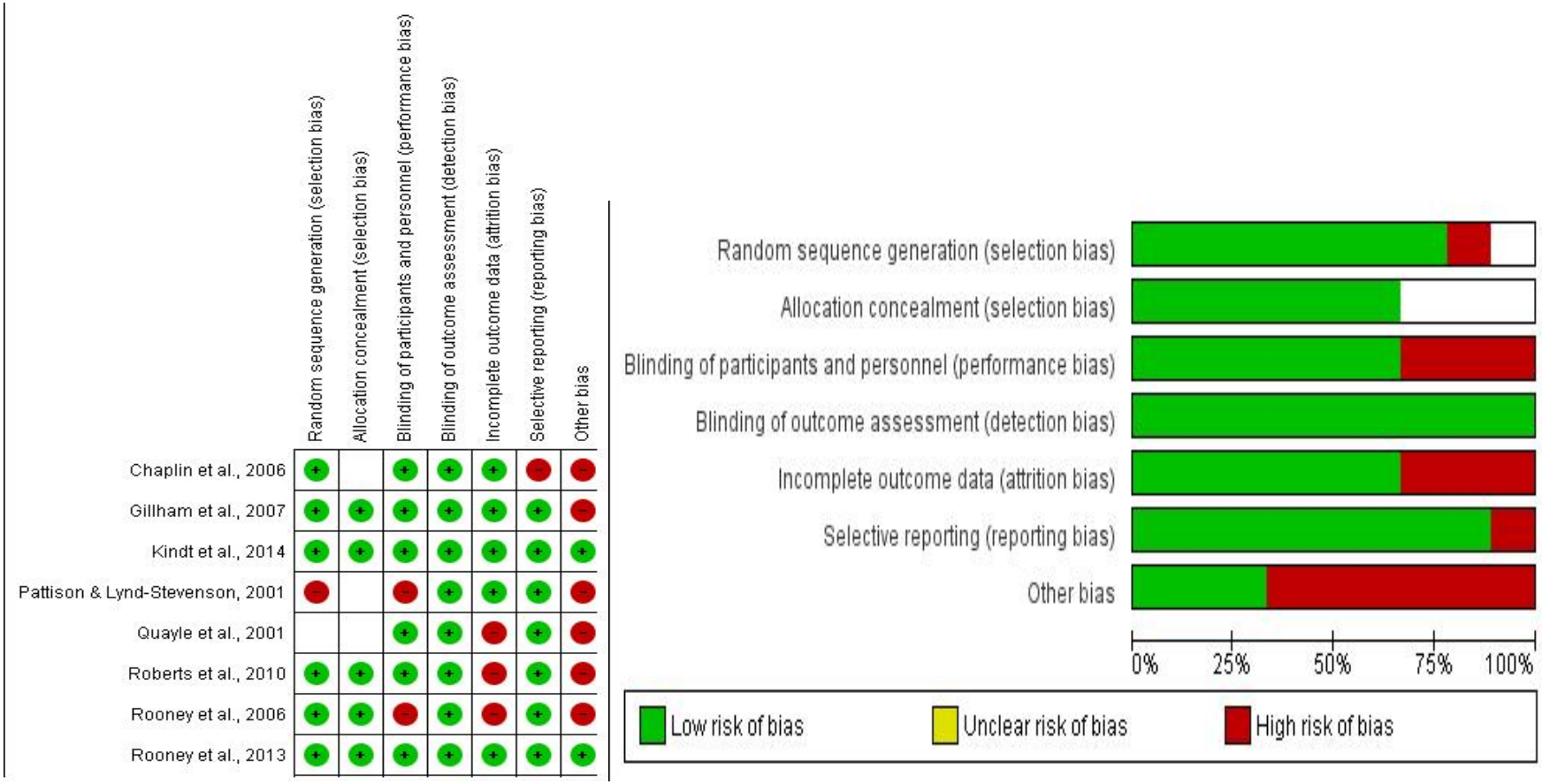


Table 4
Overview of characteristics of included studies (meta-aggregation of CBT and IPT-oriented, school-based, prevention interventions)

Studies citations	Population (age range or mean age)	Context	Intervention & content	Administrators of the programme	Phaenomena of interest	Data collection methods	Method of analysis	Country of origin	Quality Assessment Items[a,b]									
									1	2	3	4	5	6	7	8	9	10
Garmy et al., 2015	89 adolescents, 13-15 years	Schools in urban and rural areas of southern Sweden	DISA CBT	MHP & school staff	To explore adolescents' experiences with a CBT-based, depression prevention programme	Focus groups interviews	Content analysis	Sweden	U	Y	Y	Y	Y	Y	Y	Y	Y	Y
Kvist Lindholm & Zetterqvist Nelson, 2015	32 school girls, 12-14 years	School in a small municipality in Sweden	DISA CBT	MHP & school staff	To explore participants understanding about the programme	Semi-structured group interviews	Discourse analysis	Sweden	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Shochet et al., 2014	109 students, mean age 13.98 years	Catholic secondary schools, Western Sydney, Australia	RAP-A CBT & IPT	MHP & school staff	To explore the lived experiences of programme's participants perceived mechanisms of change that underlie programme's impact as well as a wider range of outcomes	Individual, short-structured interviews	Thematic analysis	Australia	U	Y	Y	Y	Y	Y	Y	Y	Y	Y
Skryabina et al., 2016	115 children, 9-10 years	Schools in the South West of England	FRIENDS CBT	MHP & school staff	To explore children's views from participating in the programme	Focus groups of 2-9 children	Thematic analysis	UK	U	Y	Y	Y	Y	Y	Y	Y	Y	Y

Taylor et al., 2014	42 students, 12-16 years	South West and East Midlands regions of England	RAP CBT & IPT	MHP	To investigate the perceptions of children and facilitators/teachers of the process of the implemented programme	Interviews and focus groups	Thematic analysis	UK	U	Y	Y	Y	Y	Y	Y	N	Y	Y

Note: CBT = Cognitive Behavioural Therapy, DISA = Din Inre Styrka Aktiveras (Activate your inner strength), FRIENDS = FRIENDS for Life, IPT = Interpersonal Therapy, MHP = Mental Health Professionals, RAP = Resourceful Adolescent Programme, RAP-A = Resourceful Adolescent Programme

[a] The methodological quality of the included studies was assessed by the ten components of the JBI QARI Critical Appraisal Checklist for Interpretative and Critical Research and each letter denotes the ratings for the included studies in each category. N = No, U = Unclear, Y = Yes.

[b] JBI QARI Critical Appraisal Checklist's components

1. Item 1 assesses the congruity between the stated philosophical perspective and the research methodology
2. Item 2 assesses the congruity between the research methodology and the research question or objectives
3. Item 3 assesses the congruity between the research methodology and the methods used to collect data
4. Item 4 assesses the congruity between the research methodology and the representation and analysis of data
5. Item 5 assesses the congruity between the research methodology and the interpretation of results
6. Item 6 assesses whether there is a statement locating the researcher culturally or theoretically
7. Item 7 assesses whether the influence of the researcher on the research, and vice- versa, is addressed
8. Item 8 assesses whether the participants, and their voices, are adequately represented
9. Item 9 assesses whether the research is ethical according to current criteria or, for recent studies, and there is evidence of ethical approval by an appropriate body
10. Item 10 assesses whether the conclusions drawn in the research report flow from the analysis, or interpretation, of the data

Appendix II

Table 9. Independent, pair-wise, unrelated-group, separate t-tests, assessing the differences between male and female students in model's variables at baseline. After applying the Bonferroni's correction, the p value was set at .007. Under the Bonferroni's correction, gender differences were significant on all model's variables except of emotion regulation and socio-emotional disturbances. However, the Bonferroni correction is conservative; as such, it confers greater risk for Type I error due to loss of power. I therefore conducted a set of MANOVA which showed that significant gender differences were evident on all the model's outcomes. Results of the t-tests are presented for illustration purposes.

						t-test for equality means			
Gender		N	Mean	Std. Deviation	Std. Error Mean	t	Mean Difference	95%CI	
								Lower	Upper
Stress perceptions	Male	227	15.58	6.55	0.43	-5.83***	-3.65	14.72	16.43
	Female	266	19.23	7.22	0.44			18.36	20.10
Perceived self-efficacy	Male	225	69.10	12.26	0.81	5.07***	6.01	67.49	70.71
	Female	241	63.08	13.26	0.85			61.40	64.77
Emotion regulation	Male	202	9.74	8.13	0.57	1.97*	1.58	8.61	10.87
	Female	232	8.15	8.56	0.56			7.05	9.26
Anxiety	Male	162	10.49	6.99	0.54	-5.35***	-4.15	9.40	11.57
	Female	198	14.64	7.57	0.53			13.58	15.70
Mental well-being	Male	222	47.51	9.36	0.62	5.30***	4.78	46.27	48.75
	Female	255	42.73	10.20	0.63			41.47	43.99
Positive Emotions	Male	190	11.94	10.81	0.78	6.50***	7.70	10.39	13.49
	Female	225	4.24	12.94	0.86			2.54	5.94
Socio-emotional disturbances	Male	197	12.36	6.32	0.45	-3.51**	-2.20	11.47	13.24
	Female	231	14.56	6.59	0.43			13.71	15.42

***p*≤0.05, ****p*≤0.01, *****p*≤0.001

Table 12. Simple regression analysis, testing the effects of stress perceptions on anxiety symptoms, mental well-being, positive emotions, and socio-emotional disturbances (imputed dataset).

	Coefficient (imputed)	Std.er. (imputed)	df	t (imputed)	95%CI (imputed) Lower	Upper
Level of anxiety symptoms						
Stress perceptions	0.73	0.03	509	19.41***	0.65	0.80
Perceived self-efficacy						
Stress perceptions	-1.08	0.06	527	-15.56***	-1.21	-0.94
Level of mental well-being						
Stress perceptions	-0.90	0.05	485	-17.57***	-1	-0.79
Positive emotions						
Stress perceptions	-1.29	0.05	512	-22.57***	-1.41	-1.18
Social-emotional disturbances						
Stress perceptions	0.60	0.03	510	18.08***	0.54	0.67

Table 14. Path analyses, testing the mediating effects of perceived self-efficacy (imputed dataset).

	Coefficient (imputed)	Std. er. (imputed)	t (imputed)	obs (imputed)
Perceived self-efficacy				
Stress perceptions				
Levels of mental well-being				
Perceived self-efficacy	0.44	0.02	15.67***	488
Stress perceptions	-0.40	0.05	-7.44***	
Perceived self-efficacy				
Stress perceptions				
Levels of anxiety symptoms				
Perceived self-efficacy	-0.12	0.02	-4.40***	507
Stress perceptions	0.60	0.05	11.67***	
Perceived self-efficacy				
Stress perceptions				

Composite positive emotions score				
Perceived self-efficacy	0.37	0.03	10.79***	509
Stress perceptions	-0.88	0.06	-13.14***	
Perceived self-efficacy				
Stress perceptions				
Social-emotional disturbances				
Perceived self-efficacy	-0.16	0.02	-7.27***	506
Stress perceptions	0.42	0.04	10.38***	

Table 16. Mediation analysis following structural equation modelling (imputed dataset).

	coefficient	**Bootstrapped std er.**	**obs**	**z**	**95%CI**	
					Lower	**Upper**
Perceived self-efficacy			509			
Stress perceptions	-1.09	0.07		-15.37***	-1.23	-0.95
Levels of anxiety symptoms						
Perceived self-efficacy	-0.12	0.02		-4.41***	-0.17	-0.06
Stress perceptions	0.60	0.05		11.69***	0.49	0.70
Perceived self-efficacy			487			
Stress perceptions	-1.10	0.07		-15.21***	-1.24	-0.96
Level of mental well-being						
Perceived self-efficacy	0.44	0.02		15.71***	0.39	0.50
Stress perceptions	-0.40	0.05		-7.46***	-0.51	-0.29
Perceived self-efficacy			508			
Stress perceptions	-1.11	0.07		-15.67***	-1.25	-0.97
Level of social-emotional disturbances						
Perceived self-efficacy	-0.16	0.02		-7.29***	-0.20	-0.12
Stress perceptions	0.42	0.04		10.40***	0.34	0.50
Perceived self-efficacy			511			
Stress perceptions	-1.10	0.07		-15.61***	-1.23	-0.96
Level of positive emotions						
Perceived self-efficacy	0.37	0.03		10.82***	0.30	0.44
Stress perceptions	-0.88	0.06		-13.16***	-1.01	-0.75

Table 21. Post – hoc analysis of the moderated-mediation model at baseline (outcome variable: anxiety symptoms)

	coefficient	**Std er.**	**obs**	**z**	**95%CI**	
					Lower	**Upper**
Perceived self-efficacy						
Stress perceptions	-0.85	0.12	261	-6.89***	-1.10	-0.61
Level of reappraisal	0.55	0.20		2.73**	0.15	0.95
Interaction term (moderator-predictor)	-0.004	0.009		-0.48	-0.02	0.01
Level of anxiety symptoms						
Perceived self-efficacy	-0.10	0.04		-2.58*	-0.18	-0.02
Stress perceptions	0.62	0.07		8.12***	0.47	0.78
Use of reappraisal	0.11	0.33		0.33	-0.54	0.76
Interaction term (moderator-predictor)	-0.002	0.006		-0.45	-0.015	0.009
Interaction term (moderator-mediator)	-0.001	0.003		-0.41	-0.008	0.005
Use of reappraisal as difference in scores of two subscales (1SD<Mean)	0.09	0.038		2.43**	0.01	0.16
Use of reappraisal as difference in scores of two subscales (mean)	0.10	0.033		3.22***	0.04	0.17
Use of reappraisal as difference in scores of two subscales (1SD>mean)	0.12	0.048		2.54*	0.02	0.22

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Table 22. Post – hoc analysis of the moderated-mediation model at baseline (outcome variable: mental well-being)

	coefficient	**Std er.**	**obs**	**z**	**95%CI**	
					Lower	**Upper**
Perceived self-efficacy						
Stress perceptions	-0.75	0.09	338	-7.70***	-0.95	-0.56
Use of reappraisal	0.72	0.16		4.48***	0.40	1.04
Interaction term (moderator-predictor)	-0.010	0.007		-1.31	-0.02	0.005
Level of mental well-being						
Perceived self-efficacy	0.32	0.04		7.02***	0.23	0.41
Stress perceptions	-0.47	0.07		-6.20***	-0.61	-0.32
Level of reappraisal	-0.50	0.35		-1.43	-1.20	0.18
Interaction term (moderator – predictor)	0.01	0.006		1.74	-0.001	0.024

Interaction term (moderator – mediator)	0.007	0.003		2.01*	0	0.015
Use of reappraisal as difference in scores of two subscales (1SD<Mean)	-0.24	0.05		-4.67***	-0.35	-0.14
Use of reappraisal as difference in scores of two subscales (mean)	-0.33	0.04		-6.91***	-0.42	-0.23
Use of reappraisal as difference in scores of two subscales (1SD>mean)	-0.42	0.07		-5.94***	-0.56	-0.28

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Table 23. Post – hoc analysis of the moderated-mediation model at baseline (outcome variable: social-emotional disturbances)

	coefficient	**Std er.**	**obs**	**z**	**95%CI**	
					Lower	**Upper**
Perceived self-efficacy						
Stress perceptions	-0.83	0.11	303	-7.44***	-1.05	-0.61
Level of reappraisal	0.55	0.18		3.03**	0.19	0.91
Interaction term (moderator x predictor)	-0.005	0.008		-0.59	-0.02	0.01
Level of social-emotional disturbances						
Perceived self-efficacy	-0.12	0.03		-3.24***	-0.19	-0.04
Stress perceptions	0.46	0.06		6.74***	0.32	0.59
Level of reappraisal	0.21	0.30		0.71	-0.37	0.80
Interaction term (moderator x predictor)	-0.005	0.005		-1.01	-0.01	0.005
Interaction term (moderato x mediator)	-0.002	0.003		-0.86	-0.009	0.003
Use of reappraisal as difference in scores of two subscales (1SD<Mean)	0.10	0.03		3.03**	0.04	0.17
Use of reappraisal as difference in scores of two subscales (mean)	0.12	0.02		4.73***	0.07	0.18
Use of reappraisal as difference in scores of two subscales (1SD>mean)	0.15	0.04		3.77***	0.07	0.24

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Table 24. Post – hoc analysis of the moderated-mediation model at baseline (outcome variable: total score of positive emotions)

	coefficient	**Std er.**	**obs**	**z**	**95%CI**	
					Lower	**Upper**
Perceived self-efficacy						
Stress perceptions	-0.78	0.10	290	-7.46***	-0.98	-0.57
Level of reappraisal	0.73	0.17		4.15***	0.38	1.08
Interaction term (moderator x predictor)	-0.01	0.008		-1.40	-0.02	0.004
Level of positive emotions						
Perceived self-efficacy	0.30	0.05		5.33***	0.19	0.41
Stress perceptions	-0.90	0.09		-9.71***	-1.09	-0.72
Level of reappraisal	-0.30	0.42		-0.73	-1.13	0.52
Interaction term (moderator x predictor)	0.01	0.008		1.33	-0.005	0.02
Interaction term (moderator x mediator)	0.004	0.004		0.97	-0.004	0.013
Use of reappraisal as difference in scores of two subscales (1SD<Mean)	-0.23	0.05		-4.15***	-0.36	-0.12
Use of reappraisal as difference in scores of two subscales (mean)	-0.30	0.04		-6.17***	-0.40	-0.21
Use of reappraisal as difference in scores of two subscales (1SD>mean)	-0.37	0.07		-5.05***	-0.52	-0.24

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Table 27. Independent, pair-sample, unrelated-group, t-tests of the follow-up sample.

						t-test for equality means			
Gender		**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**	**t**	**Mean Difference**	**95%CI**	
								Upper	**Lower**
Stress perceptions	Male	93	14.45	5.32	0.55	-4.66***	-3.80	13.35	15.54
	Female	123	18.26	6.36	0.57			17.12	19.39
Perceived self-efficacy	Male	83	68.28	12.47	1.36	2.10*	3.81	65.56	71.01
	Female	110	64.47	12.51	1.19			62.10	66.83
Emotion regulation score	Male	92	9.92	8.28	0.86	1.26	1.55	8.20	11.63
	Female	115	8.37	9.13	0.85			6.68	10.06

Anxiety	Male	60	8.00	6.47	0.83	-5.87***	-7.10	6.32	9.67
	Female	74	15.10	7.33	0.85			13.40	16.80
Mental well-being	Male	81	47.18	8.15	0.906	2.58*	3.37	45.38	48.98
	Female	110	43.80	9.45	0.901			42.02	45.59
Total positive emotions score	Male	66	11.07	12.14	1.49	2.68**	7.70	8.08	14.06
	Female	80	5.77	11.66	1.30			3.17	8.37
Socio-emotional disturbances	Male	59	11.30	6.12	0.79	-3.51**	-2.82	9.71	12.90
	Female	82	14.21	5.99	0.66			12.90	15.53

Table 28. Two-by-two, mixed, repeated-measure analysis, testing the gender differences on model's variables at baseline and 6-month follow-up.

	coefficient	**Std. er.**	**t**	**95%CI**	
				Lower	**Upper**
Stress perceptions					
Gender	2.57	0.87	2.94**	0.85	4.28
Stage3	-0.99	0.62	-1.58	-2.22	0.23
interaction	1.07	0.84	1.28	-0.57	2.73
f	5.97**				
Perceived self-efficacy					
Gender	-3.99	1.71	-2.33*	-7.36	-0.63
Stage3	-0.29	1.29	-0.22	-2.83	2.24
Interaction	-0.25	1.74	-0.14	-3.67	3.17
f	2.45				
Reappraisal (equated to the difference in scores of the two subscales)					
Gender	-0.91	1.22	-0.75	-3.31	1.48
Stage3	0.76	1.02	0.75	-1.23	2.77
Interaction	-1.33	1.38	-0.97	-4.03	1.37
f	1.03				
Anxiety					

Gender	4.52	1.05	4.27***	2.44	6.59
Stage3	-0.82	0.76	-1.08	-2.32	0.67
Interaction	1.65	1.00	1.65	-0.31	3.62
f	10.46***				
Mental well-being					
Gender	-4.02	1.31	-3.05**	-6.60	-1.43
Stage3	0.01	0.96	0.01	-1.88	1.91
Interaction	0.26	1.29	0.21	-2.26	2.80
f	3.67*				
Socio-emotional disturbances					
Gender	2.78	0.93	2.97**	0.94	4.61
Stage3	0.69	0.78	0.90	-0.83	2.23
Interaction	-0.50	0.99	-0.51	-2.45	1.43
f	3.27*				
Positive emotions (equated to the difference in the scores of the two subscales)					
Gender	-7.10	1.67	-4.24***	-10.39	-3.82
Stage3	-1.44	1.39	-1.03	-4.18	1.29
Interaction	2.00	1.87	1.07	-1.66	5.68
f	5.83***				

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Table 34. Post – hoc analysis of the longitudinal, moderated-mediation model (outcome variable: anxiety symptoms)

	coefficient	**Std er.**	**obs**	**z**	**95%CI**	
					Lower	**Upper**
Perceived self-efficacy						
Stress perceptions	-0.84	0.15	109	-5.60***	-1.13	-0.54
Level of reappraisal	0.67	0.10		6.16***	0.45	0.88
Interaction term (moderator-predictor)	0.003	0.01		0.23	-0.02	0.02
Level of anxiety symptoms						
Perceived self-efficacy	-0.13	0.05		-2.64**	-0.23	-0.03
Stress perceptions	0.69	0.09		7.40***	0.50	0.87
Use of reappraisal	0.01	0.07		0.21	-0.12	0.15
Interaction term (moderator-predictor)	-0.001	0.01		-0.17	-0.02	0.01
Interaction term (moderator-mediator)	-0.003	0.004		-0.80	-0.001	0.005
LR test of model vs. saturated: chi2(1) = 0.15, Prob > chi2 = 0.6989						
Use of reappraisal as difference in scores of two subscales (1SD<Mean)	0.08	0.06		1.36	-0.0009	0.26
Use of reappraisal as difference in scores of two subscales (mean)	0.11	0.04		2.36**	0.047	0.23
Use of reappraisal as difference in scores of two subscales (1SD>mean)	0.14	0.07		1.87	0.03	0.33

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Table 35. Post – hoc analysis of the longitudinal, moderated-mediation model (outcome variable: mental well-being)

	coefficient	**Std er.**	**obs**	**z**	**95%CI**	
					Lower	**Upper**
Perceived self-efficacy						
Stress perceptions	-0.85	0.13	149	-6.53***	-1.10	-0.59
Use of reappraisal	0.59	0.09		6.54***	0.41	0.77
Interaction term (moderator-predictor)	-0.005	0.01		-0.48	-0.02	0.01
Level of mental well-being						
Perceived self-efficacy	0.35	0.05		7.03***	0.25	0.45
Stress perceptions	-0.25	0.09		-2.79**	-0.43	-0.07

Level of reappraisal	0.26	0.06		4.07***	0.13	0.39
Interaction term (moderator – predictor)	0.008	0.01		0.84	-0.01	0.02
Interaction term (moderator – mediator)	-0.003	0.004		-0.67*	-0.01	0.005
LR test of model vs. saturated: chi2(1) = 2.27, Prob > chi2 = 0.1318						
Use of reappraisal as difference in scores of two subscales (1SD<Mean)	-0.31	0.07		-4.03***	-0.49	-0.18
Use of reappraisal as difference in scores of two subscales (mean)	-0.30	0.06		-4.83***	-0.45	-0.20
Use of reappraisal as difference in scores of two subscales (1SD>mean)	-0.30	0.09		-3.28***	-0.53	-0.16

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Table 36. Post – hoc analysis of the longitudinal, moderated-mediation model (outcome variable: socio-emotional disturbances)

	coefficient	**Std er.**	**obs**	**z**	**95%CI**	
					Lower	**Upper**
Perceived self-efficacy						
Stress perceptions	-0.89	0.15	117	-5.78***	-1.19	-0.58
Level of reappraisal	0.55	0.10		5.38***	0.35	0.75
Interaction term (moderator x predictor)	-0.009	0.01		-0.73	-0.03	0.01
Level of social-emotional disturbances						
Perceived self-efficacy	-0.14	0.04		-3.20***	-0.23	-0.05
Stress perceptions	0.30	0.08		3.57***	0.13	0.47
Level of reappraisal	-0.15	0.05		-2.61**	-0.26	-0.03
Interaction term (moderator x predictor)	-0.001	0.009		-0.11	-0.01	0.01
Interaction term (moderato x mediator)	0.003	0.004		-0.83	-0.004	0.011
LR test of model vs. saturated: chi2(1) = 1.30, Prob > chi2 = 0.2545						
Use of reappraisal as difference in scores of two subscales (1SD<Mean)	0.14	0.05		2.80**	0.06	0.28
Use of reappraisal as difference in scores of two subscales (mean)	0.12	0.04		2.79**	0.06	0.25
Use of reappraisal as difference in scores of two subscales (1SD>mean)	0.11	0.07		1.58	0.01	0.29

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Table 37. Post – hoc analysis of the longitudinal, moderated-mediation model (outcome variable: total score of positive emotions)

	coefficient	**Std er.**	**obs**	**z**	**95%CI**	
					Lower	**Upper**
Perceived self-efficacy						
Stress perceptions	-0.86	0.14	122	-6.14***	-1.14	-0.58
Level of reappraisal	0.52	0.10		5.27***	0.33	0.72
Interaction term (moderator x predictor)	-0.004	0.01		-0.37	-0.02	0.01
Level of positive emotions						
Perceived self-efficacy	0.39	0.08		4.79***	0.23	0.55
Stress perceptions	-0.55	0.14		-3.76***	-0.83	-0.26
Level of reappraisal	0.16	0.10		1.64	-0.03	0.36
Interaction term (moderator x predictor)	-0.006	0.01		-0.43	-0.03	0.02
Interaction term (moderator x mediator)	-0.01	0.007		-2.25	-0.003	0.002
LR test of model vs. saturated: chi2(1) = 0.87, Prob > chi2 = 0.3511						
Use of reappraisal as difference in scores of two subscales (1SD<Mean)	-0.44	0.11		-3.80***	-0.69	-0.23
Use of reappraisal as difference in scores of two subscales (mean)	-0.34	0.08		-3.93***	-0.54	-0.19
Use of reappraisal as difference in scores of two subscales (1SD>mean)	-0.22	0.11		-1.90	-0.58	-0.03

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Table 38. First-stage, moderated mediation analysis at baseline and follow-up (assessing the moderating effects of reappraisal and suppression in isolation).

Baseline Analysis						
Outcome variable: anxiety symptoms **Emotion regulation strategy:** suppression						
	Coefficient	**Bootstrapped standard error**	**Obs.**	**z**	**95%CI (bias-corrected)**	
1SD<Mean	0.150	0.03	261	3.75***	0.06	0.22
Mean	0.151	0.03		3.87***	0.07	0.22
1SD>Mean	0.153	0.04		3.61***	0.07	0.23
Outcome variable: mental well-being **Emotion regulation strategy:** Suppression						
1SD<Mean	-0.47	0.05	338	-7.96***	-0.60	-0.37
Mean	-0.47	0.05		-8.78***	-0.58	-0.38
1SD>Mean	-0.48	0.06		-7.09***	-0.61	-0.36
Outcome variable: socio-emotional disturbances **Emotion regulation strategy:** Suppression						
1SD<Mean	0.17	0.03	303	5.48***	0.12	0.23
Mean	0.17	0.02		6.19***	0.13	0.24
1SD>Mean	0.18	0.03		5.97***	0.13	0.25
Outcome variable: positive emotions **Emotion regulation strategy:** Suppression						
1SD<Mean	-0.44	0.06	290	-7.15***	-0.60	-0.33
Mean	-0.43	0.05		-8.39***	-0.53	-0.33
1SD>Mean	-0.42	0.06		-6.99***	-0.55	-0.31
Outcome variable: anxiety symptoms **Emotion regulation strategy:** Reappraisal						
1SD<Mean	0.13	0.03	262	3.76***	0.07	0.20
Mean	0.12	0.03		3.74***	0.06	0.20
1SD>Mean	0.13	0.03		3.38***	0.06	0.21
Outcome variable: mental well-being **Emotion regulation strategy:** Reappraisal						
1SD<Mean	-0.32	0.05	341	-6.31***	-0.42	-0.22
Mean	-0.33	0.05		-6.75***	-0.44	-0.24
1SD>Mean	-0.35	0.05		-5.89***	-0.48	-0.24

Outcome variable: socio-emotional disturbances **Emotion regulation strategy:** Reappraisal						
1SD<Mean	0.13	0.03	305	4.36***	0.08	0.20
Mean	0.13	0.02		4.46***	0.08	0.20
1SD>Mean	0.13	0.03		4.01***	0.07	0.20
Outcome variable: positive emotions **Emotion regulation strategy:** Reappraisal						
1SD<Mean	-0.20	0.03	310	-5.48***	-0.29	-0.14
Mean	-0.21	0.03		-6.38***	-0.29	-0.15
1SD>Mean	-0.23	0.03		-5.89***	-0.32	-0.16
Longitudinal Analysis						
Outcome variable: anxiety symptoms **Emotion regulation strategy:** Suppression						
	Coefficient	**Standard error**	**Obs.**	**z**	**95%CI**	
1SD<Mean	0.11	0.05	114	1.99*	0	0.23
Mean	0.11	0.05		2.16*	0	0.21
1SD>Mean	0.10	0.04		2.23*	0	0.19
Outcome variable: mental well-being **Emotion regulation strategy:** Suppression						
1SD<Mean	-0.51	0.08	155	-5.88***	-0.75	-0.37
Mean	-0.49	0.07		-6.72***	-0.67	-0.38
1SD>Mean	-0.47	0.08		-5.41***	-0.65	-0.31
Outcome variable: socio-emotional disturbances **Emotion regulation strategy:** Suppression						
1SD<Mean	0.23	0.07	123	3.29***	0.11	0.38
Mean	0.21	0.06		3.41***	0.10	0.36
1SD>Mean	0.19	0.06		3.13**	0.09	0.35
Outcome variable: positive emotions **Emotion regulation strategy:** Suppression						
1SD<Mean	-0.50	0.11	127	-4.41***	-0.78	-0.33
Mean	-0.48	0.10		-4.82***	-0.70	-0.33
1SD>Mean	-0.46	0.10		-4.22***	-0.71	-0.28
Outcome variable: anxiety symptoms **Emotion regulation strategy:** Reappraisal						
1SD<Mean	0.15	0.05	115	2.78**	0.06	0.27

Mean	0.15	0.05		2.90**	0.06	0.28
1SD>Mean	0.15	0.06		2.53*	0.06	0.31
Outcome variable: mental well-being **Emotion regulation strategy:** Reappraisal						
1SD<Mean	-0.35	0.08	157	-4.24***	-0.51	-0.20
Mean	-0.40	0.07		-5.50***	-0.58	-0.28
1SD>Mean	-0.45	0.09		-4.98***	-0.70	-0.30
Outcome variable: socio-emotional disturbances **Emotion regulation strategy:** Reappraisal						
1SD<Mean	0.15	0.05	123	2.93**	0.06	0.27
Mean	0.17	0.05		3.29***	0.08	0.29
1SD>Mean	0.20	0.06		3.05**	0.08	0.33
Outcome variable: positive emotions **Emotion regulation strategy:** Reappraisal						
1SD<Mean	-0.33	0.10	127	-3.20***	-0.60	-0.17
Mean	-0.36	0.10		-3.66***	-0.65	-0.20
1SD>Mean	-0.39	0.11		-3.36***	-0.73	-0.22

***p*≤0.05, ****p*≤0.01, *****p*≤0.001**

Table 39. Four separate factorial MANOVAs were undertaken for assessing whether there were significant differences on model's variables between completers and non-completers of RCMAS and SDQ. Independent variables consist of two participant groups for each of the outcomes in which there was the greatest proportion of missing data (RCMAS and SDQ). As such, participants were divided in completers and non-completers in these two measures by creating two dummy variables for each MANOVA. The following test statistics are provided: W for Wilk's lambda, P for Pillai's trace, L for Lawley-Hotelling trace, R for Roy's largest root.

Source	Statistic	df	F(df1, df2)		F	Prob>F
Anxiety-missing (baseline)	W: 0.98 P: 0.01 L: 0.01 R: 0.01	1	5.00 5.00 5.00 5.00	134.00 134.00 134.00 134.00	0.51 0.51 0.51 0.51	0.76 0.76 0.76 0.76
Residual		113				
Total		114				
Sdq-missing (baseline)	W: 0.94 P: 0.05 L: 0.05	1	5.00 5.00 5.00	134.00 134.00 134.00	1.46 1.46 1.46	0.20 0.20 0.20

	R: 0.05		5.00	134.00	1.46	0.20
Residual		139				
Total		140				
Anxiety-missing (followup)	W: 0.94 P: 0.05 L: 0.05 R: 0.05	1	5.00 5.00 5.00 5.00	108.00 108.00 108.00 108.00	1.21 1.21 1.21 1.21	0.31 0.31 0.31 0.31
Residual		112				
Total		113				
Sdq-missing follow-up	W: 0.98 P: 0.01 L: 0.01 R: 0.01	1	5.00 5.00 5.00 5.00	108.00 108.00 108.00 108.00	0.40 0.40 0.40 0.40	0.84 0.84 0.84 0.84
Residual		112				
Total		113				

Appendix III

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NG7 2HA

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

For office's use – Do not fill in

Ident. No.:

Personal Details
(please fill in your personal details)

Initials:
Date of Birth: **(DD/MM/YYYY)**
Age:
Gender: **(M/F)**
Year in School:
Ethnicity: **1. Other** **2. African-British** **3. White-British** **4. Other African background** **5. Other White background** **6. Asian Background** **7. Not prefer to say**
Number of Siblings:

Please read the instructions carefully!

Please fill in the questions below. They are short and simple questions. There are not correct or wrong answers. It will not take more than 15-20 minutes for filling it in. Thanks in advance for your participation in my study!

The questions below ask you about your feelings and thoughts **during the last month**. In each case, you will be asked to indicate by **circling** how often you felt or thought a certain way.

0 = Never, 1 = Almost Never, 2 = Sometimes, 3 = Fairly Often, 4 = Very Often

Questions	0 = Never	1 = Almost Never	2 = Sometimes	3 = Fairly Often	4 = Very Often
In the last month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
In the last month, how often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
In the last month, how often have you felt nervous and "stressed"?	0	1	2	3	4
In the last month, how often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
In the last month, how often have you felt that things were going your way?	0	1	2	3	4
In the last month, how often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
In the last month, how often have you been able to control irritations in your life?	0	1	2	3	4
In the last month, how often have you felt that you were on top of things?	0	1	2	3	4

In the last month, how often have you been angered because of things that were outside of your control?	0	1	2	3	4
In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Instructions: The questions below ask you about your feelings, thoughts and actions. In each case, you will be asked to indicate by **circling** how often you felt or thought a certain way.

	1 Not at all	2	3	4	5 Very Well
1. How well can you express your opinions when other classmates disagree with you?	1	2	3	4	5
2. How well do you succeed in cheering yourself up when an unpleasant event has happened?	1	2	3	4	5
3. How well can you study when there are other interesting things to do?	1	2	3	4	5
4. How well do you succeed in becoming calm again when you are very scared?	1	2	3	4	5
5. How well can you become friends with other children?	1	2	3	4	5
6. How well can you study a chapter for a test?	1	2	3	4	5
7. How well can you have a chat with an unfamiliar person?	1	2	3	4	5
8. How well can you prevent to become nervous?	1	2	3	4	5
9. How well do you succeed in finishing all your homework every day?	1	2	3	4	5
10. How well can you work in harmony with your classmates?	1	2	3	4	5
11. How well can you control your feelings?	1	2	3	4	5
12. How well can you pay attention during every class?	1	2	3	4	5
13. How well can you tell other children that they are doing something that you don’t like?	1	2	3	4	5
14. How well can you give yourself a pep-talk when you feel low?	1	2	3	4	5
15. How well do you succeed in understanding all subjects in school?	1	2	3	4	5

16. How well can you tell a funny event to a group of children?	1	2	3	4	5
17. How well do you succeed in satisfying your parents with your schoolwork?	1	2	3	4	5
18. How well do you succeed in staying friends with other children?	1	2	3	4	5
19. How well do you succeed in suppressing unpleasant thoughts?	1	2	3	4	5
20. How well do you succeed in passing a test?	1	2	3	4	5
21. How well do you succeed in not worrying about things that might happen?	1	2	3	4	5

1------2-------3-------4--------5--------6-------7-------8-------9-------10
strongly neutral strongly
disagree agree

Instructions: For each of the following items, write a number from 0 - 10, using the scale above.

1. ____ When I want to feel happier, I think about something different

2. ____ I keep my feelings to myself.

3. ____ When I want to feel less bad (e.g. sad, angry or worried), I think about something different

4. ____ When I am feeling happy, I am careful not to show it.

5. ____ When I'm worried about something, I make myself think about it in a way that helps me feel better.

6. ____ I control my feelings by not showing them.

7. ____ When I want to feel happier about something, I change the way I'm thinking about it.

8. ____ I control my feelings by changing the way I think about them.

9. ____ When I am feeling bad (e.g. sad, angry or worried), I am careful not to show it.

10. ____ When I want to feel less bad (e.g. sad, angry or worried) about something, I change the way I'm thinking about it.

Instructions: Below are some statements about feelings and thoughts. Please tick the box that best describes your experience of each **over the last 2 weeks**.

STATEMENTS	None of the time	Rarely	Some of the time	Often	All of the time
I've been feeling optimistic about the future					
I've been feeling useful					
I've been feeling relaxed					
I've been feeling interested in other people					
I've had energy to spare					
I've been dealing with problems well					
I've been thinking clearly					
I've been feeling good about myself					
I've been feeling close to other people					
I've been feeling confident					
I've been able to make up my own mind about things					

I've been feeling loved					
I've been interested in new things					
I've been feeling cheerful					

Instructions: This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you have felt like this in the **past two weeks**. Use the following scale to record your answers.

Very slightly or not at all (1)

A little (2)

Moderately (3)

Quite a bit (4)

Extremely (5)

Interested _____

Distressed _____

Excited _____

Upset _____

Strong _____

Guilty _____

Scared _____

Hostile _____

Enthusiastic _____

Proud _____

Irritable _____

Alert _____

Ashamed _____

Inspired _____

Nervous _____

Determined _____

Attentive _____

Jittery _____

Active _____

Afraid _____

Instructions: Read each question carefully. Put a circle around the word **YES** if you think it is true about you. Put a circle around the word **NO** if you think it is not true about you.

1. I have trouble making up my mind. Yes / No

2. I get nervous when things do not go the right way for me. Yes / No

3. Others seem to do things easier than I can. Yes / No

4. I like everyone I know. Yes / No

5. Often I have trouble getting my breath. Yes / No

6. I worry a lot of the time. Yes / No

7. I am afraid of a lot of things. Yes / No

8. I am always kind. Yes / No

9.	I get mad easily.	Yes /No
10.	I worry about what my parents will say to me.	Yes / No
11.	I feel that others do not like the way I do things.	Yes / No
12.	I always have good manners.	Yes / No
13.	It is hard for me to get to sleep at night.	Yes / No
14.	I worry about what other people think about me.	Yes / No
15.	I feel alone even when there are people with me.	Yes / No
16.	I am always good.	Yes / No
17.	Often I feel sick in the stomach.	Yes / No

18.	My feelings get hurt easily.	Yes / No
19.	My hands feel sweaty.	Yes / No
20.	I am always nice to everyone.	Yes / No
21.	I am tired a lot.	Yes / No
22.	I worry about what is going to happen.	Yes / No
23.	Other children are happier than I am	Yes/No
24.	I tell the truth every single time.	Yes / No
25.	I have bad dreams.	Yes / No

26. My feelings get hurt easily when I am fussed at. Yes / No

27. I feel someone will tell me I do things the wrong way. Yes / No

28. I never get angry. Yes / No

29. I wake up scared some of the time. Yes / No

30. I worry when I go to bed at night. Yes / No

31. It is hard for me to keep my mind on my schoolwork. Yes / No

32. I never say things that I shouldn't. Yes / No

33. I wriggle in my seat a lot. Yes / No

34. I am nervous. Yes / No

35. A lot of people are against me. Yes / No

36. I never lie. Yes / No

37. I often worry about something bad happening to me. Yes / No

Instructions: For each item, please mark the box for **Not True**, **Somewhat True** or **Certainly True**. It would help us if you answered all items as best you can even if you are not absolutely certain or the item seems daft! Please give your answers on the basis of how things have been for you **over the last six months**.

	Not true	Somewhat true	Certainly true
1. I try to be nice to other people. I care about their feelings	☐	☐	☐
2. I am restless; I cannot stay still for long	☐	☐	☐
3. I get a lot of headaches, stomach-aches or sickness	☐	☐	☐
4. I usually share with others (food, games, pens etc.)	☐	☐	☐
5. I get very angry and often lose my temper	☐	☐	☐
6. I am usually on my own. I generally play alone or keep to myself	☐	☐	☐
7. I usually do as I am told	☐	☐	☐
8. I worry a lot	☐	☐	☐
9. I am helpful if someone is hurt, upset or feeling ill	☐	☐	☐
10. I am constantly fidgeting or squirming	☐	☐	☐
11. I have one good friend or more	☐	☐	☐
12. I fight a lot. I can make other people do what I want	☐	☐	☐
13. I am often unhappy, down-hearted or tearful	☐	☐	☐
14. Other people my age generally like me	☐	☐	☐

15. I am easily distracted; I find it difficult to concentrate ☐ ☐ ☐

16. I am nervous in new situations. I easily lose confidence ☐ ☐ ☐

17. I am kind to younger children ☐ ☐ ☐

18. I am often accused of lying or cheating ☐ ☐ ☐

19. Other children or young people pick on me or bully me ☐ ☐ ☐

20. I often volunteer to help others (parents, teachers, children) ☐ ☐ ☐

21. I think before I do things ☐ ☐ ☐

22. I take things that are not mine from home, school or elsewhere ☐ ☐ ☐

23. I get on better with adults than with people my own age ☐ ☐ ☐

24. I have many fears, I am easily scared ☐ ☐ ☐

25. I finish the work I'm doing. My attention is good ☐ ☐ ☐

Instructions: This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you have felt like this in the **past two weeks**. Use the following scale to record your answers.

Very slightly or not at all (1)

A little (2)

Moderately (3)

Quite a bit (4)

Extremely (5)

Interested _____

Stressed out (distressed) _____

Excited _____

Upset _____

Strong _____

Guilty _____

Scared _____

Angry (hostile) _____

Eager (enthusiastic) _____

Irritable _____

Alert _____

Ashamed _____

Lively (inspired) _____

Nervous _____

Satisfied _____

Paying good attention (attentive) _____

Jumpy (jittery) _____

Active _____

Proud _____

Afraid _____

Appendix IV

Figure 10. The PRISMA reporting checklist of the meta-analytic review

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	32
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	N/A (a structured summary is provided in the published version of this meta-analytic review)
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	32,33,34,35
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	34
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	36
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	36
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	37-38
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	37-38

Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	38
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	38-39
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	39-40
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	40
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	40
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	39-40

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	39-40
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	39-40
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	39
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	173-174 (Appendix I)
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	177 (Appendix I)

Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	43
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	43
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	177 (Appendix I)
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	44
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	45, 46, 47
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	48
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	49
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	N/A (a statement regarding the funding sources is reported in the published version of this meta-analytic review)