Developing and evaluating an internet-delivered intervention for repetitive negative thinking

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A thesis in partial fulfilment of the requirements for the degrees of Doctor of Philosophy and Master of Psychology (Clinical)

School of Psychology

Faculty of Science

February 2022

Thesis submission for the degree of Doctor of Philosophy

Thesis Title and Abstract | **Declarations** | Inclusion of Publications Statement | Corrected Thesis and Responses

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Publication Details #1

Full Title:	Understanding the experience of rumination and worry: A descriptive qualitative survey study.
Authors:	Joubert, A. E., Moulds, M. L., Werner-Seidler, A., Sharrock, M., Popovic, B., Newby, J. M.
Journal or Book Name:	British Journal of Clinical Psychology
Volume/Page Numbers:	00, 1-18
Date Accepted/Published:	16/03/2022
Status:	published
The Candidate's Contribution to the Work:	The candidate conceptualised the methodology, developed survey questions, and led the recruitment, data analysis, and writing of the manuscript, with assistance from the co-authors.
Location of the work in the thesis and/or how the work is incorporated in the thesis:	This publication has been included in lieu of Chapter 2 in the thesis.

Publication Details #2

Full Title:	Managing rumination and worry: A pilot study of an internet intervention targeting repetitive negative thinking in Australian adults.
Authors:	Joubert, A. E., Grierson, A. B., Chen, A. Z., Moulds, M. L., Werner-Seidler, A., Mahoney, A. E. J., Newby, J. M.
Journal or Book Name:	Journal of Affective Disorders
Volume/Page Numbers:	294, 483-490
Date Accepted/Published:	November 2021
Status:	published
The Candidate's Contribution to the Work:	The candidate conceptualised the research question, developed the intervention program, and led the recruitment, trial management, assessment and clinical supervision of participants, data analysis, and writing of the manuscript,

Publication Details #3

Full Title:	Managing Rumination and Worry: A randomised controlled trial of an internet intervention targeting repetitive negative thinking delivered with and without clinician guidance.
Authors:	Joubert, A. E., Grierson, A. G., Li, I., Sharrock, M. J., Moulds, M. L., Werner-Seidler, A., Stech, E. P., Mahoney, A. E. J., Newby, J. M.
Journal or Book Name:	Behaviour Research and Therapy
Volume/Page Numbers:	
Date Accepted/Published:	
Status:	submitted
The Candidate's Contribution to the Work:	The candidate conceptualised the research question, refined the intervention program, and led the recruitment, trial management, assessment and clinical supervision of participants, data analysis, and writing of the manuscript, with assistance from the co-authors.
Location of the work in the thesis and/or how the work is incorporated in the thesis:	This publication has been included in lieu of Chapter 4 in the thesis.

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I confirm that where I have used a publication in lieu of a chapter, the listed publication(s) above meet(s) the requirements to be included in the thesis. I also declare that I have complied with the Thesis Examination Procedure.

Acknowledgements

First and foremost, I am forever grateful to Associate Professor Jill Newby, who has been the epitome of a dream supervisor. Your calm, kind, and encouraging approach has played a pivotal role in making the last four years such a positive and smooth experience, even amid a global pandemic. Thank you for being extremely generous with your time and expertise and for your enthusiasm for my research. Thanks also to Associate Professor Aliza Werner-Seidler for all your helpful feedback and suggestions and to Professor Michelle Moulds, whose warmth and encouragement were always strongly felt even via email from across the other side of the world.

To my work wives, Ash, Aileen, and Siobhan; thank you for being my constant cheerleaders and always celebrating even the smallest of my milestones and achievements. It's a privilege to know such wonderful, kind, intelligent, and driven women. Thanks also to my CRUfAD family, in particular Hila, Ali, Ian, Maria, and Jonathan, for all your help with Virtual Clinic and for all the laughs we had along the way. And to Emeritus Professor Gavin Andrews, who gave me my first research job and introduced me to e-health interventions. For two years you asked me "when are you going to do a PhD?" on a daily basis and I'm proud to say I've now done just that; thank you for your encouragement and belief in me.

To my Masters colleagues; thank you for all the good times we had in 826 while we navigated such a steep learning curve together. I'm also grateful to all of my clinical supervisors who've mentored and inspired me as a clinician. And a very big thank you to my wonderful friends for many, many things, not least the interest you've always shown in my studies.

To Mum and Dad, for leaving everything you knew and moving us from South Africa to Australia so that Mike and I could have better opportunities. Throughout all my studies,

I've tried to honour your bravery and mirror your work ethic. Thank you for your unwavering enthusiasm, support, and encouragement of everything I do. And to Mike; I can always count on your incredible sense of humour to make me laugh, even during the hardest of times, and cherish our conversations. I'm so incredibly proud and grateful to be your big sister.

And to my husband, Tom, for more than could ever be put down in words. Your endless love, support, and patience throughout all the highs and lows has been the backbone of my PhD/Masters. Thank you for always believing in me, especially when I don't believe in myself. Any day with you is my favourite sort of day so I can't wait to have more free time and for all of life's adventures we're yet to have together.

Finally, my sincere thanks and gratitude to each of the participants for making this research possible. I can only hope more people are helped by this intervention.

Publications and presentations

Publications

Joubert, A. E., Moulds, M. L., Werner-Seidler, A., Sharrock, M., Popovic, B., Newby, J. M. Understanding the experience of rumination and worry: A descriptive qualitative survey study. *British Journal of Clinical Psychology, 00*, 1-18.

*This manuscript has been included in lieu of **Chapter 2** in the present thesis.*

Joubert, A. E., Grierson, A. B., Chen, A. Z., Moulds, M. L., Werner-Seidler, A., Mahoney, A. E. J., Newby, J. M. (2021). Managing rumination and worry: A pilot study of an internet intervention targeting repetitive negative thinking in Australian adults. *Journal of Affective Disorders, 294*(1), 483-490. https://doi.org/10.1016/j.jad.2021.07.076

*This manuscript has been included in lieu of **Chapter 3** in the present thesis.*

Joubert, A. E., Grierson, A. G., Li, I., Sharrock, M. J., Moulds, M. L., Werner-Seidler, A., Stech, E. P., Mahoney, A. E. J., Newby, J. M. Managing rumination and worry: A randomised controlled trial of an internet intervention targeting repetitive negative thinking delivered with and without clinician guidance. *Manuscript under review.*

*This manuscript has been included in lieu of **Chapter 4** in the present thesis.*

Oral presentations

Joubert, A. E. (December 2021). Managing rumination and worry – A randomised controlled trial of an internet intervention delivered with and without clinician guidance versus

treatment as usual. Online oral presentation at the *Sydney Postgraduate Psychology Conference.*

Joubert, A. E. (October 2021). Managing rumination and worry – a randomised controlled trial of an internet intervention delivered with and without clinician guidance versus treatment as usual. Online oral presentation at the *Australian Association for Cognitive and Behaviour Therapy 41st National Conference*.

Joubert, A. E. (September 2021). Managing rumination and worry: A randomised controlled trial of an internet intervention delivered with and without clinician guidance versus treatment as usual. Online oral presentation at *Transdiagnostic Approaches to Mental Health International Online Conference,* University of Manchester.

Joubert, A. E. (October 2020). Managing rumination and worry: A pilot study of an internet intervention targeting repetitive negative thinking in Australian adults. Oral presentation at the *UNSW Forensic and Clinical Masters Conference*, Sydney, Australia.

Joubert, A. E. (September 2020). Developing and evaluating an internet intervention for repetitive negative thinking. 1-minute thesis presentation at the *UNSW Postgraduate Research Showcase*, Sydney, Australia.

Poster presentations

Joubert, A. E., Grierson, A. B., Chen, A. Z., Moulds, M. L., Werner-Seidler, A., Mahoney, A. E. J., & Newby, J. M. (October 2021). Managing rumination and worry: A pilot study of an internet intervention targeting repetitive negative thinking in Australian adults. Virtual poster presentation at the *Australian Association for Cognitive and Behaviour Therapy 41st National Conference*.

Joubert, A. E., Moulds, M. L., Werner-Seidler, A., Letran, B., & Newby, J. M. (October 2021). Understanding rumination and worry; Using data from an online qualitative

survey to inform the development of a treatment intervention. Virtual poster presentation at the *Australian Association for Cognitive and Behaviour Therapy 41st National Conference*.

Joubert, A. E., Moulds, M. L., Werner-Seidler, A., Letran, B., & Newby, J. M. (July 2019). Understanding rumination and worry; Using data from an online qualitative survey to inform the development of a treatment intervention. Poster presentation at the *Ninth World Congress of Behavioural and Cognitive Therapies*, Berlin, Germany.

Abstract

Targeting and reducing the processes underlying the development and maintenance of depression and anxiety disorders, such as repetitive negative thinking (RNT), is a promising approach suggested to improve the efficacy and durability of psychological treatment. Delivering treatment online overcomes many of the barriers to accessing mental health treatment and improves treatment coverage. This thesis therefore involved the development and evaluation of a novel internet-delivered treatment targeting RNT.

Study 1 involved an online qualitative survey to gain insight into how individuals define, experience, and understand rumination and worry. The findings from Study 1 were used to inform the development of the online intervention evaluated in subsequent chapters. Study 2 outlines the pilot evaluation of the online intervention. The results of Study 2 demonstrated the preliminary efficacy and acceptability of the intervention in adults, with significant reductions in participants self-reported levels of RNT, rumination, and worry, as well as symptoms of depression and generalised anxiety. Treatment effects were maintained at 1-month follow-up. Study 3 aimed to extend these preliminary findings using a randomised controlled trial design and compared the intervention when it was delivered with and without clinician guidance to a treatment-as-usual (TAU) control group. Participants in both the clinician guided and self-help groups had significantly lower levels of RNT, rumination, and worry, as well as symptoms of depression and anxiety compared to TAU at both post-treatment and 3-month follow-up. Treatment effects were significantly larger in the clinician guided group compared to self-help.

This thesis provided the first evidence that targeting rumination and worry, both types of RNT, using an online intervention is efficacious, feasible, and acceptable in adults. This thesis also provided the first direct comparison of treatment outcomes and adherence between guided and self-help intervention formats and, in doing so, is the first to demonstrate the

superiority of the clinician guided format. These findings add to the growing body of literature suggesting that internet-delivered interventions can successfully simultaneously target rumination and worry and that doing so is associated with significant improvements in depression and anxiety symptoms.

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List of abbreviations

ADIS-5	Anxiety and Related Disorders Interview Schedule for DSM-5
BDI-II	Beck Depression Inventory- Second Edition
CBT	Cognitive behaviour therapy
DSM-5	Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
GAD	Generalised anxiety disorder
GAD-7	Generalised Anxiety Disorder 7-item
GP	General Practitioner
ISI	Insomnia Severity Index
K10	Kessler Psychological Distress Scale 10-item
MDD	Major Depressive Disorder
PHQ-9	Patient Health Questionnaire – 9
PSWQ	Penn State Worry Questionnaire
RCT	Randomised controlled trial
RNT	Repetitive negative thinking
RRS	Ruminative Response Scale
RTQ-10	Repetitive Thinking Questionnaire – 10
TAU	Treatment as usual

Chapter 1: General introduction

Depression and anxiety disorders are common mental health conditions associated with significant individual disability as well as societal and economic burden (World Health Organisation [WHO], 2017). As a significant proportion of individuals do not benefit from existing evidence-based treatments or relapse afterwards (Butler, Chapman, Forman, & Beck, 2006; Cuijpers, Cristea, Karyotaki, Reijnders, & Huibers, 2016; Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012), there is an important need to develop novel treatment methods which optimise treatment outcomes. A promising approach suggested to improve the efficacy and durability of treatment is to target and reduce the processes underlying the development and maintenance of depression and anxiety disorders, such as repetitive negative thinking (Ehring & Watkins, 2008; Ehring et al., 2011; McEvoy, Nathan, & Norton, 2009; Topper, Emmelkamp, & Ehring, 2010). Delivering treatment online is also recognised to overcome many of the barriers to accessing mental health treatment and improves treatment coverage (Andersson & Titov, 2014; Andrews, Basu, et al., 2018; Andrews, Cuijpers, Craske, McEvoy, & Titov, 2010). The current thesis addressed this pressing issue and outlines the development and evaluation of a novel internet-delivered treatment targeting repetitive negative thinking.

Prevalence and burden of depression and anxiety disorders

Depressive disorders are characterised by persistent low mood and/or lack of interest or pleasure in previously enjoyable or rewarding activities (American Psychiatric Association [APA], 2013). They can also include changes in appetite, sleep disturbance, fatigue, poor concentration, excessive guilt, hopelessness, and suicidality (APA, 2013). The current thesis focuses on unipolar depressive disorders including Major Depressive Disorder (MDD) and Persistent Depressive Disorder (Dysthymia). Anxiety disorders are characterised by

excessive and persistent feelings of anxiety, fear, and tension which are out of proportion to the actual threat or danger and cause significant distress and interference in daily functioning (APA, 2013). There are a range of anxiety disorders, such as generalised anxiety disorder, social anxiety disorder, specific phobia, panic disorder, and agoraphobia (APA, 2013). Each of these diagnoses reflects a specific fear focus, however, all anxiety disorders typically include a range of cognitive (e.g., difficulty concentrating, worries), physical (e.g., muscle tension, fatigue), behavioural (e.g., sleep difficulties, avoidance), and emotional (e.g., irritability, fear) symptoms (APA, 2013).

Depression and anxiety disorders are common mental disorders. In 2017, 3.4% of the world's population or 262 million people were estimated to be affected by depression while 3.8% of the world's population (284 million people) were reportedly affected by an anxiety disorder (WHO, 2017). Anxiety disorders are ranked as the sixth leading cause of disability worldwide while depression is currently the leading cause of disability globally and is recognised as a significant contributor to suicide, which is ranked in the top 20 leading causes of death worldwide (WHO, 2017). According to the Australian National Health Survey, in 2017-18 one in ten people (10.4%) in Australia had depression while 3.2 million Australians (13.1%) suffered from an anxiety disorder (Australian Bureau of Statistics [ABS], 2018). Lifetime prevalence of both of these disorders is high, with 15% of Australians experiencing depression and 26.3% experiencing an anxiety disorder (ABS, 2008), while one in four individuals experience more than one of these disorders concurrently (Slade, Johnston, Oakley Browne, Andrews, & Whiteford, 2009). These data pre-date the emergence of the novel coronavirus SARS-CoV-2 (COVID-19), associated with significant disruptions to daily life and a range of negative social and economic impacts which have exacerbated many of the determinants of poor mental health on a global scale (Aknin et al., 2021; Pierce et al., 2020; Shakespeare-Finch et al., 2020). A systematic review of the prevalence of major depressive

disorder and anxiety disorders in 204 countries during the COVID-19 pandemic found increased prevalence in both males and females and across the lifespan, with an estimated increase of 53.2 million cases of major depression and 76.2 million cases of anxiety disorders globally (COVID-19 Mental Disorders Collaborators, 2021). Similarly, research into the mental health impact of the COVID-19 pandemic in Australia to date has found that mean levels of depression and anxiety symptoms during the pandemic are higher relative to usual population-based studies, including for individuals with no pre-existing mental health diagnoses (e.g., Batterham et al., 2021; Dawel et al., 2020; Newby, O'Moore, Tang, Christensen, & Faasse, 2020). These findings demonstrate the serious acute mental health impact of the COVID-19 pandemic, however, longitudinal studies are needed to investigate the long-term impact.

Depression and anxiety typically onset early in life during adolescence and early adulthood (Côté et al., 2009) and follow a chronic (Bruce et al., 2005) and relapsing course (Judd, 1997). They are associated with significant individual, societal, and economic burden. For example, they are associated with increased risk of physical health conditions such as cardiovascular disease (Katon, 2011; Kawachi, Sparrow, Vokonas, & Weiss, 1994; Wulsin, Vaillant, & Wells, 1999), occupational impairment including lost productivity and absences from work (Birnbaum et al., 2010), as well as significant functional impairment, and reduced quality of life (Löwe et al., 2008; Rapaport, Clary, Fayyad, & Endicott, 2005). In Australia, depression and anxiety disorders together contribute almost 10% of the total burden of disease for women and 4.8% for men (ABS, 2008). Depression also has the third highest burden of all diseases in Australia (13%) and is the leading cause of non-fatal disability (23%; Australian Institute of Health and Welfare, 2014), with the disability associated with depression estimated to cost the Australian health system almost AUD$13 billion per year (LaMontagne, Sanderson, & Cocker, 2010).

In addition to being common and disabling conditions, depression and anxiety disorders often co-occur, with co-morbidity rates between 40-80% (Brown, Campbell, Lehman, Grisham, & Mancill, 2001; Kessler, Chiu, Demler, Merikangas, & Walters, 2005; Kessler et al., 2015). This co-morbidity is associated with more severe symptoms and impairment, increased suicide risk, and poorer prognosis (Kaufman & Charney, 2000; Kessler et al., 2015; Pollack, 2005; Rapee et al., 2013; Rohde, Clarke, Lewinsohn, Seeley, & Kaufman, 2001).

Evidence-based psychological treatments

Cognitive Behaviour Therapy (CBT) is one of the first-line psychological treatment approaches recommended by Australian (Andrews, Bell, et al., 2018; Malhi et al., 2021) and international (National Institute for Health and Care Excellence, 2009, 2019) clinical practice guidelines for both depression and anxiety disorders. CBT is a skills-based therapy which aims to identify and modify maladaptive cognitions and behaviours theorised to maintain these disorders (Beck, 1979; Fenn & Byrne, 2013). CBT treatment of anxiety and depressive disorders typically incorporates psychoeducation about anxiety and/or depression and treatment strategies such as cognitive restructuring, problem solving, graded exposure, behavioural activation, and arousal management or relaxation.

Challenges in standard Cognitive Behaviour Therapy (CBT) treatment of depression and anxiety disorders

CBT is well-established as the "gold-standard" psychological treatment for depression and anxiety disorders (e.g., Cuijpers, van Straten, Andersson, & van Oppen, 2008), however, significant challenges in the CBT-based treatment of these disorders exist. For example, despite there being effective treatments, these are typically difficult to access, particularly outside of major cities, associated with financial costs and stigma, and require individuals to

attend during business hours (Andersson & Cuijpers, 2009; Andersson & Titov, 2014; Andrews et al., 2010; Clement et al., 2015; Mohr et al., 2006; Mohr, Ho, et al., 2010; Spek et al., 2007). Less than half of those experiencing depression and/or anxiety seek treatment for their symptoms (Burgess et al., 2009; Slade et al., 2009). Of those who do seek help, only a quarter (26%) receive an evidence-based treatment while only 16% receive a minimally adequate "dose" of treatment (Harris et al., 2015). In addition to poor treatment coverage and quality, a significant proportion of individuals do not respond to standard CBT treatments or achieve remission, and many relapse afterwards (e.g., Butler et al., 2006; Cuijpers et al., 2016; Cuijpers et al., 2014; Hofmann et al., 2012; Vittengl, Clark, Dunn, & Jarrett, 2007). Many individuals with depression and/or an anxiety disorder also continue to experience high levels of residual symptoms following CBT treatment (Cornwall & Scott, 1997; Dimidjian et al., 2006; Fava, Grandi, Zielezny, Canestrari, & Morphy, 1994; Hofmann et al., 2012; Judd, 1997; Kennedy, Abbott, & Paykel, 2004; Nathan & Gorman, 2007; Paykel et al., 1995; Scott, 2006). Residual symptoms predict poorer long-term outcomes for the patient, with prospective longitudinal studies showing that the presence of residual symptoms following treatment significantly increases an individuals' risk of relapse (e.g.,Beshai, Dobson, Bockting, & Quigley, 2011; Riso et al., 2003). Moreover, residual symptoms are associated with significant levels of ongoing distress and impairment across a number of domains in the patients' life, as well as high healthcare utilisation (Judd, 1997; Kennedy et al., 2004; Paykel et al., 1995).

In summary, depression and anxiety disorders are common mental health conditions associated with significant individual disability and societal and economic burden. Despite available evidence-based treatments, a significant proportion of individuals do not benefit from these existing treatment options or relapse afterwards. Thus, there is an important need to improve the efficacy and durability of treatment. A promising approach suggested by a

number of scholars (e.g., Harvey, Watkins, & Mansell, 2004; Hofmann & Hayes, 2019; McEvoy et al., 2009) and explored in the current thesis is the development of treatment interventions which target and reduce the processes underlying the development and maintenance of depression and anxiety disorders. A range of these approaches have been tested, such as targeting anxiety sensitivity (e.g., Allan, Albanese, Judah, Gooch, & Schmidt, 2020), intolerance of uncertainty (e.g., Boswell, Thompson-Hollands, Farchione, & Barlow, 2013; Robichaud & Dugas, 2006), attention and interpretation biases (Beard, 2011; Fodor et al., 2020), perfectionism (Egan, Wade, & Shafran, 2011), and repetitive negative thinking (Watkins, 2016). This thesis focuses on targeting repetitive negative thinking.

Repetitive negative thinking

Repetitive negative thinking (RNT) is defined as the propensity to dwell repeatedly on negative feelings, situations, and events (Ehring & Watkins, 2008). Experienced by individuals as uncontrollable, perseverative, intrusive, and repetitive, RNT has been identified as a core underlying cognitive mechanism in both depression and anxiety disorders (Ehring & Watkins, 2008; Ehring et al., 2011). RNT has repeatedly been implicated in the onset, maintenance, and severity of depression and anxiety disorders and has also been shown to increase the likelihood of relapse following treatment, making it an important treatment target (e.g.,Ehring & Watkins, 2008; Ehring et al., 2011; Kircanski, Thompson, Sorenson, Sherdell, & Gotlib, 2015; Thomsen, 2006). RNT has been well-established as a transdiagnostic process, with elevated levels of RNT demonstrated in a number of other psychiatric disorders including social anxiety disorder, post-traumatic stress disorder, obsessive-compulsive disorder, insomnia, eating disorders, and substance use disorders (Ehring & Watkins, 2008; Harvey et al., 2004; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008).

Arguably two of the most studied variants of repetitive negative thinking are rumination and worry. Although there are a number of definitions of rumination, the most established definition refers to it as "behaviours and thoughts that passively focus one's attention on one's depressive symptoms and on the implications of these symptoms" (Nolen-Hoeksema, 1998). Rumination can also involve thinking over and over about past negative experiences, dwelling on past failures, regrets, and perceived negative aspects of the self, and over-analysing situations once they are over, using an evaluative and analytic cognitive style. When ruminating, a person may repeatedly ask themselves abstract questions such as "Why do I feel like this?" and "What is wrong with me?" (Nolen-Hoeksema et al., 2008; Watkins, 2015). To date, rumination has predominantly been studied in the context of major depressive disorder.

Defined as "a chain of thoughts and images, negatively affect-laden and relatively uncontrollable" (Borkovec, Robinson, Pruzinsky, & DePree, 1983), worry is often focused on imagined catastrophes and possible future threats, risks, and uncertainties and typically involves a person questioning how they would cope if these feared events were to occur (Borkovec, 1994). For example, a person may worry repeatedly about their family, their own health, personal finances, upcoming situations, work, or world events. As a core diagnostic feature or hallmark of generalised anxiety disorder (GAD; APA, 2013), worry has generally been studied within the context of GAD, however, is a common feature across anxiety disorders (Barlow, 1988, 2002; Barlow & Di Nardo, 1991).

As noted earlier, depression and anxiety disorders are the most common mental disorders and leading contributors to global disease burden (Vos, 2020; WHO, 2017). They are also frequently co-morbid (Brown et al., 2001; Kessler et al., 2005; Kessler et al., 2015) and share similar cognitive, emotional, and behavioural symptoms and maintaining factors (Barlow, Allen, & Choate, 2004; Barlow et al., 2017; Clark, 2009; Norton, 2006; Norton &

Paulus, 2017; Norton & Philipp, 2008). Thus, while RNT is present in a number of psychiatric disorders, the scope of this thesis is limited to RNT in major depressive disorder and generalised anxiety disorder.

Similarities between rumination and worry

Rumination and worry have generally been studied separately and within the context of depression and anxiety disorders, respectively. However, evidence suggests that rumination and worry are highly similar processes. Direct comparisons of rumination and worry have repeatedly demonstrated that the two processes are highly correlated (e.g., Fresco, Frankel, Mennin, Turk, & Heimberg, 2002; Muris, Roelofs, Meesters, & Boomsma, 2004; Segerstrom, Tsao, Alden, & Craske, 2000). Rumination and worry also share more similarities than differences; for example, both are negatively valenced, predominately verbal and abstract in nature, repetitive, and difficult to control (e.g., Papageorgiou & Wells, 1999; Watkins, 2004, 2008; Watkins, Moulds, & Mackintosh, 2005). Indeed, the only consistently replicated variation between rumination and worry is temporal orientation and thought content; rumination is typically focused on the past and losses, whereas worry is typically focused on the future and possible threats (e.g., Papageorgiou & Wells, 1999; Watkins, 2004; Watkins, Moulds, & Mackintosh, 2005).

Evidence also suggests that rumination and worry are transdiagnostic processes across depression and anxiety, with research studies showing that rumination and worry often co-occur in the same individual (Watkins et al., 2005) and that each are associated with symptoms of both depression and anxiety (Fresco et al., 2002; Hong, 2007; McLaughlin & Nolen-Hoeksema, 2011; Meyer, Miller, Metzger, & Borkovec, 1990; Muris, Roelofs, Rassin, Franken, & Mayer, 2005; Segerstrom et al., 2000). There is evidence of elevated levels of worry in individuals with major depressive disorder (Chelminski & Zimmerman, 2003; Starcevic, 1995), and that experimentally induced worry contributes to both depressed and

anxious mood states (Andrews & Borkovec, 1988). Further, rumination has been shown to be a significant predictor of symptoms of both depression and anxiety (Nolen-Hoeksema, 2000) and can prolong experimentally induced anxious mood (Blagden & Craske, 1996). These findings are in line with evidence that depression is highly co-morbid with anxiety (Brown et al., 2001; Clark & Watson, 1991; Kessler et al., 2005; Kessler et al., 2015) and could partially account for the particularly high co-morbidity rates between depression and generalised anxiety disorder (Brawman-Mintzer et al., 1993; Brown et al., 2001; McEvoy, Watson, Watkins, & Nathan, 2013; Moffitt et al., 2007).

The role of rumination and worry in depression and anxiety

Rumination and worry have repeatedly been shown to play a role in the development, severity, and maintenance of depression and anxiety disorders across several experimental and prospective longitudinal studies. For example, numerous prospective studies have demonstrated that individuals who ruminate are more likely to develop depression, to have more severe depressive symptoms, and to experience more prolonged episodes of depression than individuals who do not ruminate or have lower levels of rumination (Just & Alloy, 1997; Morrow & Nolen-Hoeksema, 1990; Nolen-Hoeksema, 2000; Robinson & Alloy, 2003; Segerstrom et al., 2000; Spasojević & Alloy, 2001). Rumination has also been shown to predict the onset of anxiety (Nolen-Hoeksema, 2000) and was moderately correlated with symptoms of both depression and anxiety in a meta-analysis of 179 correlational studies and 37 clinical group comparison studies (Olatunji, Naragon-Gainey, & Wolitzky-Taylor, 2013). Worry has been proposed as "a presenting characteristic of all anxiety disorders, with the possible exception of simple phobia" (Barlow & Di Nardo, 1991). Worry has also been demonstrated to predict subsequent anxiety levels over time (Segerstrom et al., 2000; Siddique, LaSalle-Ricci, Glass, Arnkoff, & Díaz, 2006) and been shown to occur in depression (Chelminski & Zimmerman, 2003).

In addition, rumination and worry also influence mood and several cognitive processes. For example, experimental studies have demonstrated that induction of rumination causes negative mood, exacerbates existing dysphoric (low/depressed) mood, and is associated with increased negative thinking and impaired concentration and problem solving (Donaldson & Lam, 2004; Hubbard, Faso, Krawczyk, & Rypma, 2015; Lyubomirsky, Kasri, & Zehm, 2003; Lyubomirsky & Nolen-Hoeksema, 1995). Similarly, experimental induction of worry has been associated with increased negative affect, poorer problem-solving confidence, and slower decision-making speed (Davey, 1994; Lyonfields, Borkovec, & Thayer, 1995; McLaughlin, Borkovec, & Sibrava, 2007; Metzger, Miller, Cohen, Sofka, & Borkovec, 1990). Although typically studied separately, a within-subjects laboratory study that induced both worry and rumination found that both processes lead to similar negative mood states, namely increases in anxiety, depression, and negative affect, and decreases in positive affect and relaxation (McLaughlin et al., 2007).

These studies provide strong evidence for the causal roles of worry and rumination in the onset, duration, and severity of depression and anxiety and, in doing so, suggest that these repetitive negative thinking processes need to be specifically targeted in treatment in order to better treat patients' depression and anxiety. However, preliminary findings suggest that existing CBT protocols are minimally effective in reducing RNT processes (Ciesla & Roberts, 2002; Jones, Siegle, & Thase, 2008; Schmaling, Dimidjian, Katon, & Sullivan, 2002). As noted earlier, a significant proportion of those with depression and/or an anxiety disorder continue to experience high levels of residual symptoms following standard CBT treatment (Cornwall & Scott, 1997; Dimidjian et al., 2006; Fava et al., 1994; Hofmann et al., 2012; Judd, 1997; Kennedy et al., 2004; Nathan & Gorman, 2007; Paykel et al., 1995; Scott, 2006). Rumination in particular has been a common residual symptom following standard CBT for depression, remaining elevated after both full and partial remission of depressive

symptoms (DeRubeis et al., 2005; Judd, Paulus, & Zeller, 1999; Riso et al., 2003). Rumination has also been associated with lower treatment responsiveness to existing CBT interventions, with patients with higher levels of rumination at the start of treatment improving at a slower rate in response to standard CBT compared to those with lower pre-treatment levels of rumination (Ciesla & Roberts, 2002; Jones et al., 2008; Schmaling et al., 2002). In addition to predicting poorer and slower treatment response and reduced likelihood of remission, pre-treatment rumination levels have been correlated with higher levels of depressive symptoms following treatment, delayed remission of symptoms, and greater likelihood of relapse following CBT treatment (Ciesla & Roberts, 2002; Jones et al., 2008; Michalak, Hölz, & Teismann, 2011; Schmaling et al., 2002). Similarly, there is evidence that anticipatory worry predicts poorer treatment outcomes at both post-treatment and 1-year follow-up for both individual and group CBT for social anxiety disorder (Mörtberg & Andersson, 2014).

These preliminary findings indicate that standard CBT treatment may not be sufficient in reducing RNT, that RNT remains elevated following standard CBT treatment procedures, and that these elevated residual symptoms are associated with significant ongoing impairment and increased likelihood of relapse. Together with the strong evidence for the causal roles of worry and rumination in both depression and anxiety, these findings have prompted researchers to develop treatment interventions which specifically target RNT.

Overview of existing CBT-based repetitive negative thinking interventions

Several CBT based interventions have been developed to specifically target RNT in order to reduce and prevent depression and anxiety. Drawing on functional analysis and behavioural activation principles, individuals receiving Rumination-focused CBT (RFCBT; Watkins, 2016) are taught to recognise their individual warning signs and antecedent cues for rumination, control their exposure to these cues (where possible), and to practice alternative,

more adaptive strategies in response. Based on research differentiating between adaptive and maladaptive forms of RNT (Watkins, 2008; Watkins, Moberly, & Moulds, 2008), individuals are also taught to recognise when they are engaging in an unhelpful, abstract, evaluative, and global thinking style and to shift into a more adaptive concrete, specific, and action-oriented thinking style (Watkins, 2016; Watkins et al., 2007; Watkins et al., 2012). To interrupt habitual thinking patterns, Mindfulness-based Cognitive Therapy aims to increase an individuals' metacognitive awareness about when they are engaging in rumination and/or worry and teaches them to shift their attention away from their rumination/worry and on to the present moment in a non-judgemental way (Segal, Williams, & Teasdale, 2002). Similarly addressing metacognition, Metacognitive Therapy aims to modify the positive and negative metacognitive beliefs about worry thought to initiate and sustain pathological worrying (Wells, 2009; Wells, 2010).

A recent meta-analysis of 36 studies involving 3,307 participants found that treatments for depression specifically targeting one form of RNT (e.g., Rumination-focused CBT) had medium-sized effects on reducing rumination compared to treatment controls and led to significantly better treatment outcomes than those that did not target RNT (e.g., antidepressants, light therapy; Spinhoven et al., 2018). A similar meta-analysis of treatments for anxiety which included 46 studies and 3,194 participants found that RNT-focused psychological treatments were associated with significantly larger effect sizes on anxiety symptom severity and RNT compared to non-psychological treatments (Monteregge, Tsagkalidou, Cuijpers, & Spinhoven, 2020). These findings show promising evidence in favour of interventions specifically targeting RNT.

Implications of the similarities between rumination and worry for treatment interventions

As outlined earlier, empirical evidence suggests that rumination and worry are highly correlated, share several characteristics, commonly co-occur in the same individual, and are associated with both depression and anxiety. The similarities observed between rumination and worry have led to the hypothesis that these different variants of RNT share the same underlying mechanisms and, by extension, could be simultaneously targeted and reduced using the same principle or intervention strategy (Ehring & Watkins, 2008; Topper, 2016). Of note, however, the majority of the existing RNT interventions have typically focused on either rumination *or* worry, rather than explicitly targeting and measuring both RNT variants simultaneously. Therefore, this thesis aimed to develop and evaluate a new internet-delivered treatment program specifically targeting *both* rumination and worry.

Several reasons support the need to develop a new intervention for RNT. Firstly, targeting both rumination and worry simultaneously provides a more efficient means of reducing these processes compared to targeting them each individually and is important given that both processes frequently co-occur in the same individual (Watkins et al., 2005). Secondly, given evidence that worry and rumination are elevated in both anxiety and depression and that each of these processes are associated with symptoms of both disorders, an intervention program targeting both variants of RNT could be used with individuals with depression, anxiety, and comorbid disorders. Additionally, as both rumination and worry are commonly experienced by the general population and not just by those suffering from clinical disorders (Topper, Emmelkamp, Watkins, & Ehring, 2017), an intervention targeting these processes can be used to help individuals regardless of whether or not they meet the diagnostic criteria for depression and/or an anxiety disorder. Because they are common styles of thinking, rumination and worry may not have the stigma of mental illness, potentially

making the focus of the intervention more appealing to end-users than treatments explicitly for depression and/or anxiety (Topper et al., 2017). This may help to combat the low rates of treatment seeking (Burgess et al., 2009; Harris et al., 2015; Slade et al., 2009).

Fifth, as highlighted at the beginning of this chapter, depression and anxiety disorders commonly co-occur (Brown et al., 2001; Kessler et al., 2005; Kessler et al., 2015), with this co-morbidity associated with more severe impairment and poorer prognosis (Kaufman & Charney, 2000; Kessler et al., 2015; Pollack, 2005; Rapee et al., 2013; Rohde et al., 2001). However, disorder-specific treatments do not necessarily successfully alleviate the symptoms of disorders other than those they were developed to treat. For example, some disorder-specific treatments for depression have been shown to reduce depressive symptoms but not symptoms of anxiety (Barlow et al., 2004; Titov et al., 2015; Topper et al., 2010). As a result, there is growing consensus amongst scholars and clinicians that targeting the shared underlying mechanisms between depression and anxiety may be the most effective and efficient treatment approach and may better address the high co-morbidity rates (Harvey et al., 2004; Hofmann & Hayes, 2019; McEvoy et al., 2009). Finally, given that RNT is a transdiagnostic process, this same intervention could not only be used to treat the elevated levels of RNT found in GAD and MDD, but could potentially also be an effective intervention for multiple other disorders in which elevated levels of RNT are found, such as insomnia, social anxiety disorder, and post-traumatic stress disorder (Topper et al., 2010).

In summary, the investigation of interventions which simultaneously target both rumination and worry is warranted. The next part of this chapter will thus discuss the existing research into interventions targeting both processes simultaneously. I will also outline barriers to accessing face-to-face treatments and how treatment interventions can be made more accessible by delivering them online.

Existing interventions targeting both rumination and worry

To my knowledge, only two previous studies have evaluated interventions which simultaneously target both rumination and worry. Topper and colleagues (2017) sought to evaluate whether explicitly targeting these processes could prevent the development of major depression and generalised anxiety disorder. In this first study to target and measure both RNT variants, 251 Dutch adolescents and young adults (aged 15-22) with elevated levels of rumination and worry (but no current diagnoses of depression and/or generalised anxiety disorder) were randomly allocated to receive 6-weeks of Rumination-focused CBT delivered in either a face-to-face group format or individually via the internet with clinician support, or to a waitlist control condition (Topper et al., 2017). Relative to participants in the waitlist control group, participants in both the group-delivered and internet-delivered groups reported significantly reduced RNT (between-group *d*s = .53 to .89) as well as symptoms of depression and anxiety (between-group *d*s = .36 to .72). These treatment effects were maintained at 12-month follow-up. No significant differences were observed between the group-delivered and internet-delivered groups, suggesting that the obtained treatment effects were independent of the mode in which treatment was delivered, and that delivering treatment online was just as effective as the face-to-face format (Topper et al., 2017).

Both intervention groups also had significantly lower rates of depression and generalised anxiety disorder (based on the number of participants who scored below cut-off on validated self-report measures) at 12-month follow-up compared to the waitlist control condition. Consistent with their hypothesized mechanism of change, mediation analyses demonstrated that reductions in rumination and worry mediated the effects of the intervention on the prevalence of depression and generalised anxiety disorder. Targeting rumination and worry may therefore reduce the prevalence of probable diagnoses of depression and generalised anxiety disorder (Topper et al., 2017). However, the absence of diagnostic

interviews in the experimental design means these effects are based solely on self-report measures, raising concerns of response bias and biased treatment effects. Further, as participants' psychiatric history was not assessed, it was unknown whether participants had experienced previous episodes of depression and/or anxiety prior to taking part in the intervention. As a result, it is not possible to determine whether the observed intervention effects represent prevention of the onset of depression and anxiety, or a reduced likelihood of relapse/recurrence of these disorders.

To address these limitations and extend Topper et al. (2017) findings, Cook, Mostazir, and Watkins (2019) randomly allocated 235 UK university students (aged 18-24) with elevated levels of rumination and worry but no current diagnoses of depression and/or generalised anxiety disorder to either internet-delivered Rumination-focused CBT with the support of a clinician (i.e., guided) or treatment-as-usual (TAU). As a secondary aim of the study, participants were also randomly allocated to a third treatment group who completed the same internet-delivered Rumination-focused CBT program without any clinician support (i.e., unguided) to evaluate the feasibility and acceptability of this alternate form of treatment delivery. There was no direct comparison between the guided and unguided internet-delivered intervention groups. In addition to self-report measures of rumination, worry, depression, and anxiety, structured diagnostic interviews using the Structured Clinical Interview for DSM-IV (SCID-I) were used to assess depression (current and past), anxiety disorders, and eating disorders. Outcomes were assessed at baseline, 3-months, 6-months, and 15-months.

Compared to TAU, guided internet-delivered Rumination-focused CBT was associated with significantly larger reductions in rumination at 3-months post-treatment and significantly larger reductions in worry and symptoms of depression at 6-months post-treatment. However, there was no evidence of significant between-group differences at 15-

month follow-up. The authors also found similar effect sizes and adherence rates between the two active treatment groups and thus proposed that the findings provided preliminary proof of principle for the use of unguided internet-delivered Rumination-focused CBT. However, as acknowledged by the authors, the absence of a direct comparison between the guided and unguided groups prevents any firm conclusions about their relative efficacy or adherence, and further studies are needed to compare the effects of unguided and guided formats.

Together, the studies by Topper et al. (2017) and Cook et al. (2019) lend further support to the notion that interventions can directly target RNT and that doing so can help reduce participants' depressive and anxious symptoms. The novel expansion of their treatment focus to also target worry also extends the existing literature in this field to show that both variants of RNT can be effectively targeted simultaneously and that doing so is associated with reductions in both depressive and anxious symptoms.

Delivering treatments targeting rumination and worry online

Of particular interest to the current thesis, the studies by Topper et al. (2017) and Cook et al. (2019) also demonstrated that the internet can be an effective mode of delivery for these targeted interventions. Internet-delivered psychological interventions tend to be delivered via specialised software or web platforms as "programs" or "courses" which include progressive modules or lessons (Andrews, Newby, & Williams, 2015). Treatment content is presented in text, comic-style graphics, video, and/or audio form (Andersson, Titov, Dear, Rozental, & Carlbring, 2019) and typically includes psychoeducation, treatment strategies appropriate to the disorder or problem being targeted, and relapse prevention (Andrews et al., 2015). Similar to face-to-face treatment, participants are also provided with "homework" activities to facilitate skills practice between modules. Programs will often also include automated participant assessment and monitoring as well as notifications/reminders to facilitate program engagement and completion (Andersson, Titov, et al., 2019). Online

programs can be delivered in an “unguided” format, in which participants do not receive any additional support or coaching (i.e., self-help), or in a “guided” format, in which clinicians or mental health technicians provide support or coaching to those completing the program (Baumeister, Reichler, Munzinger, & Lin, 2014). This support or guidance is provided via phone, email, or secure messaging and can be initiated at pre-specified points in the intervention or provided as-needed (Baumeister et al., 2014).

There are several barriers to accessing face-to-face mental health treatment. These include difficulty attending treatment during regular business hours, the stigma associated with having mental health difficulties and seeking treatment for these, the limited availability of appropriately trained clinicians to deliver treatment programs and long waiting lists, particularly in regional and remote areas (Andersson & Cuijpers, 2009; Andersson & Titov, 2014; Andrews et al., 2010; Clement et al., 2015; Mohr et al., 2006; Mohr, Ho, et al., 2010; Spek et al., 2007). It is also not always possible to access face-to-face services; for example, many face-to-face services have been suspended during the COVID-19 pandemic (Aknin et al., 2021; Shakespeare-Finch et al., 2020).

Attending face-to-face services is also associated with significant costs. For example, even after the Medicare rebate in Australia, the average out-of-pocket cost of attending a face-to-face appointment in Australia is AUD$57 (Anderson, Wong, Newby, & Andrews, 2016). In a representative community sample of 8,841 Australian adults, just under half reported incurring out-of-pocket costs when accessing psychological treatment and cost was identified as the most common barrier to accessing care (Page, Sparti, Santomauro, & Harris, 2021). Of note, costs are incurred even when the service itself is provided free of charge, with absence from work, transport, parking, and childcare recognised as additional costs associated with attending face-to-face treatment (Anderson et al., 2016).

Delivering treatment via the internet is recognised to overcome many of these barriers and has a number of advantages compared to face-to-face treatment. The scalability and relative low cost of delivering treatments online means that evidence-based treatments can be more easily disseminated on a population-level and accessed by patients who had previously been unable to do so, whether due to their geographical location, long waiting lists, limited availability of trained clinicians, or the high cost of treatment (Andersson & Cuijpers, 2009; Andrews et al., 2010; Spek et al., 2007). In addition to improved treatment coverage, the computerised delivery of treatment materials means treatment programs can be disseminated exactly as designed, ensuring treatment fidelity and that patients have access to evidence-based treatment materials (Andrews et al., 2018). This is important given that less than a quarter of those who seek treatment for a mental health disorder receive appropriate, evidence-based care (Andrews, Issakidis, Sanderson, Corry, & Lapsley, 2004; Stein et al., 2004). Online treatment can also be accessed from within the privacy and comfort of the individual's own home at a time of their choosing, providing greater anonymity and convenience. It may also be more viable and appealing to those who work full-time or have irregular work schedules and thus have difficulty attending treatment sessions during regular business hours.

Internet delivered treatments typically require less therapist time yet have shown equivalence in outcomes to face-to-face treatment for some disorders (Andersson, Cuijpers, Carlbring, Riper, & Hedman, 2014; Carlbring, Andersson, Cuijpers, Riper, & Hedman-Lagerlöf, 2018; Spek et al., 2007), making them cost-effective to deliver (Hedman, Ljótsson, & Lindefors, 2012; Mitchell, Joshi, Patel, Lu, & Naslund, 2021; Nordgren et al., 2014). Internet-delivered treatments are typically also significantly cheaper for people to access than face-to-face treatments (e.g., Anderson et al., 2016) and do not have the same additional out-

of-pocket costs associated with attending treatment in person described above (e.g., transport, lost wages; Anderson et al., 2016).

The effectiveness, feasibility, and acceptability of computer and internet-based treatments for depression and anxiety has been well-established in the general population, with a number of randomised controlled trials (RCTs) and meta-analyses demonstrating large to medium effect sizes, superiority over control groups, maintenance of treatment gains, and acceptable participant adherence and satisfaction rates (Andrews et al., 2018; Andersson, Carlbring, Titov, & Lindefors, 2019; Andrews et al., 2010; Cuijpers, Noma, Karyotaki, Cipriani, & Furukawa, 2019; Hedman et al., 2014; Josephine, Josefine, Doebler, Ebert, & Baumeister, 2017; Karyotaki, Efthimiou, Miguel, Bermpohl, Furukawa, Cuijpers, Patel, et al., 2021; Karyotaki et al., 2018; Karyotaki et al., 2017; Olthuis, Watt, Bailey, Hayden, & Stewart, 2015). As noted above, several studies have also demonstrated equivalence to face-to-face treatment of depression and anxiety (Andersson et al., 2014; Carlbring et al., 2018; Spek et al., 2007). The internet therefore provides a promising avenue to deliver interventions targeting both rumination and worry on a large scale and overcome many of the barriers associated with face-to-face treatment.

Limitations of existing internet-delivered interventions targeting both rumination and worry

The findings of Topper et al. (2017) and Cook et al. (2019) suggest that internet-delivered interventions can target and reduce both rumination and worry simultaneously with corresponding reductions in both depression and anxiety symptoms. Despite these encouraging initial findings, several gaps remain in the literature. Firstly, given their focus on early intervention and prevention, the limited research to date has only been conducted with adolescent and young-adult populations; Topper et al. (2017) recruited participants aged between 15 and 22 years old (M = 17 years) whereas Cook et al. (2019) recruited participants

18 to 24 years old (M = 20 years). The potential impact of internet-delivered programs specifically targeting both rumination and worry in adults older than 25 years of age thus remains unknown. Secondly, the two existing studies have evaluated the efficacy of targeting both rumination and worry in terms of preventing the onset of depression and anxiety. Accordingly, Topper et al. (2017) excluded participants if they self-reported current diagnoses of generalised anxiety disorder and/or major depression, while Cook et al. (2019) excluded participants if they met the diagnostic criteria for a current major depressive episode, anxiety disorder, and/or an eating disorder. The effectiveness of targeting both rumination and worry using an internet-delivered intervention for those currently experiencing depression and/or anxiety thus remains unknown.

Thirdly, to my knowledge, no study has investigated the efficacy of an internet-delivered intervention targeting both rumination and worry when it is delivered without clinician support (i.e., unguided) in an adult sample. Guided internet interventions require appropriately trained clinicians to support clients while they complete an online program. Although guided interventions are still more scalable, accessible, and cost-effective than face-to-face interventions, the requirement for trained clinicians represents a barrier to scaling these treatments to meet community need. By comparison, unguided internet interventions do not have these constraints and offer almost limitless opportunity for widespread dissemination. It is thus important to develop and evaluate unguided internet interventions targeting rumination and worry.

Meta-analyses have initially suggested that whilst both guided and unguided internet interventions for anxiety and depression are efficacious, unguided interventions are typically associated with more modest treatment outcomes and lower adherence rates compared to guided interventions (Andersson & Cuijpers, 2009; Andersson & Titov, 2014; Andrews, 2010; Spek et al., 2007). However, preliminary evidence suggests that so called “second

generation" unguided interventions, which include features designed to facilitate user engagement (e.g., automated email reminders), are associated with similar clinical improvements and adherence rates as guided interventions (Berger et al., 2011; Titov et al., 2013; Titov et al., 2016). The results of Cook et al. (2019) provided preliminary evidence to suggest that both the guided and unguided versions of their internet intervention improved rumination and worry and symptoms of depression and anxiety. However, as noted earlier, there was no direct comparison between the guided and unguided groups. Further studies are therefore needed to establish the relative efficacy and acceptability of guided and unguided internet interventions for rumination and worry. In addition to extending our understanding of the utility and benefit of clinician guidance, these findings will be important to inform how to disseminate the intervention program to the general public.

Finally, mean completion rates in the Topper et al. (2017) and Cook et al. (2019) studies were also relatively low, with participants in the guided internet-delivered Rumination-focused CBT conditions completing an average of 3.96 (*SD* = 1.65) and 3.46 (*SD* = 2.25) out of 6 sessions, respectively, and 2.66 sessions (*SD* = 2.35) in the unguided condition. The evaluation of brief (i.e., < 6 sessions) interventions is thus also important as shorter programs may be more appealing to potential users and reduce treatment drop out (Loughnan, Butler, et al., 2019; Loughnan, Sie, et al., 2019).

Summary of the rationale and aims of this thesis

So far in this chapter, I have highlighted the prevalence and significant burden of depression and anxiety disorders and the need to improve current psychological treatment options for these disorders. I have identified repetitive negative thinking as a core underlying mechanism which contributes to the onset, severity, maintenance, and relapse of depression and anxiety disorders. I have shown that two variants of repetitive negative thinking, rumination and worry, are promising targets to improve the treatment of both depression and

anxiety. I have presented evidence that explicitly targeting rumination and worry is associated with significant reductions in these processes as well as individuals' depressive and anxiety symptoms. I have then shown that these targeted interventions can be delivered successfully via the internet. I have also outlined how delivering treatment via the internet overcomes a number of barriers to accessing face-to-face treatment. Finally, I have highlighted the limitations of the existing research and suggested that further research is needed to evaluate treatment effects of internet interventions for rumination and worry in adults, including those currently experiencing depression and anxiety, and to compare guided and unguided intervention formats.

Therefore, the overarching aim of this thesis was to develop a brief internet-delivered intervention specifically targeting both rumination and worry and to evaluate its impact in reducing these processes and symptoms of depression and anxiety in an adult population. Secondary aims were to evaluate the feasibility and acceptability of the intervention as well as the relative efficacy and acceptability of the program when it was delivered with and without clinician guidance, and compared to usual care.

Introduction to the present investigation

The aims of this thesis were achieved across three studies. Study 1, published in the British Journal of Clinical Psychology (Joubert et al., 2022) and presented in the following chapter, involved an online qualitative survey to gain insight into how individuals define, experience, and understand rumination and worry. The findings of Study 1 were used to inform the development of the online intervention discussed in subsequent chapters.

Study 2, published in the Journal of Affective Disorders (Joubert et al., 2021) and presented in Chapter 3, outlines the development and pilot evaluation of the online intervention program. Drawing on a number of CBT-based treatment perspectives (e.g., Rumination-focused CBT, Mindfulness-based Cognitive Therapy) and the real-world

examples and language drawn from participants in Study 1, I created a brief online intervention program specifically targeting rumination and worry. This pilot study provided results on the preliminary outcomes, feasibility, and acceptability of the online intervention. Study 2 was the first study to specifically target rumination and worry using an online intervention in adults and in a clinical sample, and the first to evaluate a brief, unguided (self-help) format.

Study 3, presented in Chapter 4, aimed to extend these preliminary findings using a randomised controlled trial design. After making refinements to the intervention based on the qualitative feedback obtained from participants in the pilot trial, I compared the online intervention to a treatment-as-usual control group to better delineate specific treatment effects. To explore optimal levels of clinical support and inform decisions about dissemination, I also compared treatment outcomes, acceptability, and feasibility when the intervention was delivered with and without clinician guidance. Study 3 was the first randomised controlled trial of an online intervention targeting rumination and worry in adults as well as the first to directly compare guided and unguided formats of an intervention targeting rumination and worry.

Finally, Chapter 5 discusses the implications of the findings of the current research program and considers suggestions for future research in this area as well as the ways in which my research findings can be translated into clinical practice.

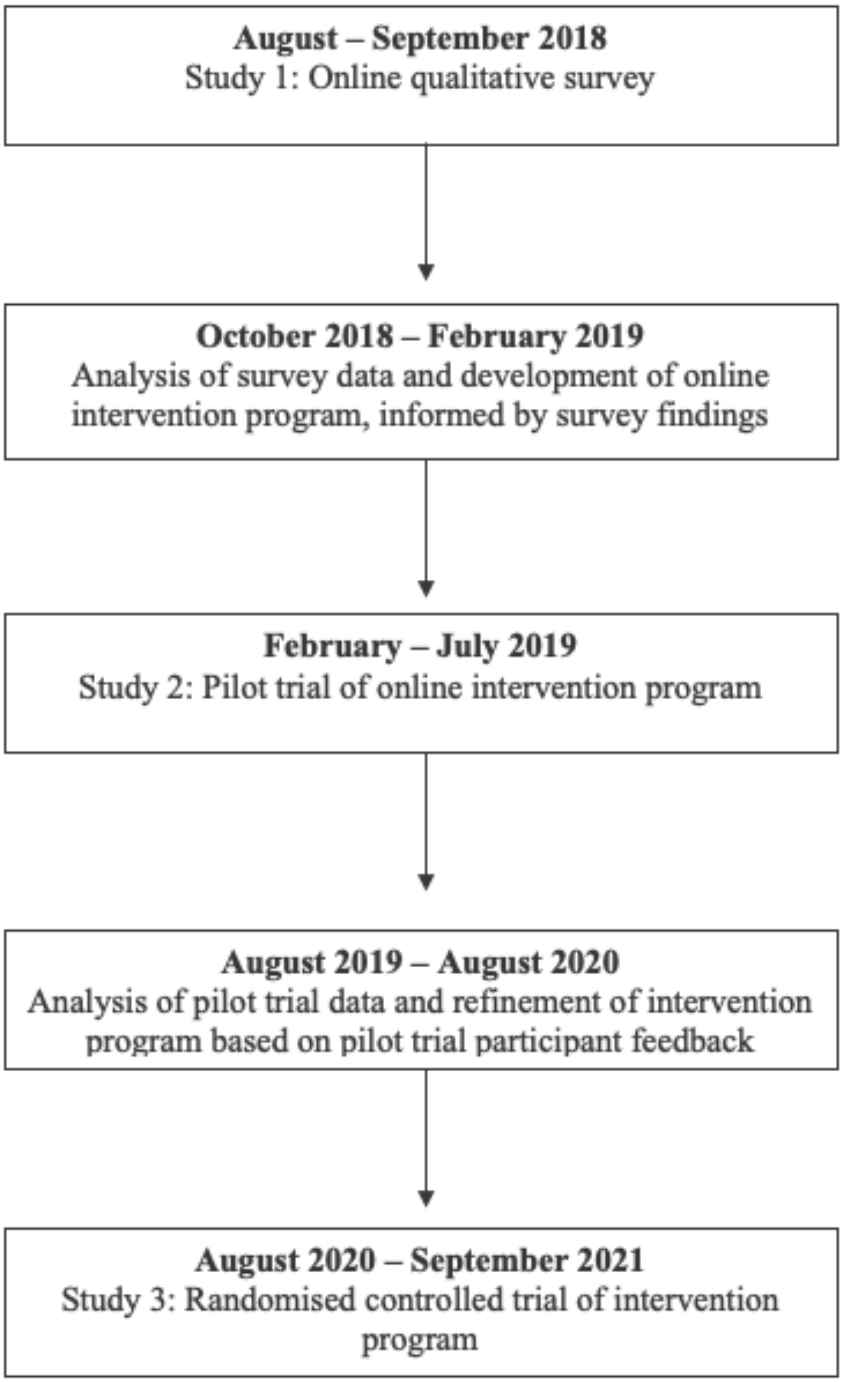

Figure 1. Timeline of studies included in current thesis.

Chapter 2: Understanding the experience of rumination and worry

Published as:

Joubert, A. E., Moulds, M. L., Werner-Seidler, A., Sharrock, M., Popovic, B., Newby, J. M. Understanding the experience of rumination and worry: A descriptive qualitative survey study. *British Journal of Clinical Psychology, 00*, 1-18.

Author contributions

Conceptualisation, methodology, and development of survey questions: AJ, JN, MM, AWS. Coding of participant responses: AJ, MS, BP. Writing – original draft: AJ. Writing – review and editing – AJ, JN, MM, AWS, MS, BP.

Preamble

Study 1 is a qualitative study aimed at gaining insight into how individuals understand and experience rumination and worry. Using an online survey, I explored individuals' personal experiences, triggers, cognitions, and coping strategies as well as the terms they used to describe these. I also aimed to use the insights gained from this study to inform the development of the novel online treatment intervention targeting rumination and worry evaluated in Studies 2 and 3 of this thesis.

Abstract

Objectives*:* Rumination and worry have been implicated in the onset, severity, maintenance, and relapse risk of depression and anxiety disorders. Despite this, little research has examined individuals' personal experiences of these processes. This study investigates how individuals experience these processes, which will provide insight into these common features of mental disorders and inform the development of an online intervention specifically targeting rumination and worry.

Design: An online qualitative survey was conducted to gain insight into peoples' personal definitions, experiences with, and understandings of, rumination and worry.

Methods: Participants answered open- and closed-ended questions about their personal understanding of rumination and worry, typical thought content, triggers, frequency, duration, and coping strategies. Participant responses were coded into themes. Participants also completed self-report questionnaires of depression, anxiety, and stress and repetitive negative thinking.

Results: 207 adults completed the online survey (76% female; mean age = 28.2 years, range = 17-71), 51% of whom reported previously experiencing depression and anxiety. All participants were familiar with the concept of worry, whereas 28% of participants indicated they had never heard of rumination. Participants reported most commonly ruminating and/or worrying about personal relationships, past mistakes, negative experiences, and conversations/social interactions. The most commonly reported triggers for rumination and/or worry were social situations/interpersonal interactions (25%) and negative events/experiences (24%). Distraction was the most common coping strategy (48%) however 21% reported being unable to stop themselves from ruminating and/or worrying.

Conclusions: The results provide a unique insight into the personal experiences and understandings of rumination and worry of potential end-users of treatment programs targeting these processes.

Introduction

Repetitive negative thinking (RNT) refers to the tendency to repeatedly dwell on negative situations, feelings, and events (Ehring & Watkins, 2008). It has been identified as a core underlying cognitive mechanism in major depressive disorder and several anxiety disorders (Ehring & Watkins, 2008; Ehring et al., 2011). Rumination and worry are arguably the two most studied variants of RNT. Rumination refers to a passive, repetitive, and evaluative focus on the causes, meanings, and implications of depressive symptoms (Nolen-Hoeksema, 1998) while worry has been conceptualised as a "chain" of repetitive and uncontrollable thoughts and images focused on possible future negative outcomes and the consequences of these (Borkovec, 1994). Rumination and worry have each been shown to be key contributing factors in the onset, severity, maintenance, and relapse risk of depression and anxiety disorders (Segerstrom et al., 2000; Watkins & Roberts, 2020), making them important treatment targets. Independent of clinical disorders, both processes have also been associated with increased negative affect and negative cognition, difficulties concentrating and paying attention, as well as impaired problem solving (e.g., Lyubomirsky & Tkach, 2004; Nolen-Hoeksema, 2004).

Whilst cognitive behaviour therapy (CBT) has long been considered the gold-standard psychological treatment for depression and anxiety disorders (Cuijpers et al., 2008), preliminary findings suggest CBT may not completely resolve RNT (e.g., Jones et al., 2008; Schmaling et al., 2002). This may partially explain why a significant proportion of people do not respond to, or relapse, following standard CBT treatments, and why many continue to experience high levels of residual symptoms, particularly rumination (Dimidjian et al., 2006; Hofmann et al., 2012). Accordingly, clinical researchers have increasingly focused on developing and evaluating treatments specifically targeting these RNT processes to better prevent and reduce psychopathology, with promising findings to date (e.g., Teismann et al.,

2014; Watkins et al., 2011; Watkins et al., 2007). Also promising are initial outcomes of trials evaluating the efficacy of internet-delivered interventions which simultaneously target both rumination and worry. The results indicate the effectiveness of these interventions in reducing participants' levels of rumination and worry, as well as symptoms of depression and anxiety and suggest that the internet can be an effective mode of delivery for these targeted interventions (Cook et al., 2019; Topper et al., 2017). Delivering treatment via the internet is recognised to overcome a number of the barriers to accessing face-to-face treatment, with equivalent effectiveness (Andrews, Basu, et al., 2018; Andrews et al., 2010).

However, these existing internet-delivered interventions have so far only been evaluated in adolescents and young adults (under 25) without clinically significant depressive and/or generalised anxiety symptoms and have been focused on preventing rather than treating these disorders. Therefore, the potential treatment benefits of an internet-delivered intervention targeting both rumination and worry in adults, including those currently experiencing depression and/or anxiety, remains unknown. We thus sought to develop an internet-delivered program specifically targeting rumination and worry and evaluate its acceptability and effectiveness in reducing rumination and worry in Australian adults. The intervention program will be open to individuals regardless of whether or not they meet diagnostic criteria for depression and/or anxiety. As a key first step, we conducted the current study to gather qualitative data about these processes in this population – the findings of which were used to inform the development of the online treatment program.

The typical approach adopted to study RNT is to ask participants to answer pre-defined questions on standardised self-report questionnaires developed by researchers and clinicians. This approach has provided important information about the frequency, severity, and consequences of RNT and the factors that are associated with it, particularly in clinical samples (see Nolen-Hoeksema 2004b, Lyubomirsky & Tkach, 2004, or Watkins & Roberts,

2020 for reviews). Existing literature has also highlighted the role of rumination and worry in a number of clinical disorders and the importance of targeting these processes to reduce and prevent psychopathology (for reviews, see Ehring & Watkins, 2008; Harvey et al., 2004).

Far fewer studies have taken a qualitative approach to explore rumination and worry, however, doing so facilitates a more in-depth understanding of these processes (Willig, 2001). In existing qualitative studies, rumination has consistently been characterised as a common yet intrusive, repetitive, and uncontrollable experience (Oliver, Smith, & Leigh, 2015; Pearson, Brewin, Rhodes, & McCarron, 2008; Sloan, Moulding, Weiner, Dowling, & Hall, 2021). Rumination has also been shown to be focused on a number of different themes and is often triggered by interpersonal situations and interactions (Oliver et al., 2015; Pearson et al., 2008; Sloan et al., 2021). Also consistent across the existing qualitative literature is the use of distraction as the most commonly reported attempt at stopping or interrupting rumination (Oliver et al., 2015; Pearson et al., 2008; Sloan et al., 2021).

A number of theories (e.g., Dugas, Gagnon, Ladouceur, & Freeston, 1998; Nolen-Hoeksema, 1991; Papageorgiou & Wells, 2001; Wells, 1995) suggest that RNT is initiated and reinforced by positive (e.g., "rumination helps me problem solve") and negative (e.g., "my worrying is uncontrollable") metacognitive beliefs. In support of these theories, metacognitive beliefs predict symptom maintenance and are associated with increased RNT frequency (Cartwright-Hatton & Wells, 1997; Papageorgiou & Wells, 2001). Metacognitive beliefs have also been consistently reported by participants in existing qualitative studies exploring RNT (Oliver et al., 2015; Pearson et al., 2008; Sloan et al., 2021).

The handful of qualitative studies which have investigated individuals' understandings and experiences of RNT have provided valuable insights into the content, frequency, duration, and consequences of RNT, as well as start and stop triggers and the emotions associated with these processes. However, these existing studies have focused on

treatment seeking, clinical samples (Oliver et al., 2015; Pearson et al., 2008; Sloan et al., 2021). Rumination and worry are commonly experienced by individuals with and without clinical disorders (e.g., Mahoney, McEvoy, & Moulds, 2012; McEvoy et al., 2018; McEvoy, Thibodeau, & Asmundson, 2014; Wong, McEvoy, & Rapee, 2016) and thus the intervention we are developing is designed for a broad range individuals regardless of whether or not they are experiencing clinical symptoms of a disorder. We thus sought to explore the experiences and understanding of a mixed sample. Further, people's understanding and experience of RNT may influence their willingness to engage in treatment strategies as well as the acceptability of the intervention, a factor which has been implicated in adherence to online interventions (Christensen, Griffiths, & Farrer, 2009). Improving the relevance and relatability of the program has the potential to increase user engagement (e.g., Beatty & Binnion, 2016). It is thus critical that the information conveyed, language used, examples given, and the strategies taught are relatable and relevant to end-users of the program.

The aim of this current study was therefore to better understand the personal experiences of rumination and worrying of potential end-users of online interventions for RNT. We recruited a sample of individuals from the community and examined the language, labels, and terms they use when talking about these processes, their perceptions of, and understanding of rumination and worry. We also investigated the personal triggers of rumination and worry, the coping strategies individuals use to manage rumination and worry, and any strategies they employ to stop or reduce rumination and worry. We used an online survey with a series of open-ended and forced choice options to achieve these aims. Open-ended survey questions allowed for an in-depth and individualised understanding of participants' beliefs and experiences of rumination and worry, in comparison to quantitative methods such as standardised self-report questionnaires (Silverman, 2000). To characterise the nature of the sample, participants also completed standardised self-report questionnaires

and were asked about their mental health history. The data obtained from this survey will be used to inform the development of an online treatment program that aims to specifically target RNT.

Methods

Recruitment

The sample was comprised of both community and undergraduate student participants. First year psychology students (n=101) from University of New South Wales were recruited via the university's online research participation system in return for course credit. Community participants (n=106) were recruited via social media advertisements and went into the draw to win one of three gift cards valued at $50 each in return for their participation.

Measures

Demographic information

Participants were asked to provide basic demographic information including their age, gender, highest education level, relationship status, country of birth, primary language spoken at home, and current employment status.

Mental health history

Participants were asked brief questions about their current and past mental health, including whether or not they had previously experienced depression and/or anxiety ("*Have you ever experienced depression and/or anxiety?*"). Participants were also asked about any current and past pharmacological and/or psychological mental health treatments.

Understanding and experience of rumination and worry

A series of open- and closed-ended questions, informed by key theoretical models of RNT and existing clinical interventions (e.g., the functional analysis component of Rumination Focused Cognitive Behaviour Therapy, Watkins, 2018; Metacognitive therapy,

Wells, 2009) was developed to investigate participants' understanding and experience of rumination and worry, including typical duration, frequency, triggers, content, coping strategies, and moderating factors. The full list of questions is given in Appendix A. To identify their personal understanding of the terms rumination and worry, participants were asked to provide their own definition of each term (e.g., "In your own words, please write your personal definition of worry"). A definition of rumination and worry was not provided to participants at any point throughout the survey. When asked to provide their definition of rumination, participants were additionally asked to indicate whether or not they had previously heard of this term, and if so, were asked to define it. Participants who indicated that they had not heard of rumination were able to complete the rest of the survey.

To investigate what topics participants typically worried and/or ruminated about, participants were asked to choose all that applied from a list of available options based on theoretical models of RNT (Table 2). Participants were also asked to briefly outline what purpose they thought ruminating/worrying served for them and to indicate what time of the day they were most likely to ruminate/worry ("morning"; "afternoon"; "evening"; "late at night/in bed").

Standardised self-report measures

The *Repetitive Thinking Questionnaire-10* (RTQ-10; McEvoy, Mahoney, & Moulds, 2010) is a 10-item measure of the extent to which someone engages in perseverative negative thinking, independent of a specific mental health disorder (i.e., not tied to disorder-specific content, such as sad mood). The RTQ-10 has excellent internal consistency ($\alpha = .91$; Wong et al., 2016). Internal consistency in the current sample was $\alpha = .56$.

The *Depression, Anxiety, and Stress Scales* (DASS-21; Lovibond & Lovibond, 1995) measure the frequency with which individuals experience symptoms of depression, anxiety, and stress over the past week. The DASS-21 has been shown to be reliable and valid in both

clinical and non-clinical samples (Antony, Bieling, Cox, Enns, & Swinson, 1998; Henry & Crawford, 2005) and each of the subscales have excellent internal consistency (depression: α = 0.94; anxiety: α = 0.87; stress: α = 0.91; Antony et al., 1998). Moderate levels of symptoms on the depression, anxiety, and stress subscales are given by the cut-off scores of 14, 10, and 19, respectively (Lovibond & Lovibond, 1995). Internal consistency in the current sample was excellent (α = .92).

Method

All parts of this study were completed online. No inclusion or exclusion criteria were applied to capture a range of experiences and symptom levels. Participants read the Participant Information Sheet and Consent Form online before providing electronic informed consent. Participants then responded to the survey questions and completed self-report questionnaires of depression, anxiety, and stress (DASS-21) and repetitive negative thinking (RTQ-10). This study was approved by University of New South Wales Human Research Ethics Advisory Panel (Approval Number 3069).

Qualitative Data Analysis

Survey data were exported into Microsoft Excel for qualitative analysis. As noted above, survey questions were informed by key theoretical models of RNT and existing clinical interventions. One of the main aims of this study was to inform the development of an intervention program targeting RNT for adults. To help us make decisions about what to include in the intervention (i.e., information which would be relevant for the majority of end-users) versus what to exclude (i.e., information which would only be relevant for a very small minority of end-users), data analysis primarily consisted of determining the frequency of participant responses by calculating proportions.

One author (AJ) coded responses to the open-ended questions using a deductive approach. Inductive analysis is recommended when previous research or theories about a

phenomenon of interest are limited or lacking whereas deductive analysis is used when previous literature, theories or conceptual frameworks already exist (Armat, Assarroudi, Rad, Sharifi, & Heydari, 2018; Elo & Kyngäs, 2008; Hsieh & Shannon, 2005; Mayring, 2014). Given that RNT has been well-studied and several theories and conceptual frameworks already exist, a deductive approach was chosen in favour of an inductive approach. This involved AJ reading through the responses to immerse herself in the data and develop a codebook to categorise the data. This process was repeated for each open-ended question. Initial response categories were then reviewed and refined by the principal investigator (JN) (e.g., Newby, Werner-Seidler, Black, Hirsch, & Moulds, 2021).

For each open-ended question, AJ, MS, and BP separately coded whether or not a participants' responses fell into any of the response categories for that question using binary coding (0 = *does not fit into category,* 1 = *fits into category).* For example, response categories for participants' definitions of worry included "physical symptoms" "negative emotions e.g., stress, anxiety/fear, concern", "lack of control and/or unwanted", "overthinking and/or repetitive", "future oriented and/or concern over something that could happen or hasn't happened yet". Participants' responses to a particular question could fit into more than one response category. Coding was then compared between the three independent coders and any discrepancies resolved by the lead/senior researcher (JN). When there was a discrepancy between coders, JN coded the item independently so as to avoid being biased by the coders' responses. The proportion of responses that fell into each category was then calculated. We also calculated the proportion of consistent coding between the three independent coders. 98% of responses were coded the same, with the remaining 2% of responses coded by JN.

Reflexivity is an important part of qualitative analysis (Braun & Clarke, 2019) and thus researchers involved in the project were cognisant of their perspectives and experiences

when developing the response categories and when interpreting and coding the data. The research team comprised of six females with diverse research and clinical experience and backgrounds in clinical psychology and mental health research. One of the coders (AJ) was a provisional psychologist with research interests in RNT while the other two coders (MS, BP) held undergraduate degrees in psychology and were familiar with cognitive processes in mental health.

Results

Response rates

A total of 218 people provided electronic informed consent to participate in the survey. Eleven did not progress any further after providing consent, giving a total of 207 survey respondents, 177 of whom completed the entire survey. As not all participants responded to all of the survey questions, response frequencies were calculated as a proportion of the total number of participants who responded to a particular question rather than the total number of survey respondents.

Demographic characteristics

As shown in Table 1, the majority of participants were female (76%), aged between 17 and 71 years (*M = 28.2, SD = 13.9),* employed in either full-time (13%) or part-time (22%) paid work and almost half were currently students (46%). The majority of participants had never married (70%), were born in Australia (75%), and spoke English as their primary language (78%).

Table 1. Participant characteristics.

	N=207		N=207
Mean age (SD)	28.2(13.9)	**Previously experienced depression and/or anxiety n (%)**	
Gender, n (%)		Never	64 (30.9)
Female	158 (76.3)	Yes – both	105 (50.7)
Male	46 (22.2)	Yes – anxiety	21 (10.1)
Other	3 (1.4)	Yes – depression	16 (7.7)
Country of birth n (%)		**Current psychotherapy n (%)**	
Australia	156 (75.3)	No	154 (74.3)
China	11 (5.3)	Psychologist	28 (13.5)
United Kingdom	9 (4.3)	Psychiatrist	7 (3.3)
New Zealand	3 (1.4)	Counsellor	14 (6.7)
USA	2 (0.9)	Other	5 (2.4)
Philippines	2 (0.9)	**Current medications n (%)**	
Germany	1 (0.4)	No	154 (74.3)
Vietnam	1 (0.4)	SSRI	28 (13.5)
Italy	1 (0.4)	SNRI	12 (5.7)
Other	21 (10.1)	Benzodiazepine	6 (2.8)
Primary language n (%)		Antipsychotic	7 (3.3)
English	162 (78.2)	Other	11 (5.3)
Vietnamese	12 (5.8)	**Past treatment (e.g., medications, psychotherapy) n (%)**	
Cantonese	10 (4.8)	Medication	27 (13)
Mandarin	10 (4.8)	Psychotherapy	58 (28)
Tagalog	2 (0.9)	**Self-report Measures mean (SD)**	
Other	11 (5.3)	RTQ-10	29.4 (9.4)
Relationship status n (%)		DASS-21	38.8 (22.3)
Never married	145 (70)	DASS-21 Depression subscale n (%)	
Married/de facto	50 (24.1)	Normal	90 (43.4)
Separated/Divorced	11 (5.3)	Mild-Moderate	78 (37.6)
Widowed	1 (0.4)	Severe-Extremely Severe	39 (18.8)
Employment status n (%)		DASS-21 Anxiety subscale n (%)	
Student	95 (45.8)	Normal	80 (38.6)
Full-time paid work	33 (15.9)	Mild-Moderate	73 (35.2)
Part-time paid work	45 (21.7)	Severe-Extremely Severe	54 (26)
Seeking work	9 (4.3)	DASS-21 Stress subscale n (%)	
Retired	5 (2.4)	Normal	96 (46.3)
Registered sick/disabled	9 (4.3)	Mild-Moderate	82 (39.6)
Other	11 (5.3)	Severe-Extremely Severe	29 (14)

On the DASS-21 (M = 38.8, SD = 22.3), 44% were in the normal range, 38% in the mild-moderate range, and 18% in the severe-extremely severe range on the Depression subscale. For Anxiety, 40% were in the normal range, 35% in the mild-moderate range, and 25% in the severe-extremely severe range. Almost half of the participants scored in the

normal range for Stress, whilst 39% fell into the mild-moderate range and 14% were in the severe-extremely severe range. The mean score on the RTQ-10 was 29.4 (*SD* = 9.4). This mean was slightly higher than those reported in studies with undergraduate (e.g., McEvoy et al., 2010) and never-depressed community samples (e.g., McEvoy et al., 2018), however was lower than those reported for clinical samples (e.g., Mahoney et al., 2012; McEvoy et al., 2018).

Just over half of the participants reported having previously experienced both depression and anxiety (51%; n=105/207). A third (31%; n=64/207) reported currently taking mental health medications while a quarter (26%; n=54/207) reported currently receiving psychotherapy, which is comparable to figures from the 2007 Australian National Survey of Mental Health and Wellbeing (Slade et al., 2009).

Understanding and experiences of rumination and worry

Frequency and duration

As shown in Table 2, participants most commonly reported worrying/ruminating "*daily*" (38%), followed by "*more than half the days a week*" (26%). The duration varied widely across participants, with over half (53.5%) ruminating/worrying for 20 minutes or longer on each occasion.

Table 2. Survey responses.

	n (%)
What time of the day are you most likely to worry or ruminate? Please choose all that apply (n=190)	
Morning	48 (25.2)
Afternoon	39 (20.5)
Evening	75 (39.4)
Late at night/in bed	140 (73.6)
When you worry or ruminate, how long do you typically spend worrying/ruminating? (n=190)	
Less than 5 minutes	13 (6.8)
5-10 minutes	35 (18.4)
10-20 minutes	40 (21)
20-30 minutes	28 (14.7)
Between 30 minutes - 1 hour	36 (18.9)
1-2 hours	17 (8.9)
More than 2 hours	21 (11)
On average, how often do you find yourself worrying/ruminating? (n=190)	
Daily	73 (38.4)
Weekly	38 (20)
Fortnightly	15 (7.8)
More than half the days a week	50 (26.3)
Monthly	10 (5.2)
Every couple of months or more	4 (2.1)
What do you typically worry/ruminate about? Please choose all that apply (n=191)	
Finances	82 (42.9)
Personal relationships	121 (63.3)
Past events	108 (56.5)
Assignments/exams	102 (53.4)
Work	67 (35)
Upcoming social events	66 (34.5)
Things you should have said/done	120 (62.8)
Past mistakes	132 (69.1)
Past conversations or interactions with others	118 (61.7)
Future conversations or interactions with others	85 (44.5)
World events/the news	30 (15.7)
Your health	64 (33.5)
Your family	82 (42.9)
Past negative experiences	123 (64.4)
How you feel	87 (45.5)
Why things have happened to you	74 (38.7)
How you would cope if certain things were to happen	89 (46.6)
Things that might happen in the future	111 (58.1)
Why you feel a certain way	67 (35)
Other	11 (5.7)

Definitions

Examples of participant responses are shown in Table 3. Participants' definitions of worry commonly referenced six main themes: negative emotions such as stress, anxiety, and concern (55%; n=108/197); the future (something that hasn't happened yet or could happen) (44%; n=86/197); being repetitive in nature and involving overthinking (40%; n=79/197); an unwanted, perseverative, and uncontrollable experience (20%; n=40/197); associated with physical symptoms or sensations (9%; n=17/197); and "Other" (11%; n=21/197).

When asked if they had heard of the term "rumination", almost a third of participants reported having never heard of it or being unsure if they had (28%; n=54/196). The definitions of rumination that participants provided commonly referenced it involving thinking deeply or "dwelling" (26%; n=51/196), having a negative focus (13%; n=26/196), and being focused on the past (8%; n=16/196). Over a third of participants defined rumination in terms of it being repetitive, perseverative, and difficult to stop (37%; n=72/196) and referenced a long time being spent engaging in rumination (7%; n=14/196). Participants' definitions of rumination also referenced or likened it to worry (9%; n=18/196) and animal digestion (4%; n=8/196).

Perceived purpose of rumination and worry

When asked what purpose they thought ruminating and/or worrying served for them, just over a third of participants reported that there was no purpose (33%; n=62/190) whilst 9% (n=17/190) said they were unsure or didn't know. Almost a quarter of participants reported that ruminating and/or worrying helped them to process events or their thoughts and come to an understanding of something (22%; n=41/190). 12% suggested that ruminating/worrying helped remind them to do something/not repeat something (n=22/190) and that it acted as a source of motivation (11%; n=21/190). Participants also reported ruminating/worrying was protective and helped prevent negative things (e.g., mistakes) from

occurring (9%; n=17/190) and that it helped them to be prepared and plan for the future (7%; n=14/190).

Typical content and triggers

As shown in Table 2, participants reported most commonly ruminating and/or worrying about past mistakes, past negative experiences, personal relationships, things they should have said or done, and past conversations or interactions. When asked what time of the day they were most likely to ruminate/worry, the most commonly selected response was "*late at night/in bed"* (73%; n=140/191).

The most commonly reported triggers for rumination and/or worry were social situations/interpersonal interactions (27%; n=51/190) and negative events or experiences (24%; n=45/190). Participants also referenced performance situations or situations in which demands and pressure were placed on them (16%, n=31/190), external reminders such as conversations, reading something, or seeing something on TV (15%; n=29/190), remembering past events (11%; n=20/190), and physical states such as being tired or in pain (8%; n=15/190). Being alone (9%; n=17/190) or bored (7%; n=14/188) were reported as less common triggers. A third of participants were unsure what typically triggered them to start ruminating and/or worrying (31%; n=58/190). The majority of participants reported worrying/ruminating less when they were around other people (83%; n=158/191).

Coping strategies

While 21% of participants reported that there was nothing they could do to stop themselves from ruminating/worrying (n=40/191), almost half reported that distracting themselves or doing activities (e.g., exercise) was effective in interrupting their rumination/worry (48%; n=92/191). Talking to others (13%; n=25/191), being around family and friends (8%; n=16/191), practicing mindfulness, meditation, relaxation or breathing exercises (11%; n=21/191), and seeing things from a different perspective or engaging in

positive self-talk (11%; n=21/191) were also identified as being helpful. 7% of participants reported that going to sleep was also an effective way of stopping themselves from ruminating/worrying (n=14/191).

Table 3. Examples of participant responses.

	Theme	**Example**
Definition of worry	Negative emotions	*"Feeling anxious or concerned about something"* *"Being afraid that something bad is about to happen"*
	The future	*"Thinking of all the negative outcomes that could happen"*
	Unwanted, perseverative, uncontrollable	*"Persistent thoughts in my head that I have difficulty letting go of"* *"State of mind where I can't stop thinking about something"*
Definition of rumination	Thinking deeply	*"Dwelling on a certain thought for a long period of time"*
	Repetitive, perseverative, difficult to stop	*"Thinking about the same thing over and over, replaying situations in your mind"* *"Difficult thoughts that you can't think your way out of even if you logically know this thinking isn't helpful"*
	Negatively focused	*"Like constantly thinking your worthless and life is not worth living"* *"Constantly going over something distressing"*
Perceived purpose and metacognitive beliefs	No purpose	*"Absolutely none. But I have no control"* *"None. I try to tell myself that, but it does not help. My mind thinks if I think about it enough, I will find an answer or solution and then I will feel better"*

	Processing and coming to an understanding	*"Allows me to think things through and work through my thoughts"* *"Acts as a source of reflection. I can consider my actions and what went wrong/right, and how I could change my actions if a similar situation occurred in the future"*
	Protective	*"To try to prevent bad things from happening to those I love or to me"*
	Helps prepare them	*"I'm able to think about all possible outcomes for an event"* *"Keeps me prepared for what could possibly happen"*
Triggers	Social interactions	*"When someone speaks to me in a different tone/acts differently"* *"A bad social interaction, like an argument or someone hurting me"* *"If I feel ignored or unwanted"*
	Negative events or experiences	*"Things seem to be going wrong, things not going how I expect them to go"* *"Major life stresses (housing and financial insecurity, migration, relationship issues, family issues, health issues)"*
	Performance/demanding situations	*"When I am stressed about an upcoming event or deadline"* *"Thinking about balancing work/sleep/studying/friends"*
	External reminders	*"A thought, a conversation, the TV news, radio news, internet news"* *"Hearing bad news from friends or family"* *"Receiving an email"* *"Getting a bad grade"*

Discussion

Although rumination and worry are commonly experienced and extensively studied cognitive processes implicated across a number of clinical disorders, research into peoples' personal experiences and understanding of these processes is sparse. Accordingly, this survey aimed to investigate both of these important topics. Our results suggest that individuals are more familiar with the concept of worry than rumination, with all participants aware of worry whereas 28% indicated that they had never heard of rumination. Participants endorsed worrying and/or ruminating about a number of different themes, the most common of which were personal relationships and past mistakes, negative experiences, and conversations/social interactions. Our findings also provided insight into triggers for ruminating and/or worrying, with social situations/interpersonal interactions and negative events/experiences the most commonly reported triggers. Our sample included both undergraduate students and community participants, many of whom had previously engaged in or were currently engaged in psychotherapy for anxiety and/or depression. Scores on the self-report measure of depression, anxiety, and stress (DASS-21) ranged from normative to clinical levels on each subscale. This suggests that a variety of personal perspectives and experiences of the interventions' target population were captured.

Our first aim was to determine how participants understand and define rumination and worry. Participants provided a variety of definitions of rumination and worry, suggesting it is important to enquire about an individual's understanding of these terms during assessment and treatment to ensure that clinicians and patients are indeed referring to the same processes. Further, almost a third of participants reported that they had not heard of the term rumination before or were unsure if they had. This suggests that this term needs to be clearly defined in the intervention and highlights the benefit of incorporating psychoeducation into face-to-face and online treatments. This also highlights the importance of clarifying what individuals

mean when they use these terms, particularly in clinical contexts. In line with previous qualitative studies (Oliver et al., 2015; Pearson et al., 2008; Sloan et al., 2021), rumination and worry were consistently characterised as intrusive, repetitive, and uncontrollable. Although participants were asked to define these processes separately, a number of terms were common to participants definitions of both worry and rumination, including "overthinking", "negative", "distressing", and "excessive", reflecting the similarities between these two processes (Papageorgiou & Wells, 1999; Watkins et al., 2005).

Our second aim was to determine participants' typical experiences of rumination and worry, and identify the terminology used to describe them. Participants reported most commonly ruminating and/or worrying about personal relationships, things they should have said or done, and past mistakes, negative experiences, conversations, and social interactions. Rumination has been shown to prompt the recall of negative autobiographical memories (Wisco & Nolen-hoeksema, 2009), which may explain why participants frequently reported focusing on past experiences. Consistent with previous qualitative studies (Oliver et al., 2015; Pearson et al., 2008), the most commonly reported triggers for rumination and/or worry were social situations/interpersonal interactions and negative events/experiences. As noted by Oliver et al. (2015), this is likely because interpersonal stress has been shown to influence rumination (Hammen, 2006) and negative thoughts about the self are common after an interpersonal stressor (Hilt & Pollak, 2013).

Clinicians and developers of treatment interventions can draw on these reported experiences, and the language that participants use to describe these experiences, to create relevant, real-world examples. Indeed, as noted above, this is one of our broader goals in conducting this survey. In addition to advancing the field by obtaining insight into the every-day experiences of rumination and worry, we will also use these data to inform the development of an online intervention specifically targeting rumination and worry.

Accordingly, the language used by participants will also be incorporated into recruitment materials to better target those who ruminate and/or worry. Adopting the language and examples of potential end-users may help to improve the understandability, relatability, and acceptability of treatment. Furthermore, treatment engagement and adherence may also be improved if treatments better match the experiences of end-users (e.g., Beatty & Binnion, 2016).

By identifying typical themes, triggers, and coping strategies, our findings also provide clinicians and developers of interventions with examples of cognitions, behaviours, and situational factors which can then be targeted in treatment. For example, consistent with previous studies (Pearson et al., 2008; Sloan et al., 2021), participant responses often referenced positive and negative metacognitive beliefs about rumination and worry. This suggests there may be value in providing psychoeducation about the maintaining role of these beliefs and in helping participants to identify, evaluate, and modify these in treatment (e.g., Wells, 2009). Our findings also provide real-world insight into high-risk times for rumination and worry and the strategies that individuals find most helpful to counteract them, which can also be incorporated into treatment interventions. For example, the inclusion of strategies to help manage rumination and worry at night may be particularly relevant to end-users given that almost three quarters of participants reported that this was a common time to engage in these processes. In line with previous studies (Oliver et al., 2015; Pearson et al., 2008; Sloan et al., 2021), distraction and engaging in activities was the most commonly reported coping strategy to interrupt rumination and worry. As noted by Pearson et al. (2008), this may be indicative of the difficulty that individuals have controlling or stopping RNT using willpower alone and suggests that relying on external stimuli is a more effective coping strategy. Behavioural approaches focused on absorbing activities may then be useful and acceptable suggestions to interrupt rumination and worry. This could include behavioural activation

(Jacobson, Martell, & Dimidjian, 2001) or absorption in 'flow' experiences (Watkins, 2018). The effectiveness of these suggested coping strategies will be explored when we evaluate the intervention program. As noted earlier, a third of participants were unsure about what typically triggered them to start ruminating and/or worrying. Interventions may thus also benefit from incorporating self-monitoring and helping users to create individualised formulations (e.g., functional analysis, Watkins, 2018).

The findings of the current study also add to our theoretical understanding of RNT and provide qualitative support for existing theoretical models and definitions. Participants' definitions of rumination and perceptions of its purpose were consistent with Nolen-Hoeksema's (1998) definition of a passive, repetitive, and evaluative focus on the causes, symptoms, and consequences of depressive symptoms. Similarly, participants' definitions and descriptions of worry commonly referenced an uncontrollable and repetitive process focused on anticipated future negative outcomes, consistent with Borkovec's (1994) frequently cited definition. Although worry is typically characterised as a cognitive process (Borkovec, 1994; Borkovec & Lyonfields, 1993), participants definitions of worry frequently encapsulated cognitive, emotional, and physiological components. This suggests that individuals in the community may not differentiate engaging in the process of worrying from the consequences of doing so (e.g., anxious arousal). Our findings also complement those of previous studies which suggest rumination and worry are highly correlated and share more similarities than differences (e.g., Papageorgiou & Wells, 1999; Watkins, 2004; Watkins et al., 2005), with participants' definitions and reported experiences of rumination and worry referring to them both as uncontrollable, repetitive, difficult to stop, and negatively valenced. The focus and content of worry was also judged to be more future oriented while rumination tended to focus on the past, consistent with previous research on the temporal orientation of

these processes (e.g., Papageorgiou & Wells, 1999; Watkins, 2004; Watkins, Moulds, & Mackintosh, 2005).

The clear articulation of positive and negative metacognitive beliefs about rumination and worry in this study are also consistent with theoretical accounts which propose that rumination and worry are initiated, maintained, and exacerbated by metacognitive beliefs about these processes (Dugas et al., 1998; Nolen-Hoeksema, 1991; Papageorgiou & Wells, 2001, 2003; Wells & Carter, 2009). For example, participants in the current study ascribed a number of positive or useful features to worry and rumination, reporting that this thinking helps to prepare and plan for the future, remember to do something and not repeat previous actions, and to process thoughts and events. Participants also reported that worry served a protective function by helping to prevent negative things (e.g., mistakes) from occurring. Similarly, participants' responses also referenced negative metacognitive beliefs, frequently referring to rumination and worry as unwanted, uncontrollable, and difficult to stop.

Strengths and Limitations

The use of open-ended survey questions allowed for an in-depth and individualised understanding of beliefs about and experiences of rumination and worry. However, a disadvantage of this approach is that it does not enable researchers to clarify participant responses or ask follow-up questions, as is possible in interviews or focus groups. Participants were not provided with a definition of rumination and worry in order to avoid potentially influencing their responses, and to better capture their subjective descriptions, experiences, and language. Nonetheless, we cannot rule out the possibility that participants may have reported on thoughts in general, rather than RNT. Almost a third of participants reported that they had never heard of rumination, whilst a small proportion referenced animal digestion when defining rumination. Therefore, we also cannot rule out that some participants may have answered subsequent questions in relation to worry only. In future studies, it may

be useful to provide participants with a definition of these terms after they have provided their own definitions and before they answer subsequent questions. As the majority of questions were about both rumination and worry, it is unclear whether participant responses were in relation to rumination, worry, or both. Future studies could include more specific questions. This would also allow researchers to explore potential differences between these processes. Another limitation is that the RTQ's internal consistency in the current sample was lower than expected based on previous studies (Wong et al., 2016). In addition, our sample was predominantly female and well-educated, and half were students, which may limit the generalisability of our findings. That said, our sample was broad: no inclusion or exclusion criteria were applied, participants were recruited from both undergraduate and community samples, and participants' responses on each of the subscales on the self-report measure of depression, anxiety, and stress ranged across the continuum from normal to extremely severe. Participants reported mental health difficulties and engagement with treatment services were also reflective of the broader population (Slade et al., 2009). This sample diversity likely led to a range of opinions and experiences, thus increasing generalisability in this respect.

Conclusion

This study adopted a qualitative approach to explore understandings and experience of RNT in a mixed/nonclinical sample. The results provide important insights into the personal experiences and understanding of rumination and worry, and in turn, an important foundation from which to develop effective and engaging interventions that target RNT.

Appendix A

Survey Questions

1. In your own words, please write your personal definition of "worry". Please note there are no right or wrong answers.
2. Have you heard of "rumination"? If yes, please describe what you think it means. If no, please indicate what you think it means. Please note there are no right or wrong answers.
3. What time of the day are you most likely to worry or ruminate? Please choose all that apply.
    - Morning
    - Afternoon
    - Evening
    - Late at night/in bed
4. What do you typically worry/ruminate about? Please choose all that apply.
    - Finances
    - Personal relationships
    - Past events
    - Assignments/exams
    - Work
    - Upcoming social events
    - Things you should have said/done
    - Past mistakes
    - Past conversations or interactions with others
    - Future conversations or interactions with others
    - World events/the news
    - Your health
    - Your family
    - Past negative experiences
    - How you feel
    - Why things have happened to you
    - How you would cope if certain things were to happen
    - Things that might happen in the future
    - Why you feel a certain way
    - Other (please specify)
5. Do you tend to worry/ruminate more or less when you are with other people?
    - I worry/ruminate less when I am with others
    - I worry/ruminate more when I am with others

6. What usually triggers you to start worrying/ruminating (i.e., what happens just before you start thinking like this?). Please list all the triggers in the space provided. If you're unsure, please write “unsure”.
7. In general, what makes your worrying/ruminating better?
8. On average, how often do you find yourself worrying/ruminating?
    - Daily
    - Weekly
    - Fortnightly
    - More than half the days a week
    - Monthly
    - Every couple of months or more
9. When you worry or ruminate, how long do you typically spend worrying/ruminating?
    - Less than 5 minutes
    - 5-10 minutes
    - 10-20 minutes
    - 20-30 minutes
    - Between 30 minutes - 1 hour
    - 1-2 hours
    - More than 2 hours
10. Is there anything that you can do to stop yourself from worrying/ruminating? If yes, please describe what you do. If no, please write "N/A"
11. What purpose do you think worrying/ruminating serves for you?

Chapter 3: Managing rumination and worry: A pilot study

Published as:

Joubert, A. E., Grierson, A. B., Chen, A. Z., Moulds, M. L., Werner-Seidler, A., Mahoney, A. E. J., Newby, J. M. (2021). Managing rumination and worry: A pilot study of an internet intervention targeting repetitive negative thinking in Australian adults. *Journal of Affective Disorders, 294*(1), 483-490. https://doi.org/10.1016/j.jad.2021.07.076

Author contributions

Conceptualisation, methodology, and development of intervention: AJ, JN, MM, AWS. AJ and JN supervised all participants. Project administration: AJ, JN, AG, AC. Formal analysis: AJ, JN. Writing – original draft: AJ. Writing – review editing: AJ, JN, MM, AWS, AG, AC, AM.

Preamble

As outlined in the general introduction, two previous studies in adolescents and young adults demonstrated that online interventions targeting rumination and worry reduced and prevented psychopathology (Topper et al., 2017; Cook, Mostazir, & Watkins, 2019). However, treatment effects and adherence to online interventions targeting rumination and worry had not been examined in adults or those currently experiencing clinically significantly depression and/or anxiety symptoms. These existing online interventions were also delivered with clinician guidance, significantly reducing their scalability and potential cost-effectiveness.

In Study 2, using a small pilot trial, I evaluated the preliminary efficacy and acceptability of a novel online intervention targeting rumination and worry when it was delivered in a self-help format to adult participants, with a view to subsequently evaluating the program in a larger RCT if it was found to be effective. To my knowledge, Study 2 is the

first study to target both rumination and worry in adults using a brief, unguided, internet-delivered intervention.

Abstract

Background: Rumination and worry, both forms of repetitive negative thinking (RNT), have been implicated in the onset, maintenance, severity, and relapse risk of depression and anxiety disorders. Despite promising initial findings for internet-delivered interventions targeting both rumination and worry simultaneously, no studies have investigated treatment effects in an adult population or when delivered in a brief, unguided format. We developed a 3-lesson unguided online treatment program targeting both rumination and worry and evaluated the adherence and effectiveness in Australian adults using an open pilot trial.

Methods: Adult participants (N=26) experiencing elevated levels of RNT completed the online program over 6-weeks. Outcomes were assessed at baseline, post-treatment, and 1-month follow-up. Intention-to-treat linear mixed models were used to examine effects on RNT, anxiety, depression, and general psychological distress.

Results: Of the 26 participants who started the program, 18 completed all three lessons (69.2% completion rate). Large within-subject effect sizes were found between pre- and post-treatment for RNT (Hedges' g= 2.26) and symptoms of depression (g = 1.04), generalised anxiety (g = 1.82) and distress (g = 0.93). Treatment effects were maintained at 1-month follow-up.

Limitations*:* No long-term follow-up, exclusion of severely depressed individuals.

Conclusions*:* This is the first study to evaluate a brief, unguided internet intervention targeting both rumination and worry in adults. The results provide promising preliminary evidence for the feasibility and acceptability of the online program. Randomised controlled trials are needed to evaluate treatment efficacy compared to a control group and to investigate long-term outcomes.

Introduction

Rumination and worry are both forms of repetitive negative thinking (RNT), defined as repeatedly dwelling on negative feelings, situations, and events (Ehring & Watkins, 2008). Rumination refers to a repetitive, evaluative, and analytic cognitive style that generally focuses on the causes, meanings, and consequences of depressive symptoms and mood (Nolen-Hoeksema, 1998) while worry is typically defined as a "chain" of uncontrollable thoughts focused on possible or imagined future risks, uncertainties, and catastrophes as well as questioning how one would cope if these feared events did occur (Borkovec, 1994). Both have been implicated in the onset, maintenance, and severity of depression and anxiety disorders and shown to increase the likelihood of relapse following psychological treatment (e.g., Ehring & Watkins, 2008; Watkins & Roberts, 2020). Rumination and worry are transdiagnostic processes that often co-occur in the same individual (e.g., Watkins, Moulds, & Mackintosh, 2005) and are associated with symptoms of both depression and anxiety (e.g., Segerstrom et al., 2000). Rumination and worry are highly correlated and share more similarities than differences. Indeed, the only consistently replicated variation between rumination and worry is thought content and temporal orientation; rumination is typically focused on the past and losses whereas worry is typically focused on the future and possible threats (e.g., Watkins, 2004; Watkins, Moulds, & Mackintosh, 2005). Despite this, rumination and worry have generally been studied separately and within the context of depression and anxiety disorders, respectively.

A number of Cognitive Behaviour Therapy (CBT) based treatments specifically targeting RNT have been developed to reduce and prevent psychopathology, such as Rumination-focused Cognitive Behavioural Therapy (RFCBT; Watkins et al., 2007; Hvengaard et al., 2020; Cook, Mostazir, & Watkins, 2019), Metacognitive Therapy (Wells, 2009), and Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale,

2002). Treatments for depression specifically targeting one form of RNT (e.g., RFCBT) have demonstrated significantly better treatment outcomes than those that do not target RNT (e.g., antidepressants, light therapy; Spinhoven et al., 2018). However, existing RNT interventions targeted either rumination or worry rather than both RNT variants simultaneously, leaving room for improvement.

In the first study to target and measure both RNT variants, 251 Dutch adolescents and young adults (aged 15-22) with elevated levels of rumination and worry (but no current diagnoses of depression and/or generalised anxiety disorder) were randomly allocated to receive 6-weeks of RFCBT delivered in a face-to-face group format or individually via the internet with clinician support (i-RFCBT), or to a waitlist control condition (Topper, Emmelkamp, Watkins, & Ehring, 2017). Relative to the waitlist control, both group-delivered and i-RFCBT significantly reduced RNT (between-group d = .53 to .89) and symptoms of depression and anxiety (d = .36 to .72), with treatment effects maintained at 12-month follow-up. There was no significant difference between the two active treatment conditions.

Similarly, Cook, Mostazir, and Watkins (2019) randomly allocated 235 UK university students (aged 18-24) with elevated levels of rumination and worry but no current diagnoses of depression and/or generalised anxiety disorder to receive guided i-RFCBT or treatment as usual (TAU) control. Compared to TAU, guided i-RFCBT was significantly more effective at reducing rumination, worry, and symptoms of depression at 3 and 6 months, however, treatment gains were not maintained at 15-month follow-up. Interestingly, as a secondary objective, participants were also randomly allocated to an unguided i-RFCBT group to evaluate the feasibility and acceptability of that alternate format. Although, the authors did not make any direct comparison between the guided and unguided i-RFCBT groups, compliance rates were similar between the two groups, and the authors proposed preliminary proof of principle of the use of unguided i-RFCBT. Nevertheless, the absence of a direct

comparison between the guided and unguided groups prevents any firm conclusions about their relative efficacy or adherence.

Together, this evidence suggests that interventions can simultaneously target both variants of RNT with corresponding reductions in depression and anxiety. These studies also demonstrate that RNT interventions may be effectively delivered via the internet. This is important as delivering treatment online overcomes a number of the well-documented social, logistical, economic, and geographical barriers to accessing face-to-face mental health treatment and has been shown to be as effective as face-to-face therapy, and more cost effective (Andrews et al., 2010; 2018; Spek et al., 2007; Andersson & Titov, 2014).

Despite the encouraging initial findings for internet-delivered RFCBT, the limited research to date has been conducted with adolescent and young-adult populations, and focused on evaluating preventative RNT interventions. No studies have evaluated programs targeting both rumination and worry in adults older than 25, including those currently experiencing depression and/or anxiety. Further, to our knowledge, no study has investigated the effectiveness of an internet-delivered intervention targeting both rumination and worry delivered in a brief, unguided (i.e., no therapist support) format for an adult sample. Whereas the scalability, accessibility, and cost-effectiveness of internet-interventions are reduced when delivered with clinician support, unguided internet interventions do not have these constraints and offer almost limitless scalability for wide-scale dissemination. It is thus important to evaluate whether unguided internet interventions targeting rumination and worry are associated with comparable treatment benefits. Mean completion rates in the Topper et al. (2017) and Cook et al. (2019) studies were also relatively low, with participants in the guided i-RFCBT conditions completing an average of 3.96 (*SD* = 1.65) and 3.46 (*SD* = 2.25) out of 6 sessions, respectively, and 2.66 sessions (*SD* = 2.35) in the unguided i-RFCBT condition.

The evaluation of brief (i.e., < 6 sessions) interventions is thus also important as shorter programs may be more appealing to potential users and reduce treatment drop out.

To address these gaps, we developed a brief, unguided internet-delivered intervention specifically targeting both rumination and worry. This pilot study aimed to evaluate the acceptability and impact of the intervention program in reducing rumination and worry in Australian adults. Secondary aims were to evaluate changes in anxiety, depression, general psychological distress, metacognitive beliefs about rumination and worry, program adherence, and to gain participant feedback to identify any refinements needed to the intervention prior to commencing a randomized controlled trial. We hypothesised that the program would significantly reduce participants' self-reported levels of rumination, worry, general psychological distress, depression and generalised anxiety symptoms. We also hypothesised that the program would be acceptable to participants, as measured by completion rate, treatment satisfaction, and qualitative reports. To our knowledge, this is the first study to investigate the effects of a brief unguided, internet-delivered intervention targeting both rumination and worry in adults.

Methods

Design

Within-subjects design with assessments at pre, post-treatment, and 1-month follow-up. The study was approved by St Vincent's Hospital Sydney Human Research Ethics Committee (HREC/18/SVH/220) and is registered with the Australian and New Zealand Clinical Trials Registry (ACTRN12619001535167).

Inclusion criteria

Eligibility criteria included: i) 18 years or older ii) live in Australia iii) fluent in written and spoken English iv) have access to a computer and internet v) experiencing

elevated levels of rumination and/or worry (i.e., RTQ-10 total score ≥ 28) vi) provide demographic information, including contact details of their general practitioner.

As there is no validated cut-off for elevated repetitive thinking on the RTQ-10, we chose a value of 28 to establish eligibility into the study. This value sits between the mean reported by McEvoy et al. (2018) in a population-based study of the psychometric properties of the RTQ-10 (M = 25.99, SD = 8.03) and the cut-off of 32 recommended (but not yet validated) by McEvoy et al. (2014) to distinguish between clinical and non-clinical levels of RNT.

Exclusion criteria

Applicants were excluded due to i) RTQ-10 total score of 27 or below ii) severe depression (PHQ-9 total scores > 23) iii) current active suicidality iv) self-reported diagnoses of psychosis, schizophrenia, or bipolar disorder v) commencement of medication for anxiety and/or depression less than two months before assessment, or commencement of psychological therapy less than a month before assessment.

Measures

Diagnostic Interview

The *Anxiety and Related Disorders Interview Schedule for DSM-5* (ADIS-5; Brown & Barlow, 2014) MDD, GAD, and risk assessment modules were administered to all participants to assess current DSM-5 diagnoses by a Clinical Psychologist (JN) or Masters-level Provisional Psychologist (AJ). These ADIS-5 modules have excellent inter-rater reliability (kappa estimates of 0.80 for MDD and 0.93 for GAD; Newby et al., 2017).

Primary Clinical Outcome Measures

The *Repetitive Thinking Questionnaire-10* (RTQ-10; McEvoy, Mahoney, & Moulds, 2010) measures the extent to which an individual engages in RNT in response to distressing

situations. It is comprised of the 10 highest loading items from the original 31-item RTQ (McEvoy et al., 2010). The RTQ-10 has excellent internal consistency (α = .91; Wong, McEvoy, & Rapee, 2016), and significantly correlates with measures of anxiety and depression in both clinical (Mahoney et al., 2012) and non-clinical samples (McEvoy et al., 2010).

The *Patient Health Questionnaire-9* (PHQ-9; Kroenke, Spitzer, & Williams, 2001) measures depressive symptoms over the past two weeks. The scale has good sensitivity and specificity, good test-retest reliability (*r* = .84), internal consistency (α = .86 - .89), and construct validity (Kroenke et al., 2007; Wittkampf et al., 2007), and sound diagnostic properties for depression (Gilbody et al., 2007).

The *Generalised Anxiety Disorder 7-item Scale* (GAD-7; Spitzer, Kroenke, Williams, & Lowe, 2006) is a measure of general anxiety symptoms over the past two weeks. The GAD-7 has good reliability (*r* = .85), internal consistency (Spitzer et al., 2006), and validity (Kroenke et al., 2007).

Secondary Clinical Outcome Measures

The *Kessler Psychological Distress Scale – 10-item* (K10; Kessler et al., 2002) measures non-specific psychological distress over the past two weeks. The K10 has strong psychometric properties (Andrews & Slade, 2001), with high discriminant validity (Furukawa et al., 2003) and internal consistency (α = .93; Kessler et al., 2002).

The *Metacognitions Questionnaire-30* (MCQ-30; Wells & Cartwright-Hatton, 2004) assesses metacognitive beliefs and monitoring across 5 subscales 1) positive beliefs about worry, 2) negative beliefs about worry, 3) cognitive confidence, 4) negative beliefs about the need to control thoughts, and 5) cognitive self-consciousness. The MCQ-30 has satisfactory test-rest reliability (*r*=.59 - .87) and good internal consistency (α=.72 - .93; Wells & Cartwright-Hatton, 2004).

The *Penn State Worry Questionnaire* (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) measures the frequency, intensity, and perceived uncontrollability of worry. The PSWQ has sound psychometric properties, including high internal consistency (α = 0.86 – .95) and test-retest reliability (*r* = .74 – .93; Meyer et al., 1990; Molina & Borkovec, 1994).

The *Ruminative Response Scale* (RRS; Treynor, Gonzalez, & Nolen-Hoeksema, 2003) measures the tendency to engage in rumination in response to depressed mood. The RRS has good test-retest reliability (*r* = .60 - .62) and internal consistency (α = .72-79; Treynor et al., 2003; Roelofs et al., 2006).

Risk assessment and monitoring

Beck Depression Inventory - Second Edition (Item 9 only; BDI-II; Beck, Steer, & Brown, 1996). Item 9 asks participants about suicidal thoughts and intent on a 4-point scale ranging from 0 (*I don't have any thoughts of killing myself*) to 3 (*I would kill myself if I had the chance*) and was used to monitor the presence and severity of any suicidal thinking throughout the trial.

Feasibility and acceptability measures

Treatment satisfaction

At post-treatment, participants rated their overall satisfaction with the program (1= very dissatisfied to 5 = very satisfied), the quality of the materials (1 = unsatisfactory to 4 = excellent), and treatment duration (much too little time, a bit too little time, exactly the right amount of time, a bit too much time). Participants rated how logical the program was (1 = not very logical to 10 = very logical), their degree of confidence that the program was successful in teaching skills to manage their rumination and/or anxiety (1 = not at all confident to 10 = very confident), and how confident they would be in recommending the program to a friend with similar difficulties (1 = not very confident to 10 = very confident). To inform future improvements, participants were asked brief, open-ended questions about which aspects of

the treatment were helpful and unhelpful, their likes and dislikes about the program, and suggestions for improvements.

Participants were also contacted by research staff for a brief follow-up phone interview at 1-month follow-up, during which they were asked for further feedback.

Adherence, engagement, and lesson feedback

Adherence was measured as the number of lessons completed. Prior to starting each lesson, participants were asked to indicate how many minutes they had spent reading the previous lesson and practicing what they had learned, and to provide brief feedback about the previous lesson.

Description of Intervention

The Managing Rumination and Worry program consists of three online lessons delivered over the six-week treatment period. The program (see Table 4) includes components such as psychoeducation, self-monitoring, three rules of thumb to differentiate between helpful and unhelpful rumination and worry, activity planning, structured problem solving, attention shifting, and identifying, testing and challenging meta-cognitive beliefs about RNT. Treatment content was drawn from a number of CBT-based treatment perspectives. Specifically, drawing on RFCBT, participants are taught to recognise their individual warning signs for rumination, identify antecedent cues, control their exposure to their cues, and practice alternative strategies to these cues (Watkins et al., 2016). Similar to Mindfulness-based Cognitive Therapy (MBCT), participants are also taught to shift their attention away from rumination and worry to the present in order to interrupt habitual thinking patterns (Segal, Williams, & Teasdale, 2002). Metacognitive therapy posits that RNT is initiated and maintained by positive metacognitive beliefs about the advantages of RNT and exacerbated by negative metacognitive beliefs about perceived negative consequences of RNT (Wells, 2009). Participants are thus also taught to identify, test, and

modify maladaptive metacognitive beliefs about rumination and worry. Given evidence suggesting rumination and worry are highly similar processes, treatment strategies were adapted to target both rumination and worry. Participants were explicitly advised that each strategy could be applied to both rumination and worry.

The program was delivered via the Virtual Clinic website (www.virtualclinic.org.au) in the form of an illustrated, comic-style story about two fictional characters who learn how to manage frequent worry and rumination. Each lesson consists of lesson slides following the characters' stories, introduction of treatment skills, and examples. Following each lesson, participants downloaded a brief (1-page) lesson summary and action plan, which covered key concepts, skills, and practice activities. A lesson was considered "complete" once the participant had viewed the lesson slides and downloaded the lesson summary/action plan. Participants also had access to a range of extra resources.

The program was self-paced, with a new lesson becoming available each week and participants encouraged to complete one lesson every 1-2 weeks. All lessons were accessed sequentially, with a 5-day lockout period enforced between lessons to encourage participants to revise and practice each lessons' material before moving onto the next lesson. Participants received notifications about new lesson availability and reminders via email and SMS.

Table 4. Summary of content in the *Managing Rumination and Worry* program.

Lesson	Content	Action Plan	Extra Resources
1	• Psychoeducation about rumination and worry • Self-monitoring • Activity Planning	• Review lesson materials and extra resources • Fill out Self-monitoring form when worrying/ruminating • Use Activity Planning form to plan activities for "high risk" times • Engage in distracting/absorbing activities to interrupt and prevent rumination and worry	• Self-monitoring form • Activity Planning form • Absorbing and Distracting Activities List
2	• Psychoeducation about meta-cognitive beliefs about RNT • Designing and conducting experiments to test meta-cognitive beliefs about RNT • Three Rules of Thumb to differentiate between helpful and unhelpful rumination and worry • Worry Time	• Review lesson materials and extra resources • Identify and test beliefs about rumination and worry • Practice using Three Rules of Thumb • Practice Worry Time	• Testing Your Beliefs form • Three Rules of Thumb
3	• Structured Problem Solving • Disengaging from rumination/worry and Shifting Attention onto present moment • Summary of program content	• Review lesson materials and extra resources • Practice Structured Problem Solving • Practice Disengaging and Shifting Attention • Refer to Decision Tree to help guide selection of skills when ruminating/worrying	• Structured Problem Solving form • Managing Rumination and Worry at Night • Decision Tree

Procedure

Participants were recruited between February and March 2019 via social media advertisements. After reading the study information and providing informed consent, individuals applied online via www.virtualclinic.org.au and completed brief screening questionnaires (i.e., RTQ-10, PHQ-9, Item 9 of the BDI-II) to determine their eligibility. Participants also provided basic demographic information, symptom and treatment history, and their GP's contact details. Potentially eligible individuals participated in a brief telephone interview, which included a structured diagnostic interview (ADIS-5) to assess MDD and GAD, risk assessment, and explanation of the study. Eligible participants were given immediate access to the treatment program whilst ineligible participants were directed to alternate services.

Participants were required to complete all three lessons within the 6-week active treatment period. Participants were withdrawn upon request or if they had not completed their baseline questionnaires within two weeks of being accepted into the study. As the intervention was delivered in a self-help (i.e., unguided) format, participants did not receive any coaching or clinician support. Clinicians only initiated phone or email contact with participants in response to a significant deterioration in PHQ-9 or K10 scores to check participants' safety. Telephone and/or email contact from research staff was also initiated if a participant failed to log in and complete a lesson. In addition, participants received automated email and SMS notifications and reminders from the Virtual Clinic platform (e.g., to complete lessons and questionnaires). Assistance was available for any technical issues over the phone and via email, and all assistance was logged by Virtual Clinic staff at the time of consultation.

All participants were administered the ADIS-5 MDD and GAD modules at intake phone interview to assess diagnostic status. Before starting Lessons 2 and 3, participants

completed three brief questions about (i) how much time they had spent reading the previous lesson and (ii) completing practice activities, and (iii) any feedback about the previous lesson. All outcome measures were administered at pre-treatment (prior to Lesson 1), post-treatment (one week after the final lesson) and at one-month follow-up (four weeks after post-treatment).

Statistical Analyses

All analyses were conducted using SPSS version 26. A linear mixed model with a random intercept for subject was constructed for each of the primary and secondary clinical outcome measures. Linear mixed model analyses estimate parameters in repeated measures studies with unbalanced, or incomplete data using maximum likelihood estimation, which makes use of incomplete data in a way that does not bias the parameter estimates (West, Welch, & Galecki, 2014). Linear mixed models offer the advantage of using all available data when participants have missing data, in contrast to within-subjects *t* tests which would exclude participants with missing data from the analyses. For each model, measurement occasion (pre-post, pre-follow-up) was entered as a categorical variable and an identity covariance structure specified to model the covariance structure of the random intercept. Initial model building focused on the selection of the most appropriate covariance structure for the residual correlation matrix. Model fit indices and inspection of the variance-covariance matrix supported the selection of the diagonal covariance structure for each of the outcome measures, with the exception of the PSWQ, where an autoregressive covariance structure provided the best fit.

Within-group effect sizes (Hedge's *g*) were calculated using the estimated marginal means to determine the magnitude of within-group reductions in scores between pre- and post-treatment, and pre-treatment and 1-month follow-up.

Results

Participant Characteristics

Figure 1 summarises participant flow through the study. 63 individuals started the online application for the study between February and March 2019. Of these, 26 applicants met all of the inclusion criteria and were accepted into the study.

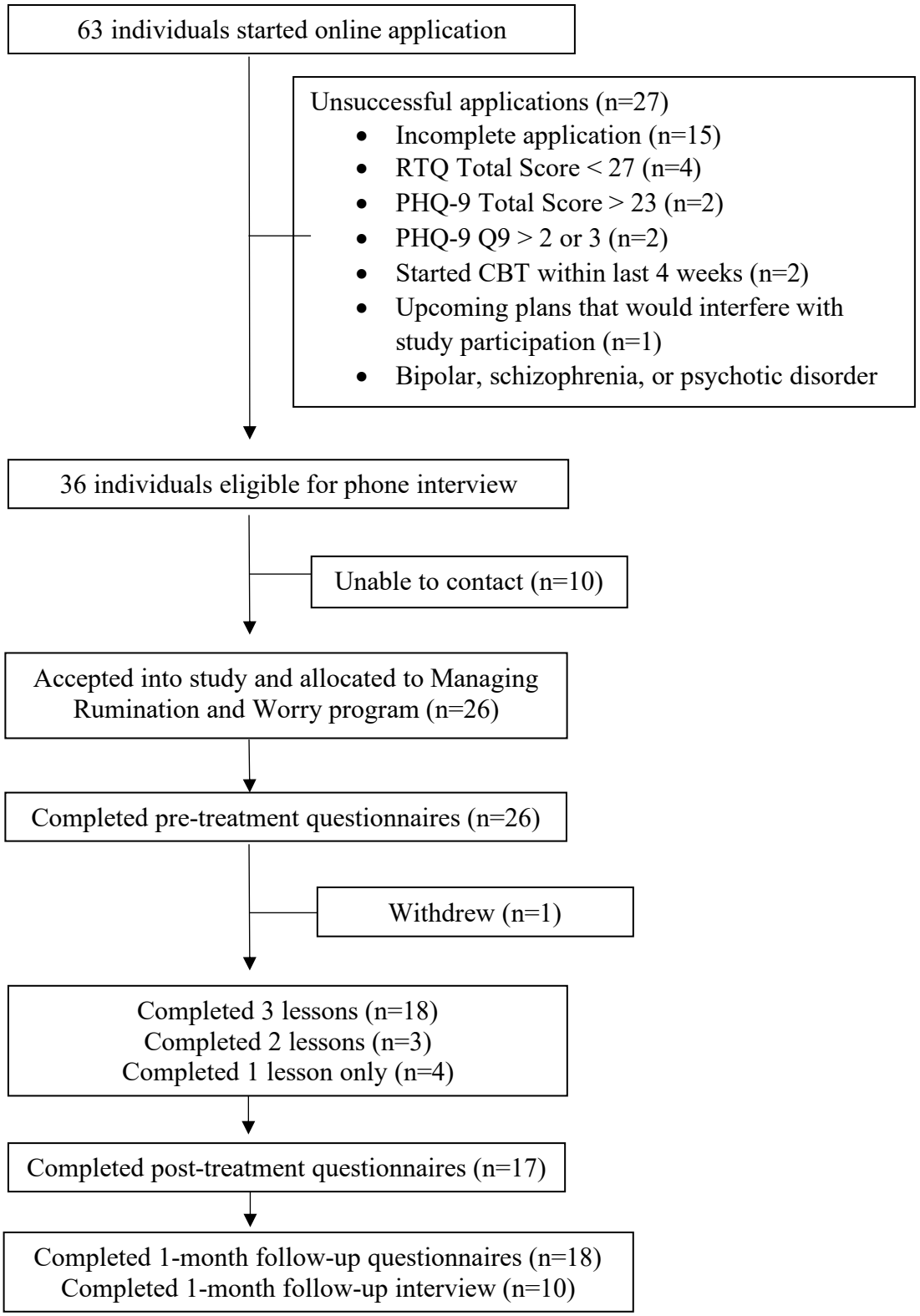

Figure 1. Participant flow diagram.

As shown in Table 5, the majority of participants were female (76.9%), aged between 24 and 75 years (M = 45.92, SD = 14.56), educated, and employed in either full-time (53.8%) or part-time (23.1%) paid work. Almost three-quarters of participants were born in Australia (73.1%) and all but two participants reported speaking English at home (92.3%). Just over half the participants reported being married (53.8%).

At pre-treatment, the mean scores on the self-report measures of anxiety (GAD-7; M=11.81, SD=4.30) and depression (PHQ-9; M = 11.23, SD = 5.40) were in the moderate range. Eight participants (30.7%) met DSM-5 diagnostic criteria for both MDD and GAD, twelve (46.1%) met criteria for GAD but not MDD, and six (23.0%) did not meet diagnostic criteria for either MDD or GAD. No participants met criteria for MDD without co-morbid GAD.

Twenty-four participants (92.3%) reported previously experiencing more than one episode of significant and persistent low mood and/or anxiety. The average age of onset of symptoms of depression and/or anxiety was 24.45 years (SD =13.74, range=10 - 65 years). Seven participants (26.9%) reported taking medication for depression and/or anxiety and five (19.2%) were receiving treatment with a psychologist, psychiatrist, or counsellor.

Table 5. Participant characteristics.

	N=26		N=26
Mean age (SD)	45.9 (14.6)	**Current psychotherapy n (%)**	
Gender, n (%)		No	21 (80.7)
Female	20 (76.9)	Psychologist	2 (7.7)
Male	6 (23.1)	Psychiatrist	1 (3.8)
Country of birth n (%)		Counsellor	1 (3.8)
Australia	19 (73.1)	Other psychotherapy	1 (3.8)
United Kingdom	2 (7.7)	**Past treatment (e.g., medications, psychotherapy) n (%)**	
Germany	1 (3.8)	No	5 (19.2)
Other	4 (15.4)	Yes	21 (80.8)
Primary language n (%)		**Past treatment type n (%)**	
English	24 (92.3)	Medication	7 (26.9)
Cantonese	1 (3.8)	Psychotherapy	15 (57.7)
Bahasa	1 (3.8)	Other	3 (11.5)
Relationship status n (%)		**Probable pre-treatment diagnosis n (%)**	
Single	4 (15.4)	GAD	12(46.1)
In a relationship	4 (15.4)	MDD	0 (0)
Married/de facto	14 (53.8)	Comorbid MDD and GAD	8 (30.7)
Separated/Divorced	4 (15.4)	Subclinical	6 (23.1)
Education level n (%)		**Previous episodes of significant and persistent low mood and/or anxiety n (%)**	
School-level	3 (11.5)	1 episode	2 (7.7)
Trade/certificate	5 (19.2)	2-3 episodes	2 (7.7)
Diploma	3 (11.5)	4-5 episodes	3 (11.5)
Undergraduate	7 (26.9)	6-7 episodes	2 (7.7)
Postgraduate	8 (30.7)	More than 7 past episodes	17 (65.4)
Employment status n (%)		**Baseline Clinical Outcome Measures mean (SD)**	
Full-time paid work	14 (53.8)	RTQ-10	42.42 (5.5)
Part-time paid work	6 (23.1)	PHQ-9	11.23 (5.4)
Retired	3 (11.5)	GAD-7	11.81 (4.3)
Registered sick/disabled	1 (3.8)	K10	27.11 (7.2)
Other	2 (7.6)	MCQ-30	74.36 (13.5)
Current medications n (%)		PSWQ	65.84 (9.6)
No	19 (73.1)	RRS	16.42 (7.7)
SSRI	4 (15.4)		
SNRI	3 (11.5)		

Adherence and Program Engagement

Of the 26 participants who started the program, eighteen completed all three lessons (69.2%). Of the non-completers, four completed the first lesson while three completed the first two lessons. On average, participants reported spending 41 minutes reading each lesson

(*M* = 41.30, *SD* = 22.1, range=1 -73 minutes) and almost 18 minutes each day practicing the skills they had learned (*M* = 17.88, *SD* = 15.5, range=3.33 – 50 minutes). Participants reported spending an average of 3.53 hours per week (*SD* = 1.54) reading the program content and practicing the skills taught in the program.

Clinical and technical support contact time

An average of 22.58 minutes (*SD* = 14.51, range = 5-72) was spent on email or phone contact per participant during the course of the program.

Clinical Outcome Measures

Table 6 shows the linear mixed model results, including the estimated marginal means for the primary and secondary outcome measures at each timepoint. We found statistically significant improvements between pre-treatment and follow-up on all outcome measures (*p*s< .01). Within-group effect sizes were medium for the Ruminative Responses Scale (RRS), and large for all other outcome measures.

Table 6. Estimated marginal means (standard deviations) for primary and secondary outcome measures and within-group effect sizes at post-treatment and follow-up.

	EMM (SD)					F(df)	Within-group ES (95%CI)	
	Lesson 1	**Lesson 2**	**Lesson 3**	**Post-treatment**	**1-Month Follow-up**		**Pre-treatment to Post-treatment**	**Pre-treatment to 1-Month Follow-Up**
RTQ-10	42.42 (5.81)	38.44	37.18	29.6 (5.28)	29.3 (6.28)	24.79 (4, 26.56)	2.26 (1.40 – 3.12)***	2.12 (1.31 – 2.94)***
K10	27.11 (7.8)	24.91	23.40	20.8 (5.4)	21.33 (5.85)	9.65 (4, 24.10)	0.93 (0.23 – 1.64)***	0.83 (0.15 – 1.51)***
PHQ-9	11.23 (5.2)	-	-	6.81 (3.12)	6.82 (4.24)	12.82 (2, 22.18)	1.04 (0.32 – 1.75)***	0.91 (0.23 – 1.60)***
GAD-7	11.80 (4.21)	-	-	5.95 (2.08)	6.73 (4.06)	23.93 (2, 24.84)	1.82 (1.02 – 2.62)***	1.20 (0.49 – 1.91)***
RRS	17.44 (5.76)	-	-	13.5 (5.32)	13.49 (5.39)	9.81(2, 15.13)	0.69 (0.00 – 1.39)**	0.69 (0.02 – 1.37)***
PSWQ	65.84 (9.18)	-	-	56.41 (8.49)	58.3 (8.83)	12.97(2, 29.54)	1.04 (0.33 – 1.76)***	0.82 (0.14 – 1.50)**
MCQ-30	74.36 (10.64)	-	-	64.22 (10.64)	65.06 (11.29)	9.64(2, 17.46)	0.82 (0.12 – 1.52)***	0.83 (0.15 – 1.51)***

Note. EMM = Estimated marginal means; SD = Standard deviation; ES = Hedge's *g* effect size; 95%CI = 95% confidence interval; RTQ-10 = Repetitive Thinking Questionnaire – 10; K10 = Kessler Psychological Distress Scale – 10 item; PHQ-9 = Patient Health Questionnaire – 9; GAD-7 = Generalised Anxiety Disorder 7-item scale; RRS = Ruminative Response Scale; PSWQ = Penn State Worry Questionnaire; MCQ-30 = Metacognitions Questionnaire – 30; ** $p < 0.01$, *** $p \leq 0.001$.

Treatment Satisfaction

Of the 17 participants who completed post-treatment questionnaires, one was "very satisfied" (n=1, 5.8%), 10 were "mostly satisfied" (58.8%), four were "neutral" (23.5%), and two were "somewhat dissatisfied" (11.7%). Of note, one of the participants who indicated that they were 'somewhat dissatisfied' provided far more positive responses on the remaining items, suggesting they may have incorrectly selected that response. The majority of participants rated the quality of the program materials as either "excellent" (n=5, 29.4%) or "good" (n=10; 58.8%), with two participants finding it "satisfactory" (11.76%). Most reported that the tempo of the program was "exactly right" (n=10, 58.8%), however five participants indicated that there was "a bit too little time" (29.4%), one participant reported they had "much too little time" (5.8%) and one participant reported that there was "a bit too much time" (5.8%). Overall, participants found the program logical (M = 7.7, SD = 1.37, range = 6-10) and reported high levels of confidence that it had successfully taught them skills to manage their rumination and worry (M = 7.35, SD = 1.45, range 6-10) and in recommending the program to a friend with similar difficulties (M = 7.35, SD = 1.93, range 3-10).

Qualitative Feedback

Most helpful aspects: Participants reported the program was easy to understand, the skills were practical and relatively easy to implement, and that the program increased awareness of when they engaged in unhelpful rumination/worry and skills they could use to reduce it. Most identified the flexibility, convenience, and anonymity of the online mode of delivery as key strengths of the program.

Dislikes: Participants disliked some technical aspects of the program, including that the slides could only be viewed on a computer (not a mobile device), having to print worksheets, and the enforced lock-out period between lessons. Some participants expressed

that clinician support would have been helpful and that the self-paced nature "did not hold them accountable enough". Feedback about the length and tempo of the program was inconsistent, with some reporting a preference for a shorter program and/or less waiting time between lessons and others reporting a preference for more lessons and/or a longer waiting period between lessons to better consolidate the content and practice the skills.

Suggested improvements: These included making the program mobile-phone accessible, delivery of treatment via an app, having the ability to provide and save information online without needing to print materials, removal of the 5-day lock-out period, reminders to practice treatment skills in addition to lesson availability reminders, the inclusion of more examples in the lesson slides, and being able to engage with a clinician about treatment content and how to apply the skills. Some participants also suggested a greater focus on how to apply the skills covered in the program to manage rumination and worry at night, as this was a common time that participants reported engaging in repetitive thinking.

Discussion

The aim of this pilot trial was to evaluate the preliminary effectiveness and acceptability of an unguided internet-delivered intervention explicitly targeting both rumination and worry in adults. Consistent with our hypotheses, the intervention program reduced both rumination and worry, with large reductions found between pre- and post-treatment which were maintained at 1-month follow-up. Large improvements were also found for symptoms of depression, generalised anxiety, and general psychological distress, suggesting transdiagnostic benefit. By post-treatment, mean scores on the self-report measures of anxiety and depression were below the clinical cut-off for probable diagnoses of GAD and MDD (Spitzer et al., 2006; Kroenke et al., 2001) and this was maintained at 1-month follow-up.

Our findings add to the growing research base suggesting that internet-delivered interventions can successfully explicitly target and reduce both rumination and worry (Topper et al., 2017; Cook et al., 2019). These findings are important given the well-established role that rumination and worry play in the onset, severity, maintenance and relapse risk of depression and anxiety disorders (e.g., Ehring & Watkins, 2008). Delivering treatment via the internet also overcomes a number of the well-established barriers to accessing mental health treatments (e.g., Andrews et al., 2010) and provides a promising avenue to disseminate interventions on a large scale. In addition, rumination and worry are both commonly experienced by the general population and, as such, may not have the connotations or perceived stigma of mental illness (Topper et al., 2017). The focus on rumination and worry may therefore be more appealing to potential end-users compared to programs targeting depression and/or anxiety, potentially increasing uptake.

Although limited, evaluations of internet-delivered interventions targeting both rumination and worry have to date demonstrated significant improvements in RNT as well as depression and anxiety symptoms. In general, our findings are consistent with this previous research, despite key differences in methodology. For example, Topper et al.'s (2017) trial was conducted with adolescent and young adults without current diagnoses of depression and/or anxiety and evaluated a longer intervention (8 modules) delivered with clinician support. Our findings extend the existing literature to provide preliminary evidence for treatment effects in adults. Furthermore, at baseline, over three-quarters of our sample (77%) met diagnostic criteria for MDD and/or GAD and average scores on self-report measures of anxiety and depression were in the moderate range. Thus, there appears to be preliminary evidence of the programs efficacy in reducing rumination and worry in participants experiencing clinically significant levels of depression and anxiety.

As a further addition to the existing literature, the observed results, feedback from participants, and adherence rates also suggest that internet interventions explicitly targeting rumination and worry can be successfully delivered in a brief, unguided format. In terms of adherence, 69.2% of participants completed all three lessons of the program. This is promising given that each participant required an average of only 22.58 minutes of phone and/or email contact to remind them to log in and/or manage risk throughout the study and speaks to the feasibility of the intervention and its delivery mode. This is also substantially lower than the amount of clinician contact required in the existing guided interventions, with clinicians reportedly spending at least 20 minutes per participant providing feedback after each completed session (Topper et al., 2017). Our findings thus suggest that participants can experience large reductions in levels of RNT and symptoms of depression and anxiety with relatively little clinician time, as compared to guided interventions. Further research is needed to confirm this.

The adherence rate in the current study is also comparable to that of existing RCTs of unguided iCBT interventions for depression and/or anxiety (e.g., Titov et al., 2013; Berger et al., 2011; Loughnan et al., 2019). Notably, it is significantly higher than the adherence rate for brief unguided iCBT for depression and anxiety delivered in a naturalistic setting (14%, Morgan et al., 2017). Our intervention program appeared to be mostly acceptable to participants, as evidenced by good treatment satisfaction and participants' confidence in the program's success in teaching them skills to better manage rumination and worry. The majority of participants also reported relating to the program characters and finding the strategies helpful and straightforward. Nonetheless, there is room for improvement regarding the technical aspects of the programs' delivery. We also received inconsistent feedback about the length and tempo of the program and some participants reported a preference to complete

the program in a guided format. Further research should thus investigate which factors influence and promote program completion.

Limitations

Our findings need to be interpreted in the context of the following limitations. As a pilot study designed to examine the preliminary efficacy and acceptability of the intervention program, the sample size is small and the trial lacked a control condition. Further, participants were not blind to treatment condition and there were no limitations imposed on accessing additional services during the study period. We therefore cannot exclude the possible effects of other variables on treatment outcomes (e.g., regression to the mean, expectancy effects, response bias), nor conclude that the observed outcomes were solely due to the intervention program. In order to address these issues, a follow-up trial with a larger sample and control group is currently underway to better delineate specific treatment effects. In addition, given the short follow-up period (one month), the long-term effectiveness of the program and sustainability of symptom improvements are also unknown. Future studies with a longer follow-up period are needed to evaluate the durability of treatment effects. Most participants were self-referred (and therefore self-motivated) to apply for and complete an internet-delivered program, which may limit the generalisability of the findings. Our sample was also disproportionately female. However, there is evidence that females report higher levels of rumination and worry (e.g., Robichaud, Dugas, & Conway, 2003) and thus recruiting participants on the basis of engaging in RNT will inevitably result in a higher proportion of female participants. Finally, excluding adults with severe depression may also limit the generalisability of our findings to more clinically severe populations. Future studies are needed to investigate treatment effects, adherence, and acceptability in participants experiencing severe depressive symptoms and should include appropriate risk-management protocols. Despite these limitations, the study's eligibility criteria were deliberately inclusive,

and the online delivery meant participants were recruited from across Australia, thus increasing generalizability in this respect.

Conclusion

In summary, this is the first study to specifically target both rumination and worry in adults using a brief, unguided, internet-delivered intervention. This pilot study provides preliminary evidence for the programs' efficacy and acceptability, with large reductions in rumination and worry as well as depression and anxiety symptoms and general psychological distress. The program was also acceptable and well-received by most participants. Our findings contribute to the growing evidence-base supporting the effectiveness of simultaneously targeting both variants of RNT in reducing depression and anxiety, and also highlight the effectiveness of internet delivery.

Chapter 4: Managing Rumination and Worry: A randomised controlled trial

Manuscript submitted as:

Joubert, A. E., Grierson, A. G., Li, I., Sharrock, M. J., Moulds, M. L., Werner-Seidler, A., Stech, E. P., Mahoney, A. E. J., Newby, J. M. Managing Rumination and Worry: A randomised controlled trial of an internet intervention targeting repetitive negative thinking delivered with and without clinician guidance. *Manuscript under review.*

Author contributions

Conceptualisation, methodology, and development of intervention: AJ, JN, MM, AWS. AJ and JN completed all diagnostic interviews at intake and supervised all participants. ES completed all diagnostic interviews at follow-up. Project administration: AJ, JN, AG, IL, MS. Formal analysis: AJ, JN. Writing – original draft: AJ. Writing – review editing: AJ, JN, MM, AWS, AG, IL, MS, EP, AM.

Preamble

Study 2 demonstrated the preliminary efficacy and acceptability of the intervention program in adults. Despite these promising preliminary findings, the pilot trial was limited by a small sample size and lack of control group. Further, the follow-up period was short (one month) and only self-report measures were used to index treatment outcomes.

To better delineate specific treatment effects, Study 3 used an RCT design with a larger sample to evaluate the efficacy and acceptability of the intervention program compared to a treatment-as-usual control group. The follow-up period was also extended to three months to better evaluate the durability of treatment effects. In addition to self-report measures, blinded diagnostic interviews were included at 3-month follow-up to investigate the impact of the intervention program on depression and anxiety diagnoses. Refinements

were also made to the intervention based on qualitative feedback obtained from participants in the pilot trial. This included incorporating additional automated reminder emails, more examples in the lesson slides, and a greater focus on managing rumination and worry at night in line with participant feedback that this was a common and distressing time that participants engaged in RNT.

As outlined in the introduction, the existing studies in this field have evaluated online interventions targeting rumination and worry delivered with clinician support (Topper et al., 2017; Cook, Mostazir, & Watkins, 2019). Although the results of Study 2 suggested that participants can experience significant reductions in RNT and symptoms of depression and anxiety when the intervention is delivered without clinician support, the relative efficacy and adherence rates of guided and self-help online interventions targeting rumination and worry was unknown. Therefore, Study 3 also directly compared treatment effects and adherence rates when the intervention was delivered with and without clinician guidance to determine the optimal level of guidance required to support users.

Abstract

Background: Rumination and worry, forms of repetitive negative thinking (RNT), are implicated in the onset, maintenance, severity, and relapse risk of depression and anxiety disorders. This is the first randomised controlled trial to evaluate an internet intervention targeting both rumination and worry in adults compared to treatment-as-usual (TAU) and the first to compare treatment effects and adherence when delivered with and without clinician guidance in this context.

Methods: Adults (N=137) with elevated RNT were randomly allocated to a 3-lesson clinician guided (n=45) or self-help (n=47) online program delivered over 6-weeks, or TAU control (n=45). RNT, anxiety, depression, and psychological distress were assessed at baseline, post-treatment (week 7), and 3-month follow-up.

Results: Intention-to-treat linear mixed models showed that participants in the self-help and clinician guided groups had significantly lower RNT, anxiety, depression, and distress at post-treatment and 3-month follow-up compared to TAU. Treatment effects were significantly larger in the clinician guided group compared to self-help (between-group *g*s = 0.41 – 0.97). No significant between-group differences were found in adherence or treatment satisfaction.

Conclusion: This internet intervention for RNT is acceptable and efficacious in reducing RNT, anxiety, depression, and distress in both clinician guided and self-help formats. The program was most effective when delivered with clinician guidance.

Introduction

Defined as repeated dwelling on negative feelings, situations, and events, repetitive negative thinking (RNT) is typically experienced by individuals as intrusive, uncontrollable, and perseverative (Ehring & Watkins, 2008). Two of the most studied variants of RNT are rumination and worry. Rumination typically involves an evaluative and passive focus on *past* negative experiences, perceived failures and regrets, and depressive symptoms and mood (Nolen-Hoeksema, 1998), while worry focuses on possible or imagined *future* uncertainties, risks, and catastrophes and how an individual would cope with these if they were to occur (Borkovec, 1994). Rumination and worry are transdiagnostic processes (Ehring & Watkins, 2008), each associated with symptoms of both anxiety and depression (Segerstrom et al., 2000) and often co-occurring in the same individual (Watkins et al., 2005). Rumination and worry are highly correlated and share more similarities than differences, with thought content and temporal orientation the only consistently replicated variation (Watkins, 2004; Watkins et al., 2005).

Both rumination and worry have repeatedly been implicated in the onset, severity, maintenance, and increased relapse risk of both depression and anxiety disorders (Ehring & Watkins, 2008; Watkins & Roberts, 2020), making them important treatment targets. There have been promising initial findings when interventions specifically targeting both rumination and worry are delivered via the internet with clinician guidance, with significant reductions in participants' self-reported levels of RNT and symptoms of generalised anxiety and depression observed relative to control (Cook et al., 2019; Topper et al., 2017). Delivering treatment online helps to overcome multiple logistical, geographical, economic, and social barriers to accessing face-to-face mental health treatment and is associated with increased scalability, treatment coverage, and greater cost-effectiveness (Andersson & Titov, 2014; Andrews, Basu, et al., 2018; Andrews, 2010; Spek et al., 2007). Further supporting

treatment coverage, RNT-focused interventions may be more appealing to end-users compare to disorder specific programs as rumination and worry may not have the perceived social stigma of mental illness (Topper et al., 2017).

To date, the limited research on internet-delivered interventions targeting both rumination and worry has evaluated whether interventions prevent the onset of psychological symptoms rather than effectively treat existing symptoms. Given this focus on preventing the emergence of psychopathology, such studies have been limited to samples of adolescents and young adults (<25 years old) without current depression and/or anxiety diagnoses. Studies are thus needed to investigate treatment effects of internet-delivered interventions targeting both rumination and worry in adult samples, including individuals currently experiencing anxiety and/or depression.

To address these gaps in the literature, we developed a brief internet-delivered intervention targeting both rumination and worry, the *Managing Rumination and Worry Program,* and evaluated its effectiveness and acceptability in a pilot trial with 26 Australian adults reporting elevated levels of RNT (Joubert et al., 2021). Participants completed a three-lesson program in an unguided (i.e., self-help) format over the six-week treatment period. We found medium to large reductions in rumination (Hedges' $g = 0.69$), worry ($g = 1.04$), a transdiagnostic measure of RNT ($g = 2.26$), and symptoms of depression ($g = 1.04$), anxiety ($g = 1.82$), and distress ($g = 0.93$) from pre- to post-treatment, all of which were maintained at one-month follow-up. Program adherence was acceptable (69.2% completion rate), as was participant satisfaction, with the majority of participants "very satisfied" or "mostly satisfied".

In the current randomised controlled trial (RCT), we tested the intervention in a larger sample, compared it to a treatment-as-usual (TAU) control group, and extended the follow-up period to three months to better evaluate the durability of treatment effects. We also included

a blinded diagnostic interview at 3-month follow-up in addition to self-report measures to investigate the impact of the intervention program on depression and anxiety diagnoses. Refinements were also made to the intervention based on qualitative feedback obtained from participants in the pilot trial (e.g., additional reminder emails).

Unguided online interventions are typically associated with more modest treatment outcomes and lower adherence rates compared to guided interventions (Andersson & Cuijpers, 2009; Andersson & Titov, 2014; Baumeister et al., 2014). However, preliminary evidence suggests that so called "second generation" unguided interventions, which include features designed to facilitate user engagement (e.g., automated email reminders), are associated with similar clinical improvements and adherence rates as guided interventions (Berger et al., 2011; Titov et al., 2013; Titov et al., 2016). Although the results of our pilot trial suggest that internet interventions targeting rumination and worry can successfully be delivered without clinician guidance, further research is needed to confirm the relative efficacy and adherence rates of guided and unguided internet-delivered interventions targeting rumination and worry.

The primary aim of this RCT was to investigate the efficacy of the online *Managing Rumination and Worry Program* in reducing RNT, rumination, worry, and symptoms of depression, anxiety, and general psychological distress compared to TAU. Our secondary aim was to compare the intervention delivered with and without clinician guidance in terms of treatment effects, participant satisfaction, and adherence. Given evidence that RNT is a transdiagnostic construct (Ehring & Watkins, 2008), we used a transdiagnostic measure of RNT that is independent of disorder-specific content (Repetitive Thinking Questionaire-10; RTQ-10). We also included a treatment-sensitive measure of sleep difficulties (Insomnia Severity Index) because pilot trial participants frequently reported that RNT disrupted their sleep.

We hypothesised that both active treatment groups would show greater reductions in self-reported levels of RNT, rumination, worry, and symptoms of depression, generalised anxiety, and general psychological distress compared to the TAU group. As our comparison between the guided and unguided formats was exploratory, we did not have a specific prediction about the relative efficacy of these two conditions. However, based on the research literature on second generation online interventions, we expected that both intervention groups would be associated with significant symptom improvement and comparable program adherence.

Methods

Design

A randomised controlled superiority trial (RCT) was used to compare the intervention program delivered with and without clinician guidance to a treatment-as-usual (TAU) control. It is reported in compliance with the CONSORT-revised 2010 guidelines (Schulz, Altman, & Moher, 2010; see supplementary materials). The study was approved by St Vincent's Hospital Sydney Human Research Ethics Committee (HREC/18/SVH/220) and is registered with the Australian and New Zealand Clinical Trials Registry (ACTRN 12620000959976).

The results of Topper et al. (2017) were used to inform power calculations. A minimum of 34 participants per group was required to detect a between-group effect corresponding to Hedges' *g* of 0.70 for the comparison between the treatment groups and control group ($\alpha = 0.05$, power of 80%). We therefore aimed to recruit a minimum total sample of 120 participants to allow for attrition.

Inclusion criteria

To be eligible for the study, participants needed to i) be 18 years or older, ii) live in Australia, iii) be fluent in written and spoken English, iv) have access to a computer and

internet, v) experience elevated levels of rumination and/or worry (RTQ-10 total score ≥ 28[1]), and vi) provide demographic details, including contact details of their general practitioner (GP).

Exclusion criteria

Exclusion criteria were: i) RTQ-10 total score ≤ 27, ii) severe depression (PHQ-9 total scores > 23), iii) current active suicidality, iv) self-reported diagnoses of schizophrenia, psychosis, or bipolar disorder, v) commencement of psychological therapy less than a month before assessment and/or commencement of medication for depression and/or anxiety less than two months before assessment.

Measures

Diagnostic interview

To assess current and past DSM-5 diagnoses of MDD and GAD, the *Anxiety and Related Disorders Interview Schedule for DSM-5* (ADIS-5; Brown & Barlow, 2014) MDD, GAD, and risk assessment modules were administered during the telephone interview by a Masters-level Provisional Psychologist (AJ) or Clinical Psychologist (JN). These modules have demonstrated good to excellent inter-rater reliability (kappa estimates of 0.93 for GAD and 0.80 for MDD; Newby, Hobbs, Mahoney, Wong, & Andrews, 2017). Potential participants were also asked whether they had previously experienced episodes of clinically significant low mood and/or anxiety in the past and, if so, to provide an estimate of how many past episodes they had experienced.

[1] Consistent with our earlier pilot trial, we used a cut-off of 28 and above on the RTQ-10 to establish participant eligibility. This value sits between the cut-off of 32 recommended by McEvoy et al. (2014) to distinguish between clinical and non-clinical levels of RNT and the reported mean (M = 25.99, SD = 8.03) in a population-based study of the psychometric properties of the RTQ-10 (McEvoy et al., 2018).

Primary clinical outcome measure

The *Repetitive Thinking Questionnaire-10* (RTQ-10; McEvoy, Mahoney, & Moulds, 2010) measures the extent to which an individual engages in transdiagnostic RNT in response to distressing situations. In both clinical and non-clinical samples, the RTQ-10 has excellent internal consistency (α's = .89-.94; McEvoy et al., 2018; McEvoy et al., 2014; Wong et al., 2016) and high convergent validity, significantly correlating with self-report measures of rumination, worry, depression, and anxiety (Mahoney et al., 2012; McEvoy et al., 2010; McEvoy et al., 2014).

Secondary clinical outcome measures

The *Patient Health Questionnaire-9* (PHQ-9; Kroenke, Spitzer, & Williams, 2001) measures depressive symptom severity over the past two weeks. The PHQ-9 has good test-retest reliability (r = .84), internal consistency (α = .86 - .89), construct validity, and treatment sensitivity (Kroenke, Spitzer, Williams, Monahan, & Löwe, 2007; Wittkampf, 2007).

The *Generalised Anxiety Disorder 7-item Scale* (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006) measures general anxiety symptom severity over the past two weeks. The GAD-7 has good validity, temporal stability (r = .85), and internal consistency (r = .83) (Kroenke et al., 2007; Spitzer et al., 2006).

The *Kessler Psychological Distress Scale – 10-item* (K10; Kessler et al., 2002) measures general psychological distress over the past two weeks. It has strong psychometric properties (Andrews & Slade, 2001), with high internal consistency (α = .93; Kessler et al., 2002), test-retest reliability (Merson, Newby, Shires, Millard, & Mahoney, 2021), and discriminant validity (Furukawa, Kessler, Slade, & Andrews, 2003).

The *Ruminative Response Scale - Brooding Subscale* (RRS: Treynor, Gonzalez, & Nolen-Hoeksema, 2003) consists of 5 items of the original 10-item RRS questionnaire

identified by Treynor et al. (2003) to capture the more maladaptive component of rumination, brooding. The brooding subscale has adequate psychometric properties, with acceptable test-retest reliability (r = .62; Treynor et al., 2003) and internal consistency (Cronbach's α= 0.69-0.78; Rosenkranz, Takano, Watkins, & Ehring, 2020; Schoofs, Hermans, & Raes, 2010).

The *Penn State Worry Questionnaire* (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) measures worry phenomena such as intensity, frequency, and perceived uncontrollability. It has sound psychometric properties, with high test-retest reliability (*r* = .74 – .93) and internal consistency (α = 0.86 – .95).

The *Insomnia Severity Index* (ISI; Morin, 1993) measures insomnia severity. Evidence of internal consistency (α = 0.90- 0.91), convergent, discriminant, and concurrent validity has been provided, as has evidence of treatment sensitivity (Bastien, Vallières, & Morin, 2001; Morin, Belleville, Bélanger, & Ivers, 2011; Thorndike et al., 2011).

Risk assessment and monitoring

Item 9 of the *Beck Depression Inventory - Second Edition* (BDI-II; Beck, Steer, & Brown, 1996), which assesses suicidal thoughts and intent on a 4-point scale ranging from 0 (*I don't have any thoughts of killing myself*) to 3 (*I would kill myself if I had the chance*), was used to monitor the presence and severity of suicidal thinking during the trial.

Feasibility and acceptability measures

Adherence, engagement, and lesson feedback

Adherence was measured as the total number of lessons completed and the proportion of participants who completed all three lessons. Prior to starting Lessons 2 and 3 and the post-treatment questionnaires, participants in the clinician guided and self-help groups were asked to provide brief feedback about the previous lesson and to record how many minutes they had spent reading the program materials and practicing what they had learned. These were used as indices of engagement.

Credibility and expectancy

Participants' perception of the credibility and expected benefit of the program was assessed prior to Lesson 1 using the Credibility/Expectancy Questionnaire (Devilly & Borkovec, 2000).

Treatment preference

Prior to starting Lesson 1 and following randomisation, participants in the active treatment conditions were asked to indicate whether they would prefer to complete the program with support from a clinician or in a self-help format (i.e., without clinician support).

Treatment satisfaction

At post-treatment (week 7), participants in the two active treatment conditions rated their overall satisfaction with the program (1= *very dissatisfied* to 5 = *very satisfied*), the quality of treatment materials (1 = *unsatisfactory* to 4 = *excellent*), the duration of treatment (*much too little time, a bit too little time, exactly the right amount of time, a bit too much time*), and how logical the program was (1 = *not very logical* to 10 = *very logical*). Participants also rated their degree of confidence that the program had successfully taught them skills to better manage their rumination/worry (1 = *not at all confident* to 10 = *very confident*) and their confidence in recommending the program to someone experiencing similar difficulties (1 = *not very confident* to 10 = *very confident*).

Side effects

At post-treatment, participants in the active treatment conditions completed an open-ended question which asked them to describe any positive effects/events and unwanted side effects/negative events that they felt had occurred because of the program.

Description of intervention

The *Managing Rumination and Worry Program* consists of three online lessons completed over six weeks. The content of the program, shown in Table 7, was informed by a number of CBT-based treatment perspectives. For example, drawing on Rumination-Focused CBT, participants are taught to recognise their individual warning signs and antecedent cues for rumination/worry, control their exposure to these cues (where possible), and to practice alternative, more adaptive strategies in response (Watkins, 2016). Based on research differentiating adaptive and maladaptive forms of RNT (Watkins, 2008; Watkins et al., 2008), participants are taught to recognise when they are using an unhelpful, abstract, evaluative, and global thinking style and to shift into a more adaptive concrete, specific, and action-oriented thinking style (Watkins et al., 2007; Watkins et al., 2012). To interrupt habitual thinking patterns, participants are also taught to shift their attention away from their rumination/worry and on to the present moment, as in Mindfulness-based cognitive therapy (MBCT; Segal et al., 2002).

The treatment program, delivered via the Virtual Clinic website (www.virtualclinic.org.au), is in the form of an illustrated comic-style story that follows two fictional characters who learn to better manage rumination and worry. Each lesson includes lesson slides that follow the characters' stories, introduce skills to manage rumination and worry, and examples of how to apply them. Following each lesson, participants download a brief (1-page) lesson summary and action plan which includes key concepts and skills covered in the lesson and suggested practice activities. A lesson is considered "complete" once the lesson slides have been viewed and the lesson summary/action plan downloaded. Participants also have access to a range of extra resources. The program is self-paced, with a new lesson becoming available each week and participants are encouraged to complete a lesson every 1-2 weeks. Lessons are accessed sequentially, with a 5-day lockout period

between each lesson to encourage participants to revise and practice lesson material before starting the next lesson. Participants received automated email and SMS notifications/reminders from the Virtual Clinic platform to complete lessons, questionnaires, and practice activities.

Table 7.

Summary of content in the Managing Rumination and Worry Program.

Lesson	Content	Action Plan	Extra Resources
1	• Psychoeducation about rumination and worry • Self-monitoring • Activity Planning	• Review lesson materials and extra resources • Fill out Self-monitoring form when worrying/ruminating • Use Activity Planning form to plan activities for "high risk" times • Engage in distracting/absorbing activities to interrupt and prevent rumination and worry	• Self-monitoring form • Activity Planning form • Absorbing and Distracting Activities List
2	• Three Rules of Thumb to differentiate helpful and unhelpful rumination and worry • Structured Problem Solving • Worry Time • Disengaging from rumination/worry and Shifting Attention onto present moment	• Review lesson materials and extra resources • Practice using Three Rules of Thumb • Practice Structured Problem Solving • Practice Worry Time • Practice Disengaging and Shifting Attention	• Three Rules of Thumb • Structured Problem Solving form
3	• Managing Rumination and Worry at Night • Shifting from General into Specific Thinking • Summary of program content	• Review lesson materials and extra resources • Practice strategies to help reduce rumination and worry at night/early morning • Practice recognising unhelpful general thinking and shifting into more specific thinking style • Refer to Decision Tree to help guide selection of skills when ruminating/worrying	• Managing Rumination and Worry at Night • Specific Thinking • Decision Tree

Procedure

Participants were recruited between August 2020 and March 2021 via social media advertisements and an email newsletter sent to the THIS WAY UP (https://thiswayup.org.au) subscription database. THIS WAY UP is a government-funded digital mental health service

which provides evidence-based internet interventions to the general public. Interested individuals read the study information, provided informed consent, and applied online via www.virtualclinic.org.au. To determine their eligibility, applicants completed brief screening questionnaires (RTQ-10, PHQ-9, BDI-II Item 9) and provided basic demographic information, including symptom and treatment history, and their GPs' contact details. Potentially eligible applicants were then contacted for a brief telephone interview, which included a structured diagnostic interview (ADIS-5) to assess current and past MDD and GAD diagnostic status, a risk assessment, and information about study participation.

Eligible participants were required to log in to the Virtual Clinic website within two weeks of being accepted into the trial; if they did not, they were withdrawn from the study. Upon doing so, the platform automatically randomised participants to one of the three groups using a randomisation sequence generated by a random number generator. The randomisation sequence (1:1:1) was uploaded to the website by someone not involved in the study and both researchers and applicants were blind to the allocation sequence, until group allocation was received. Participants were notified of their group allocation via an on-screen message and email. Participants allocated to the clinician guided and self-help groups received immediate access to the online intervention program. Participants in the control group completed an 18-week waiting period during which they completed the same baseline, post-treatment, and 3-month follow-up assessments at matched time-points to the treatment groups. Control participants were then provided with access to the intervention in a self-help format after the completion of all assessments (Week 18). During the 18-week waiting period, control participants were able to continue with and/or initiate psychological or pharmacological treatments as needed (i.e., treatment-as-usual).

Participants were assessed at pre-treatment (immediately prior to Lesson 1), post-treatment (one week after completing the final lesson; approximately Week 7), and at three-

month follow-up (12-weeks after post-treatment). See Appendix B for questionnaires administered at each time point. The ADIS-5 MDD and GAD modules were re-administered by a Clinical Psychologist (ES) during the 3-month follow-up telephone interview. ES was blinded to group allocation and not involved in any other aspect of the trial.

Clinician and technical support

Clinicians and research staff initiated telephone and/or email contact if participants failed to log in or complete a lesson/questionnaire, and to check on participants' safety in response to a significant deterioration in their PHQ-9 or K10 scores. Technical assistance was also available via phone or email, with all assistance logged at the time of consultation by Virtual Clinic staff. Participants were not restricted from accessing their usual mental health supports and services during the study period. After completing each lesson, participants in the clinician guided group were contacted via phone by a Masters-level Provisional Psychologist (AJ) or Clinical Psychologist (JN). During these calls, participants were given the opportunity to ask questions about the lesson materials and treatment skills. Clinicians reviewed participants' progress with the practice activities and provided encouragement as well as brief, verbal summaries of any insights participants had gained from reading the lesson materials and engaging in the practice activities to help reinforce this learning. Clinicians also helped participants to plan skills practice and to troubleshoot any difficulties participants were having implementing the treatment skills. Clinician guidance was provided via phone only and clinicians did not provide written feedback on completed worksheets or practice tasks. Check-in calls were semi structured; clinicians followed a protocol with questions and prompts specific to each lesson. No fidelity checks of the support provided to participants were conducted, however, care was taken to be faithful to the intervention materials and clinicians did not reference or introduce additional interventions. Participants in the self-help group completed the program in an unguided format and did not receive any

coaching or clinician support, however, had access to technical support via phone and/or email if required.

Statistical analyses

Analyses were conducted using Statistical Package for the Social Sciences (SPSS) version 26 (IBM SPSS, IBM Corp. Armonk, NY, USA). Independent *t*-tests and chi square analyses were conducted to examine group differences in adherence and measures of treatment acceptability. To examine treatment efficacy, intention-to-treat linear mixed models with random intercepts for subject were estimated for each outcome measure using restricted maximum likelihood (REML) estimation methods. Each model included time, treatment group, and time by group interaction as fixed factors. Linear mixed model analyses estimate parameters in repeated measures studies with unbalanced or incomplete data using maximum likelihood estimation, which makes use of incomplete data in a way that does not bias the parameter estimates (West, Welch, & Galecki, 2014). Initial model building focused on the selection of the most appropriate covariance structure for the residual correlation matrix. Model fit indices and inspection of the variance-covariance matrix supported the selection of the unstructured covariance structure to be the best fit for each outcome measure.

Within-group effect sizes (Hedge's *g,* adjusted for sample size) were calculated using the estimated marginal means to determine the magnitude of the within-group reductions in scores between pre- and post-treatment, and between pre-treatment and 3-month follow-up. Between-group effect sizes (Hedge's *g*, adjusted for sample size) were calculated using the pooled standard deviation to compare all groups at post-treatment and 3-month follow-up.

Results

Participant flow

Figure 2 summarises participant flow through the study. Out of the 536 individuals who started an application for the study, 277 completed the application and were eligible for

a phone interview. We attempted to contact 158 individuals for a phone interview with 140 accepted into the trial and 137 randomised. We had an overwhelming number of applicants in a brief recruitment window (48 hours) which meant that the recruitment target was reached before everyone who applied could be interviewed. Therefore, the remaining 119 applicants were sent an email advising that recruitment had closed and offering a voucher code to freely access one of the THIS WAY UP courses. One participant in the clinician guided group withdrew after randomisation, citing insufficient time, while two participants were withdrawn from the control group as they failed to complete their baseline questionnaires within two weeks of being randomised.

Participant characteristics

As shown in Table 8, a total of 137 participants aged between 18-74 years (M = 43.7, SD = 13.4) were included, the majority of whom were female (81%), born in Australia (75%), spoke English as their primary language (95%), and were employed in either full-time (40%) or part-time (24%) paid work or study. At pre-treatment, mean scores on the self-report measures of anxiety (GAD-7*;* M = 11.4 SD = 5.09) and depression (PHQ-9; M = 11.1, SD = 5.19) were in the moderate severity range. One hundred and twenty-nine participants (94%) reported previously experiencing more than one episode of significant and persistent anxiety and/or low mood, with the average age of onset of anxiety and/or depressive symptoms 23 years of age (SD = 12.39, range = 8-56 years).

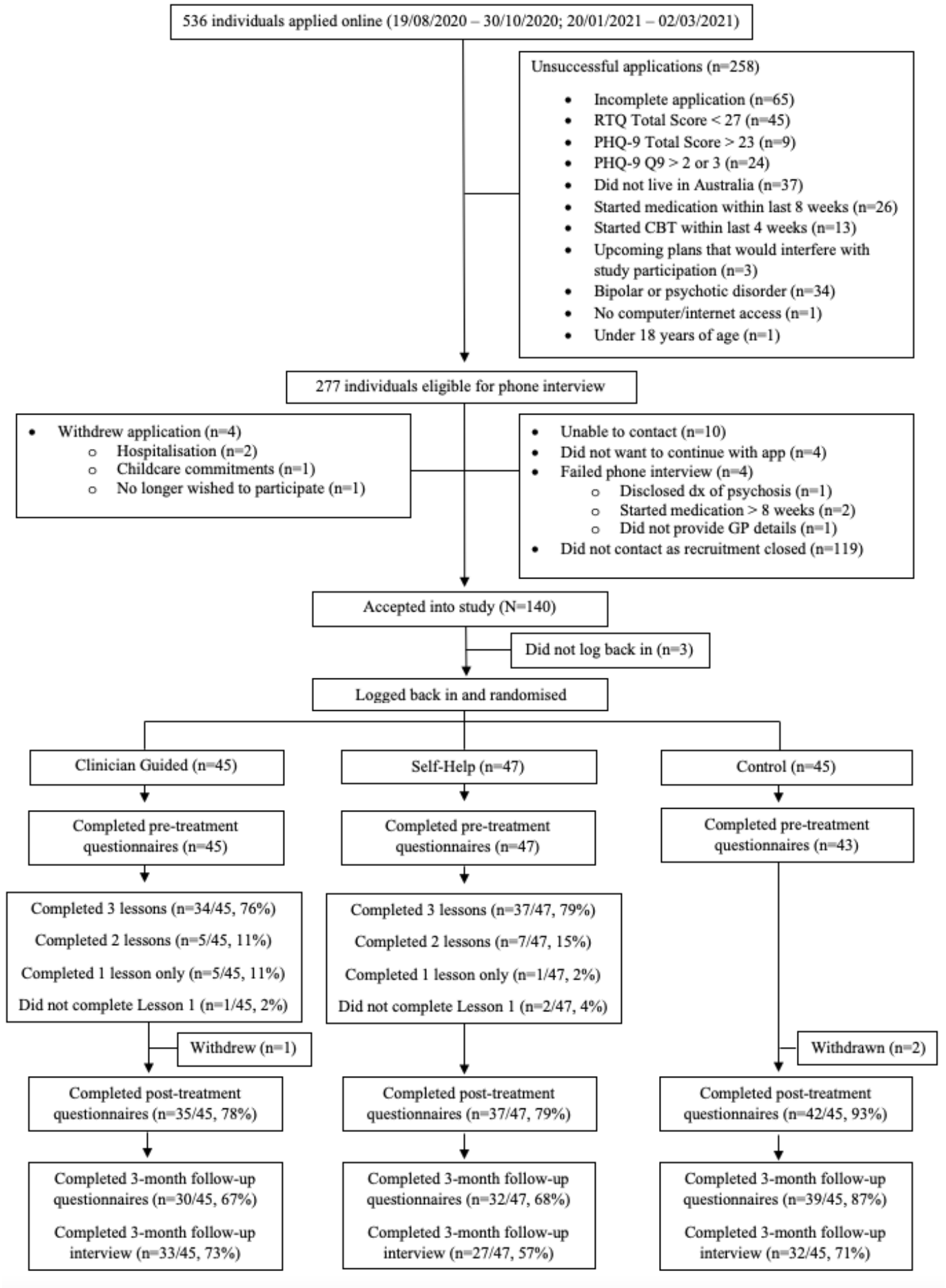

Figure 2. Participant flow diagram

Table 8.

Participant characteristics.

	Total	Clinician Guided	Self-Help	Control
	N = 137	**n = 45**	**n = 47**	**n = 45**
Mean age (SD)	43.7 (13.4)	47.0 (13.1)	42.6 (13.4)	41.6 (13.2)
Gender n (%)				
Female	111 (81)	36 (80)	36 (76.5)	39 (86.6)
Male	26 (18.9)	9 (20)	11 (23.4)	6 (13.3)
Country of birth n (%)				
Australia	103 (75.1)	34 (75.6)	37 (78.7)	32 (71.1)
United Kingdom	14 (10.2)	6 (13.3)	3 (6.4)	5 (11.1)
Other	5 (3.6)	5 (11.1)	7 (14.8)	8 (17.7)
Primary language n (%)				
English	131 (95.6)	45 (100)	44 (93.6)	42 (93.3)
Mandarin	1 (0.7)	0 (0)	1 (2.1)	0 (0)
Italian	1 (0.7)	0 (0)	1 (2.1)	0 (0)
Tagalog	1 (0.7)	0 (0)	0 (0)	1 (2.2)
Other	3 (2.1)	0 (0)	1 (2.1)	2 (4.4)
Relationship status n (%)				
Married/de facto	71 (51.8)	26 (57.7)	19 (40.4)	26 (57.8)
Single/never married	32 (23.3)	9 (20)	13 (27.7)	10 (22.2)
In a relationship	21 (15.3)	6 (13.3)	8 (17)	7 (15.6)
Divorced/Separated	12 (8.7)	4 (8.8)	6 (12.7)	2 (4.4)
Widowed	1 (0.7)	0 (0)	1 (2.1)	0 (0)
Education level n (%)				
School-level	18 (13.1)	3 (6.6)	7 (14.8)	8 (17.7)
Trade/certificate	6 (4.3)	2 (4.4)	4 (8.5)	0 (0)
Diploma	9 (6.5)	7 (15.5)	5 (10.6)	4 (8.8)
Undergraduate	56 (40.8)	17 (37.7)	13 (27.7)	19 (42.2)
Postgraduate	29 (21.1)	12 (26.6)	9 (19.1)	8 (17.7)
Other	19 (13.8)	4 (8.8)	9 (19.1)	6 (13.3)
Employment status n (%)				
Full-time paid work/study	56 (40.8)	15 (33.3)	22 (46.8)	19 (42.2)
Part-time paid work/study	34 (24.8)	13 (28.8)	7 (14.8)	14 (31.1)
Retired	13 (9.4)	6 (13.3)	5 (10.6)	2 (4.4)
Registered sick/disabled	2 (1.4)	1 (2.2)	1 (2.1)	0 (0)
Unemployed/seeking work	18 (13.13)	4 (8.8)	7 (14.8)	7 (15.6)
Other	14 (10.21)	6 (13.3)	5 (10.6)	3 (6.6)
Current medications n (%)				
No	79 (57.6)	26 (57.7)	27 (57.4)	26 (57.7)
SSRI	28 (20.4)	9 (20)	9 (19.1)	10 (22.2)
SNRI	15 (10.9)	4 (8.8)	5 (10.6)	6 (13.3)
Other	18 (13.1)	8 (17.7)	6 (12.7)	4 (8.8)
Current psychotherapy n (%)				
Psychologist	27 (19.7)	4 (8.8)	16 (34)	7 (15.5)
Psychiatrist	9 (6.5)	1 (2.2)	2 (4.2)	0 (0)
Counsellor	4 (2.9)	1 (2.2)	3 (6.3)	6 (13.3)

	Total	Clinician Guided	Self-Help	Control
	N = 137	**n = 45**	**n = 47**	**n = 45**
Past treatment (e.g., medications, psychotherapy) n (%)				
Yes	123 (89.7)	41 (91.1)	42 (89.3)	40 (88.8)
No	14 (10.2)	4 (8.8)	5 (10.6)	5 (11.1)
Past treatment type n (%)				
Psychologist	93 (67.8)	31 (68.8)	31 (65.9)	31 (68.8)
Psychiatrist	17 (12.4)	2 (4.4)	7 (14.8)	8 (17.7)
Counsellor	26 (18.9)	8 (17.7)	7 (14.8)	11 (24.4)
Medication	46 (33.5)	10 (22.2)	18 (38.2)	18 (40)
Other	16 (11.6)	7 (15.5)	5 (10.6)	4 (8.8)
Probable pre-treatment Diagnosis (ADIS-5) n (%)				
MDD (Current)	44 (32.1)	10 (22.2)	12 (25.5)	22 (48.8)
GAD (Current)	93 (67.8)	27 (60)	32 (68)	34 (75.5)
MDD (Past)	126 (91.9)	39 (86.6)	44 (93.6)	43 (95.5)
GAD (Past)	112 (81.7)	37 (82.2)	39 (82.9)	36 (80)
Previous episodes of significant and persistent low mood and/or anxiety n (%)				
No	2 (1.5)	1 (2.2)	1 (2.1)	0 (0)
Current first episode	6 (4.4)	1 (2.2)	3 (6.4)	2 (4.4)
1 previous episode	2 (1.5)	0 (0)	0 (0)	2 (4.4)
2-3 previous episodes	19 (13.9)	6 (13.3)	8 (17)	5 (11.1)
4-5 previous episodes	37 (27)	18 (40)	7 (14.9)	12 (26.7)
6-7 previous episodes	12 (8.8)	3 (6.7)	5 (10.6)	4 (8.9)
More than 7 past episodes	59 (43.1)	16 (35.6)	23 (48.9)	20 (44.4)

Treatment preference

The majority of participants in both active treatment groups reported a preference to complete the program with support from a clinician (clinician guided: 36/45, 80% preferred guided program; self-help: 38/47, 80.8% preferred guided program). This did not differ between conditions, $t(90) = -.10$, $p = .91$, $d = .02$.

Credibility and expectancy

Prior to starting Lesson 1, mean ratings of how motivated participants were to learn skills to better manage rumination and worry were high in both the clinician guided (M = 7.38, SD = 1.15) and self-help groups (M = 7.51 SD = 0.97), rated on a scale from 1 = *not at all* to 9 = *very.* Using the same scale, participants in the clinician guided group rated the

program as more logical (M = 6.46, SD = 1.73) than those in the self-help group (M = 5.78, SD = 1.48), [$t(70)$ =2.01, p = .04, d =.42] and were more confident that they could learn to manage rumination/worry (clinician guided: M = 5.02, SD = 1.63; self-help: M = 4.04, SD = 1.93; $t(70)$ =2.62, p = .01, d =.55). Across both groups, participants' expectation of how successful the program would be in teaching them to do this was moderate (clinician guided*:* M = 5.11, SD = 1.62 self-help: M = 4.76, SD = 1.38). Motivation [$t(90)$ = -.59, p = .55, d =.12] and expectation [$t(90)$ =1.09, p = .27, d =.22] did not differ between the two active treatment groups.

Adherence and engagement

On average, participants completed 2.60 (SD = .78) lessons in the clinician guided group and 2.68 (SD = .78) in the self-help group, with no significant difference between the groups, $t(90)$ = -.51, p = .60, d = .10. Of the participants who started Lesson 1, 76% (34/45) in clinician guided and 79% (37/47) in self-help completed all three lessons of the program. Rate of completion did not differ significantly between treatment groups, $x^2(1)$ = .13, p = .72. Average time reported spent reading each lesson ranged from 18.3 to 360 minutes in the clinician guided group (M = 176.53*,* SD = 74.41) and 38.3 to 360 minutes in the self-help group (M = 170.77*,* SD = 79.0). Average time spent each day practicing the skills ranged from 17.50 to 200 minutes in clinician guided (M = 59.19*,* SD = 45.94) and, excluding one significant outlier, 11.6 to 180 minutes in self-help (M = 46.22*,* SD = 38.16). Time spent reading the lesson materials [$t(61)$ = .36, p = .724, d =.08] and practicing the skills taught in the program [$t(51)$ = -.76, p = .44, d =.21] did not differ between treatment groups.

Clinical outcome measures

Estimated marginal means and within-group effect sizes for the outcome measures are presented in Table 9, and results of the between-group comparisons at post-treatment and follow-up are presented in Table 10. Both active treatment groups demonstrated significantly

greater reductions in levels of RNT, rumination, and worry, as well as symptoms of depression, anxiety, psychological distress, and insomnia compared to TAU (*g*s = 0.31 – 1.80). Both treatment groups demonstrated significant improvements across time (*p*s < .01). Treatment effects were superior in the clinician guided group across all measures, with significant medium to large effect sizes in favour of the clinician guided group over self-help observed for all measures, (*g*s = 0.32 – 0.85), except the PSWQ on which small to medium effect sizes were observed (*g*s = 0.20 – 0.71).

Clinical and technical support contact time

Over the course of the trial, clinicians and technicians spent an average of 48.64 minutes (*SD* = 21.28, range = 12 - 108) contacting each participant in the clinician guided group, 23.09 minutes (*SD* = 11.10, range = 3 - 64) in the self-help group, and 23 minutes (*SD* = 28.59, range = 2 - 67) in the control group. As expected, time spent contacting participants was significantly higher in the clinician guided group compared to both the self-help group [$t(90) = 7.26$, $p = .000$, $d = 1.53$] and control group [$t(88) = 4.82$, $p = .000$, $d = 1.02$]. Average contact time did not differ significantly between the self-help and control group, $t(90) = .01$, $p = .98$, $d = .00$.

Diagnostic status at follow-up

A total of 92 participants (67% of total sample; Clinician guided = 33/45, Self-help = 27/47, Control = 32/45) completed the 3-month follow-up diagnostic phone interview. As shown in Table 11, there were significant group differences in the number of individuals who met diagnostic criteria for MDD (χ^2 (2) = 7.68, $p = .02$) and GAD (χ^2 (2) = 13.30, $p = .001$) at 3-month follow-up. Of the participants who completed the phone interview, none of the clinician guided group, 14.9% of the self-help group, and 21.9% of the control group met the diagnostic criteria for current MDD, while 3.1% of the clinician guided group, 29.7% of the self-help group, and 40.7% of the control group met the diagnostic criteria for current GAD.

Table 9.
Estimated marginal means and within-group effect sizes for outcome measures.

Measure	Group	Baseline		Post-treatment		3-month Follow-up		Pre to Post Within Group ES		Pre to Follow-up Within Group ES	
		EMM	*SD*	EMM	*SD*	EMM	*SD*	***g***	(95% CI)	***g***	(95% CI)
RTQ-10	Clinician guided	38.66	7.24	28.53	7.13	25.60	7.01	**1.39*****	0.87 - 1.92	**1.81*****	1.21 - 2.41
	Self-help	41.06	7.26	31.48	7.11	32.52	7.05	**1.32*****	0.82 - 1.82	**1.18*****	0.66 - 1.70
	Control	42.30	7.37	39.83	7.25	38.55	7.18	**0.33**	-0.10 - 0.77	**0.51****	0.06 - 0.96
K10	Clinician guided	23.93	7.17	18.10	6.86	16.82	6.62	**0.82*****	0.33 - 1.31	**1.02*****	0.48 - 1.56
	Self-help	27.29	7.19	22.85	6.86	21.81	6.68	**0.63*****	0.17 - 1.10	**0.78*****	0.28 - 1.28
	Control	29.90	7.37	26.98	7.20	26.24	7.06	**0.40****	-0.03 - 0.83	**0.50*****	0.05 - 0.96
PHQ-9	Clinician guided	9.26	4.94	5.57	4.70	4.75	4.54	**0.76*****	0.27 - 1.24	**0.94*****	0.41 - 1.47
	Self-help	11.23	4.94	7.93	4.70	8.00	4.57	**0.68*****	0.21 - 1.15	**0.67*****	0.18 - 1.17
	Control	12.88	5.05	11.49	4.91	10.79	4.83	**0.28**	-0.15 - 0.71	**0.42****	-0.03 - 0.87
GAD-7	Clinician guided	10.22	4.64	4.87	4.46	3.85	4.33	**1.18*****	0.67 - 1.69	**1.40*****	0.84 - 1.97
	Self-help	10.85	4.64	7.38	4.45	7.59	4.34	**0.77*****	0.30 - 1.25	**0.74*****	0.23 - 1.24
	Control	13.34	4.74	10.94	4.62	9.77	4.55	**0.51*****	0.07 - 0.94	**0.76*****	0.30 - 1.22
RRS	Clinician guided	8.24	3.24	5.78	3.07	5.18	2.96	**0.77*****	0.29 - 1.26	**0.97*****	0.44 - 1.51
	Self-help	9.12	3.24	7.78	3.07	6.78	2.97	**0.42****	-0.04 - 0.88	**0.74*****	0.24 - 1.25
	Control	9.83	3.32	8.74	3.22	8.46	3.16	**0.32***	-0.11 - 0.75	**0.41****	-0.04 - 0.86
PSWQ	Clinician guided	64.77	10.06	55.91	9.75	51.35	9.50	**0.88*****	0.39 - 1.38	**1.35*****	0.79 - 1.92
	Self-help	66.02	10.07	57.92	9.74	58.17	9.51	**0.81*****	0.34 - 1.28	**0.79*****	0.28 - 1.30
	Control	68.04	10.33	66.74	10.04	64.36	9.92	**0.13**	-0.30 - 0.55	**0.36***	-0.09 - 0.81
ISI	Clinician guided	12.91	6.09	8.62	5.76	8.08	5.54	**0.72*****	0.24 - 1.20	**0.82*****	0.29 - 1.35
	Self-help	12.61	6.09	10.47	5.76	10.58	5.56	**0.36***	-0.10 - 0.82	**0.34***	-0.15 - 0.84
	Control	12.09	6.23	11.77	6.05	10.48	5.93	**0.05**	-0.38 - 0.48	**0.26**	-0.18 - 0.71

Note. EMM = Estimated marginal means; SD = Standard deviation; ES = Hedges' *g* effect size; 95%CI = 95% confidence interval; RTQ-10 = Repetitive Thinking Questionnaire – 10; K10 = Kessler Psychological Distress Scale – 10 item; PHQ-9 = Patient Health Questionnaire – 9; GAD-7 = Generalised Anxiety Disorder 7-item scale; RRS = Ruminative Response Scale (Brooding Subscale); PSWQ = Penn State Worry Questionnaire; ISI = Insomnia Severity Index – 30; *$p \leq 0.05$, **$p \leq 0.01$, *** $p \leq 0.001$.

Table 10.

Mean differences and between-group effect sizes at post-treatment and follow-up for outcome measures.

Measure		Post-treatment Mean Difference	Post-treatment Between-Group ES		Follow-up Mean Difference	Follow-up Between-Group ES	
	Group		***g***	(95% CI)		***g***	(95% CI)
RTQ-10	Clinician guided vs control	-11.29***	**1.55**	1.04 - 2.07	-12.94***	**1.80**	1.24 - 2.36
	Self-help vs control	-8.34***	**1.15**	0.67 - 1.63	-6.02***	**0.84**	0.36 - 1.32
	Clinician guided vs self-help	-2.95	**0.41**	-0.06 - 0.88	-6.91***	**0.97**	0.45 - 1.49
K10	Clinician guided vs control	-8.87***	**1.25**	0.76 -1.74	-9.42**	**1.36**	0.83 - 1.88
	Self-help vs control	-4.13**	**0.58**	0.13 - 1.03	-4.42**	**0.64**	0.16 - 1.11
	Clinician guided vs self-help	-4.74**	**0.68**	0.21 - 1.16	-4.99**	**0.74**	0.23 - 1.25
PHQ-9	Clinician guided vs control	-5.92***	**1.22**	1.22 - 1.22	-6.03***	**1.28**	0.76 -1.80
	Self-help vs control	-3.55***	**0.74**	0.28 - 1.20	-2.78*	**0.59**	0.11 - 1.06
	Clinician guided vs self-help	-2.36*	**0.49**	0.02 - 0.96	-3.25**	**0.72**	0.21 - 1.23
GAD-7	Clinician guided vs control	-6.06***	**1.32**	0.83 - 1.82	-5.92***	**1.31**	0.79 - 1.84
	Self-help vs control	-3.56***	**0.79**	0.33 - 1.25	-2.18*	**0.48**	0.01 - 0.96
	Clinician guided vs self-help	-2.50*	**0.56**	0.56 - 0.56	-3.73***	**0.85**	0.33 - 1.37
RRS	Clinician guided vs control	-2.95***	**0.92**	0.45 - 1.39	-3.28***	**1.05**	0.55 - 1.56
	Self-help vs control	-.95	**0.31**	-0.13 - 0.76	-1.68*	**0.57**	0.09 - 1.04
	Clinician guided vs self-help	-2.00**	**0.62**	0.15 - 1.09	-1.60*	**0.51**	0.00 - 1.01
PSWQ	Clinician guided vs control	-10.83***	**1.08**	0.60 - 1.56	-13.01***	**1.32**	0.80 - 1.85
	Self-help vs control	-8.82***	**0.88**	0.88 - 0.88	-6.19**	**0.63**	0.15 - 1.11
	Clinician guided vs self-help	-2.00	**0.20**	-0.26 - 0.67	-6.82**	**0.71**	0.20 - 1.22
ISI	Clinician guided vs control	-3.15*	**0.53**	0.07 - 0.98	-2.40	**0.41**	-0.07 - 0.89
	Self-help vs control	-1.30	**0.22**	-0.23 - 0.66	.10	**0.02**	-0.45 - 0.48
	Clinician guided vs self-help	-1.84	**0.32**	-0.15 - 0.78	-2.50	**0.44**	-0.06 - 0.95

Note. ES = Hedges' *g* effect size; 95% CI = 95% confidence interval; RTQ-10 = Repetitive Thinking Questionnaire – 10; K10 = Kessler Psychological Distress Scale – 10 item; PHQ-9 = Patient Health Questionnaire – 9; GAD-7 = Generalised Anxiety Disorder 7-item scale; RRS = Ruminative Response Scale (Brooding Subscale); PSWQ = Penn State Worry Questionnaire; ISI = Insomnia Severity Index – 30; *$p \leq 0.05$, **$p \leq 0.01$, *** $p \leq 0.001$.

Table 11.

Proportion of participants who met diagnostic criteria at baseline and 3-month follow-up across treatment groups.

	Clinician Guided Group		Self-help Group		TAU Control Group		Statistic (follow-up)
	Baseline (n= 45)	**Follow-up (n=33)**	**Baseline (n=47)**	**Follow-up (n=27)**	**Baseline (n=45)**	**Follow-up (n=32)**	
Diagnosis	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	
Current MDD	10 (22.2)	0 (0)	12 (25.5)	4 (14)	22 (48.9)	7 (21.8)	x^2 (2) = 7.68, p = .02
Current GAD	27 (60.0)	1 (3.03)	32 (68.1)	8 (29.6)	34 (75.6)	13 (40.6)	x^2 (2) = 13.30, p = .001
Past MDD	39 (86.7)	-	44 (93.6)	-	43 (95.6)	-	
Past GAD	37 (82.2)	-	39 (83.0)	-	36 (80.0)	-	
Missing data	0 (0)	12 (26.6)	0 (0)	20 (42.5)	0 (0)	13 (28.8)	

Note. Statistics refer to the differences between groups at 3-month follow-up. Baseline data are presented for comparison purposes. MDD = Major Depressive Disorder; GAD = Generalised Anxiety Disorder.

Treatment satisfaction

At post-treatment, 86% of participants in clinician guided and 68% in self-help reported being "mostly satisfied" or "very satisfied" with the program, while 24% of participants in the self-help group reported being "neutral". Mean satisfaction ratings on a 1-5 scale were not significantly different between clinician guided (M = 4.17, SD = 1.20) and self-help groups (M = 3.89, SD = .93), t(70) = 1.10, p = .27, d=.26. The majority of participants in clinician guided (91%) and self-help (75%) rated the program materials as "good" or "excellent". Just over half of the participants in clinician guided (57%) and self-help (60%) reported that the tempo of the program was "exactly right", with approximately a quarter of participants in each group reporting that there was "a bit too little time" (clinician guided: 27%; self-help: 24%). Satisfaction with the program materials [t(70) = 1.39, p = .16, d = .33] and tempo [t(70) = -.62 p = .53, d = .15] did not differ between conditions. Compared to the self-help group, the clinician guided group rated the program as more

logical (guided: M =8.23, SD = 1.39; self-help: M = 7.30, SD = 1.64, $t(70) = 2.58$, $p = .01$, $d = .61$), they were more confident that the program had successfully taught them skills to manage their rumination and worry (guided: M = 8.4, SD = 2.10; self-help M = 6.81, SD = 2.37, $t(70) = 2.99$, $p = .004$, $d = .71$), and were more confident in recommending the program to a friend experiencing similar difficulties (guided: M = 8.69, SD = 2.2; self-help: M= 7.32, SD = 2.64, $t(70) = 2.35$, $p = .02$, $d = .56$).

Side effects

A minority of participants in both groups reported experiencing negative or unwanted side effects (clinician guided: 3/34, 9%; self-help: 6/37, 16%). This included perceived time-pressure to complete the lessons and associated tasks and experiencing increased anxiety as a result of engaging in self-monitoring and becoming more aware of how often and for how long they typically ruminated/worried. The proportion of participants who reported negative side effects did not significantly differ between the two groups, χ^2 (1) = .87, p = .35. The majority of participants in clinician guided (33/34, 97%) and self-help (29/35, 83%) endorsed positive side effects, such as an improved sense of control and confidence in their ability to manage rumination/worry, increased recognition of when they were ruminating/worrying, being better able to interrupt unhelpful rumination and worry, reduced length of time spent ruminating/worrying, and improved sleep. There was a non-significant trend towards participants in the clinician guided group being more likely than those in the self-help group to endorse positive side effects, χ^2 (1) = 3.81, p = .051.

Discussion

The primary aim of the current study was to examine the efficacy and acceptability of the *Managing Rumination and Worry Program* in reducing adult participants' levels of RNT, rumination, worry, and symptoms of depression, anxiety, and general psychological distress compared to TAU. At baseline, 72% of our sample met the DSM-5 diagnostic criteria

for MDD and/or GAD and average scores on the self-report measures of depression and anxiety were in the moderate range. Consistent with our hypothesis, both intervention groups achieved superior treatment outcomes compared to TAU, with significant medium to large reductions in participants' levels of RNT, rumination, and worry (*g*s = 0.42 – 1.39) at post-treatment which were maintained at 3-month follow-up (*g*s = 0.74 – 1.81). Both intervention groups also appeared to show transdiagnostic improvement, with medium to large effects found for symptoms of depression, anxiety, and general psychological distress, (*g*s. = 0.63 - 1.40) and small to large effects for insomnia (*g*s = 0.34 – 0.82). By post-treatment, mean scores on the self-report measures of depression and anxiety in both intervention groups were below the clinical cut-off for probable diagnoses of MDD and GAD (Kroenke et al., 2001; Spitzer et al., 2006). Treatment effects were superior in the clinician guided group. Both versions of the intervention program were acceptable to participants, however, negative or unwanted side effects were reported by a minority of participants in both groups (clinician guided: 9%; self-help: 16%), most often related to increased anxiety as a result of self-monitoring. Thus, it may be helpful to prepare future users of the program that, although completing the program is likely to be beneficial for them overall, they may experience a temporary increase in anxiety.

These findings add to the growing research literature showing that internet-delivered interventions can successfully target and reduce rumination and worry (Cook et al., 2019; Joubert et al., 2021; Topper et al., 2017). The results of the current study and our pilot trial (Joubert et al., 2021) also extend the existing literature by demonstrating positive treatment effects in adults, including those experiencing clinically significant levels of depression and/or anxiety. These findings are important given the well-established role that rumination and worry play in the onset, severity, duration, and relapse risk of anxiety and depression (Ehring & Watkins, 2008; Watkins & Roberts, 2020). Delivering treatment online helps

overcome a number of the barriers to accessing face-to-face mental health treatment and can be scaled to reach large numbers of people (Andersson & Titov, 2014; Andrews, Basu, et al., 2018; Andrews, 2010; Spek et al., 2007).

Our secondary aim was to compare treatment effects, acceptability, and completion rates when the online intervention was delivered with and without clinician guidance. To our knowledge, this is the first study to directly compare guided and unguided versions of an internet intervention targeting rumination and worry. As expected, both groups had similar adherence, completion rates, engagement, and treatment satisfaction. While both groups showed significant improvement in RNT and depression and anxiety symptom severity, the clinician guided group had superior outcomes on all outcome measures. The superiority of the clinician guided group in the current study is consistent with some previous literature comparing treatment effects and adherence between guided and unguided internet interventions (Andersson & Cuijpers, 2009; Andersson & Titov, 2014; Baumeister et al, 2014). It is unclear why the clinician guided group performed better. It is plausible that therapeutic alliance with the study clinicians may have contributed, as therapetic alliance is high in guided online treatments and shown to directly contribute to treatment outcomes (Berger, 2017; Pihlaja et al., 2018; Sucala et al., 2012). Consistent with qualitative feedback from this group, the additional support (e.g., problem solving implementation of skills) in the clinician guided group also likely increased engagement with treatment skills and adherence to practice activities (Christensen, Griffiths, & Korten, 2002; Hilvert-Bruce, Rossouw, Wong, Sunderland, & Andrews, 2012; Simpson et al., 2011). Participants in the clinician guided group may therefore have been better able to consolidate their learning and use treatment skills, and thus also better maintain any treatment gains over the long-term. Participants in the clinician guided group were also more likely to endorse positive side effects, find the program more logical, and were more confident that the program had successfully taught

them skills to manage their rumination and worry, and in recommending the program to a friend with similar difficulties. Future research is needed to explore moderators of treatment outcomes, and understand why the clinician guided model outperformed self-help.

The requirement of trained clinicians to support users through a program significantly reduces the scalability and, potentially, the cost-effectiveness of an online intervention. However, participants in the clinician guided group required an average of only 48.64 minutes phone and/or email contact throughout the entire trial. This is equivalent to the standard length of only one face-to-face treatment session. The relatively low clinician contact required during the present study speaks to the feasibility of this format and, together with the observed treatment effects, suggests that the *Managing Rumination and Worry* program should ideally be delivered with clinician support where feasible. Importantly, the results of our pilot trial (Joubert et al., 2021) and the current study also suggest the intervention can be delivered successfully in an unguided format, with participants in the self-help groups across both trials experiencing medium to large reductions in levels of RNT and symptoms of depression and anxiety with relatively little administrative support per participant (M = 23.09 minutes in current trial, M = 22.58 in Joubert et al. 2021). This presents a scalable treatment option to disseminate this intervention to the community and offers a promising alternative when clinician guidance may not be feasible or affordable.

Despite a strong preference for the clinician guided version (clinician guided: 80%; self-help: 80.8%), not all participants allocated to the clinician guided group made use of the check-in calls and some did not respond to attempts to contact them. The amount of clinical support also varied considerably across participants from 12 to 108 minutes. Thus, it may be that not every participant needs or wants additional clinician support or needs the same amount of clinical support. Further research should explore which factors influence the

uptake of clinical support, who benefits from additional support, and look at matching treatment to user preferences (Hadjistavropoulos, Schneider, et al., 2017; Hadjistavropoulos et al., 2019).

Limitations

The findings of this study need to be interpreted in the context of several limitations. Our sample was predominately female, employed, and well-educated. Further, participants were self-referred (i.e., motivated) and our recruitment strategy of contacting subscribers of THIS WAY UP means that some participants may have had prior experience with internet-delivered psychological interventions. These factors may limit the generalisability of our findings to treatment naïve samples. Concurrent treatment is a confound; participants' current and past psychotherapy experience (both online and face-to-face) may have resulted in them using a combination of the techniques taught in the program and those learned in current/previous treatment. We therefore cannot conclude that the observed treatment effects are solely due to the intervention program and caution in interpreting the current findings is warranted. As participants were not blind to their treatment condition, we also cannot exclude expectancy effects or response bias. Further, the observed outcomes are based on those who provided data which may have influenced the treatment outcomes. Caution in interpreting the current findings is also warranted given the attrition rate at follow-up. Our findings also need to be interpreted in the context of the COVID-19 pandemic, which has been associated with heightened anxiety, stress, uncertainty, low mood, and loneliness (Shakespeare-Finch et al., 2020). During both recruitment and treatment, many participants were also under lockdown laws and/or required to adhere to physical distancing measures (e.g., Duckett et al., 2020) which may have limited opportunities to practice treatment skills, such as behavioral activation out of the home.

Conclusion

In summary, this is the first RCT to evaluate an internet intervention targeting both rumination and worry in adults, including those currently experiencing depression and/or anxiety, and is also the first to directly compare guided and self-help intervention formats. This study provides evidence of the acceptability and efficacy of the *Managing Rumination and Worry* program in both clinician guided and unguided formats. Both groups showed significant improvements in levels of rumination, worry, and symptoms of depression, anxiety, and general psychological distress, with the clinician guided group outperforming the self-help group. Further research is needed to evaluate the effectiveness of this program in routine care settings and examine predictors of treatment response and longer-term maintenance of gains of this program.

Appendix A

CONSORT 2010 checklist of information to include when reporting a randomised trial.

Section/Topic	Item No	Checklist item	Reported on page No
Title and abstract			
	1a	Identification as a randomised trial in the title	1
	1b	Structured summary of trial design, methods, results, and conclusions (for specific guidance see CONSORT for abstracts)	2
Introduction			
Background and objectives	2a	Scientific background and explanation of rationale	3-6
	2b	Specific objectives or hypotheses	5-6
Methods			
Trial design	3a	Description of trial design (such as parallel, factorial) including allocation ratio	6, 13
	3b	Important changes to methods after trial commencement (such as eligibility criteria), with reasons	N/A
Participants	4a	Eligibility criteria for participants	6-7
	4b	Settings and locations where the data were collected	N/A
Interventions	5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered	11-14, Table 1
Outcomes	6a	Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed	8-10, Supplementary Material B
	6b	Any changes to trial outcomes after the trial commenced, with reasons	N/A
Sample size	7a	How sample size was determined	6
	7b	When applicable, explanation of any interim analyses and stopping guidelines	N/A
Randomisation:			13
Sequence generation	8a	Method used to generate the random allocation sequence	
	8b	Type of randomisation; details of any restriction (such as blocking and block size)	13
Allocation concealment mechanism	9	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned	13
Implementation	10	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	13
Blinding	11a	If done, who was blinded after assignment to interventions (for example, participants, care providers, those assessing outcomes) and how	13-14
	11b	If relevant, description of the similarity of interventions	11, 13-14

Statistical methods	12a	Statistical methods used to compare groups for primary and secondary outcomes	14-15
	12b	Methods for additional analyses, such as subgroup analyses and adjusted analyses	14-15
Results			
Participant flow (a diagram is strongly recommended)	13a	For each group, the numbers of participants who were randomly assigned, received intended treatment, and were analysed for the primary outcome	15-16, Figure 1
	13b	For each group, losses and exclusions after randomisation, together with reasons	15
Recruitment	14a	Dates defining the periods of recruitment and follow-up	12, Figure 1
	14b	Why the trial ended or was stopped	6
Baseline data	15	A table showing baseline demographic and clinical characteristics for each group	Table 2
Numbers analysed	16	For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups	Figure 1
Outcomes and estimation	17a	For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval)	Tables 3 and 4
	17b	For binary outcomes, presentation of both absolute and relative effect sizes is recommended	Tables 3 and 4
Ancillary analyses	18	Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing pre-specified from exploratory	19-25
Harms	19	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)	25
Discussion			
Limitations	20	Trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analyses	29
Generalisability	21	Generalisability (external validity, applicability) of the trial findings	29
Interpretation	22	Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence	30-35
Other information			
Registration	23	Registration number and name of trial registry	2, 6
Protocol	24	Where the full trial protocol can be accessed, if available	N/A
Funding	25	Sources of funding and other support (such as supply of drugs), role of funders	30

Appendix B

Questionnaires administered at each timepoint.

Measure	Online Screening	Pre Lesson 1 (Baseline)	Pre Lesson 2 and 3	Post-treatment	3-month follow-up
RTQ-10 (RNT)	✓	✓	✓	✓	✓
PHQ-9 (Depression)	✓	✓		✓	✓
GAD-7 (Anxiety)		✓		✓	✓
K10 (Distress)		✓	✓	✓	✓
RRS (Rumination)		✓		✓	✓
PSWQ (Worry)		✓		✓	✓
ISI (Insomnia)		✓		✓	✓
BDI-II Item 9 (Suicidality)	✓	✓		✓	✓
Lesson feedback			✓	✓	
Treatment satisfaction questionnaire				✓	
Credibility and expectancy		✓			
Program side effects				✓	
Treatment preference		✓			
Started additional treatment during trial					✓

Note. RTQ-10 = Repetitive Thinking Questionnaire – 10; PHQ-9 = Patient Health Questionnaire – 9; GAD-7 = Generalised Anxiety Disorder 7-item scale; K10 = Kessler Psychological Distress Scale 10-item; RRS = Ruminative Response Scale (Brooding Subscale); PSWQ = Penn State Worry Questionnaire; ISI = Insomnia Severity Index – 30; BDI-II = Beck Depression Inventory – Second Edition.

Chapter 5: General discussion

Depression and anxiety disorders are common mental health conditions associated with significant individual, societal, and economic burden (World Health Organisation, 2017). However, the uptake and effectiveness of existing evidence-based treatments need improvement (e.g., Butler et al., 2006; Cuijpers et al., 2016; Cuijpers et al., 2014; Hofmann et al., 2012; Vittengl et al., 2007). Targeting and reducing the processes underlying the development and maintenance of depression and anxiety disorders, such as repetitive negative thinking, is a promising approach proposed to improve the efficacy and durability of psychological treatment (Ehring & Watkins, 2008; McEvoy et al., 2009; Topper et al., 2010; Watkins, 2009). There has been encouraging initial research showing that rumination and worry, both variants of repetitive negative thinking, can be simultaneously targeted to prevent psychopathology using a clinician guided online intervention in adolescent and young adult populations, and that doing so is associated with improved depression and anxiety symptoms (Cook et al., 2019; Topper et al., 2017). However, the effects of using an online intervention to target rumination and worry in an adult population, including those *currently* experiencing depression and/or anxiety, were unknown. In addition, the efficacy, feasibility, and acceptability of delivering an intervention targeting rumination and worry without clinician guidance had not been explored.

Therefore, this thesis first explored the personal experiences and understanding of rumination and worry of potential end users of an online intervention targeting rumination and worry. These findings then informed the development of the online intervention evaluated in this thesis. I then investigated the clinical outcomes, feasibility, and acceptability of an online intervention targeting rumination and worry in adults. I also directly compared the online program when it was delivered with and without clinician guidance to investigate

whether guidance was associated with superior treatment outcomes, acceptability, and program adherence.

In the final chapter of this thesis, I will summarise the main findings from this program of research and integrate these into the existing literature in the field before discussing the implications of the current findings. I will also highlight the limitations of the current research and suggest avenues for future research and dissemination.

Summary of current findings

Study 1 examined the experiences of rumination and worry in a mixed community and student sample to gain insight into individuals' personal definitions, experiences with, and understandings of, rumination and worry. To my knowledge, Study 1 is one of the first studies to adopt a qualitative approach to explore how individuals experience and understand repetitive negative thinking in a mixed/nonclinical sample. The online survey provided valuable insight into participants' personal understandings of rumination and worry, typical thought content, triggers, frequency, duration, and coping strategies, as well as the language participants use to describe these. The findings suggest that the term 'rumination' may not be widely known and that participants were less familiar with 'rumination' than the concept of 'worry', as all participants endorsed that they were aware of what 'worry' was, whilst almost a third (28%) reported that the term 'rumination' was unfamiliar to them. Whilst participants endorsed worrying and/or ruminating about a number of different themes, they reported this most commonly related to personal relationships and things that had happened in the past, including past mistakes, negative experiences, and social interactions and conversations. Consistent with previous qualitative studies on RNT (Oliver et al., 2015; Pearson et al., 2008), interpersonal situations and past negative events and experiences were the most commonly reported triggers for rumination and worry. The results also provided insight into the most commonly used coping strategies to help interrupt and stop rumination and worry;

in line with previous studies (Oliver et al., 2015; Pearson et al., 2008; Sloan et al., 2021), distraction was the most commonly reported coping strategy. In addition to adding to our existing theoretical understanding of RNT and providing qualitative support for existing theoretical models and definitions (e.g., Borkovec, 1994; Borkovec et al., 1983; Nolen-Hoeksema, 1998), the findings of Study 1 directly informed the development of the online treatment intervention evaluated in Studies 2 and 3 of this thesis.

Study 2 (Joubert et al., 2021) was a small open pilot trial to evaluate the preliminary outcomes, acceptability, and feasibility of a 3-lesson online intervention targeting rumination and worry that I developed. Twenty-six adult participants experiencing elevated levels of RNT, 74% of whom were also experiencing clinically significant symptoms of depression and anxiety, completed the 3-lesson unguided online program over the 6-week treatment period. To my knowledge, Study 2 was the first study to evaluate a brief, unguided internet-intervention targeting both rumination and worry in an adult population and to include participants who were currently experiencing anxiety and/or depression. The results of Study 2 demonstrated that the program was associated with significant reductions in participants self-reported levels of RNT (Hedges' $g = 2.26$), rumination ($g = 0.69$), and worry ($g = 1.04$) from pre- to post-treatment. Large improvements were also found for symptoms of depression ($g = 1.04$), generalised anxiety ($g = 1.82$), and general psychological distress ($g = 0.93$), suggesting that the program leads to transdiagnostic improvements. Encouragingly, treatment effects on all outcome measures were maintained at 1-month follow-up (g's = 0.69 – 2.12). By post-treatment, mean scores on the self-report measures of depression (PHQ-9) and anxiety (GAD-7) were below the clinical cut-off for probable diagnoses of MDD and GAD (Kroenke et al., 2001; Spitzer et al., 2006) and this was maintained at follow-up. Adherence was acceptable (69.2% completion rate) and most participants were satisfied with

the program. The results of Study 2 thus provided promising preliminary evidence for the efficacy, feasibility, and acceptability of the online program.

While the findings from Study 2 were encouraging, this study was limited by a small sample size and lack of control group. To address these limitations and better delineate specific treatment effects, Study 3 was a RCT which included a larger sample, comparison to a TAU group, and a longer follow-up period to better evaluate the durability of treatment effects and impact on diagnostic status. In addition to comparing the intervention program to a control group, I also compared treatment effects and program adherence when the intervention was delivered with and without clinician guidance to determine the relative effects of and adherence to guided and unguided formats. To my knowledge, Study 3 is the first randomised controlled trial of an internet-intervention targeting rumination and worry in adults and the first to directly compare guided and unguided intervention formats in this field.

As expected, participants in both the clinician guided (n=45) and self-help (n=47) groups had significantly lower levels of RNT, rumination, worry, and symptoms of depression, anxiety, and distress compared to the TAU control group (n=45) at both post-treatment (between-group gs = 0.31 – 1.55) and 3-month follow-up (gs = 0.48 – 1.80). Mirroring the pilot trial, at post-treatment, mean scores on the self-report measures of depression (PHQ-9) and anxiety (GAD-7) were below the clinical cut-off for probable diagnoses of MDD and GAD (Kroenke et al., 2001; Spitzer et al., 2006) in both treatment groups and this was maintained at follow-up. The majority of participants in the treatment groups of the RCT also did not meet the diagnostic criteria for MDD or GAD at 3-month follow-up. Both versions of the intervention program appeared to be acceptable, as demonstrated by participants' satisfaction ratings, confidence that the program had successfully taught them skills to better manage rumination and worry, and in recommending

the program to a friend with similar difficulties. Participants also found the program logical, and the majority reported relating to the program characters and their stories.

Although both intervention formats had acceptable adherence and treatment satisfaction, treatment outcomes were significantly better in the clinician guided group, with medium to large effect sizes in favour of the clinician guided group across all outcome measures (between-group *g*s = 0.32 – 0.97). Participants in the clinician guided group were also more likely to endorse positive side effects, find the program more logical, and were more confident that the program had taught them skills to manage their rumination and worry and in recommending the program to a friend. Encouragingly, participants in the clinician guided group required an average of only 48.64 minutes phone and/or email contact throughout the entire program. This is equivalent to the duration of just one face-to-face session with a psychologist and highlights the feasibility of delivering the intervention in this format.

Consideration of the current findings in the context of the existing literature

Key differences in methodology and sample population preclude a direct comparison of the current studies with the limited existing literature on targeting rumination and worry using an online intervention (Cook et al., 2019; Topper et al., 2017). However, in general, the treatment effects observed in Studies 2 and 3 are consistent with this previous research and add to the growing literature demonstrating that internet-delivered interventions can successfully target and significantly reduce rumination and worry (Cook et al., 2019; Topper et al., 2017). The observed results extend this existing literature by demonstrating treatment effects in an adult population and in participants experiencing persistent, clinically significant, and often co-morbid depression and anxiety symptoms. While there is preliminary and growing evidence for the efficacy and acceptability of guided and unguided internet-delivered rumination and worry interventions, these results are also consistent with

the broader literature showing that RNT can be successfully targeted and reduced with psychological interventions (e.g., Hvenegaard et al., 2020; Moeller et al., 2020; Rogiers et al., 2021; Teismann et al., 2014; Watkins et al., 2011; Watkins et al., 2007).

In addition, the findings of Study 2 and 3 further extend the existing literature by demonstrating that online interventions targeting rumination and worry can be delivered successfully in both a guided and self-help format and that treatment outcomes are superior when the intervention is delivered with clinician guidance. Program adherence in both Study 2 and Study 3 was acceptable; 69.2% (18/26) of participants completed all three lessons in the pilot trial while 76% (34/45) in clinician guided and 79% (37/47) in self-help completed the program in the RCT. This compares favourably to the mean completion rates reported by Topper et al. (2017) and Cook et al. (2019) of their 6-session programs, with participants in the guided internet-delivered Rumination-focused CBT conditions completing an average of 3.96 (*SD* = 1.65) and 3.46 (*SD* = 2.25) out of 6 sessions, respectively, and 2.66 sessions (*SD* = 2.35) in the unguided condition. It is therefore possible that a brief intervention may be more appealing and help reduce treatment drop-out. Differences in sample population between the current studies and Topper et al. (2017) and Cook et al.'s (2019) studies may also explain these differences in mean completion rates. For example, younger age has been associated with poorer adherence to internet-delivered CBT (Hadjistavropoulos et al., 2014; Hobbs, Mahoney, & Andrews, 2017; Karyotaki et al., 2015; Mewton, Wong, & Andrews, 2012; Williams & Andrews, 2013) and non-completion of e-health interventions is common in youth and adolescents (Clarke, Kuosmanen, & Barry, 2015).

The adherence rates in the current studies are comparable to those reported in existing RCTs of guided and self-help internet interventions for depression and/or anxiety (Berger, Hammerli et al., 2011; Loughnan, Sie, et al., 2019; Richards & Richardson, 2012; e.g., Titov et al., 2013). Earlier meta-analyses have shown that self-help interventions are typically

associated with lower adherence rates compared to guided interventions (Andersson & Cuijpers, 2009; Andersson & Titov, 2014; Andrews et al., 2010; Spek et al., 2007). Interestingly, adherence rates did not differ between the clinician guided and self-help group in the RCT, with participants completing an average of 2.60 (*SD* = .78) lessons in the clinician guided group and 2.68 (*SD* = .78) lessons in self-help. The current findings are therefore more in line with preliminary evidence showing that incorporating features designed to improve user engagement (such as automated email reminders) into self-help interventions results in similar adherence rates as guided interventions (Berger, Caspar et al., 2011; Berger, Hammerli et al., 2011; Titov et al., 2013; Titov et al., 2016).

The amount of clinician and technician time spent in both the self-help and clinician guided groups across Study 2 (*M* = 22.58 minutes, *SD* = 14.51) and Study 3 (clinician guided: *M* = 48.64 minutes, *SD* = 21.28; self-help: *M* = 23.09 minutes, *SD* = 11.10) suggests that participants can experience large reductions in RNT and symptoms of depression and anxiety with relatively little clinician and/or technician time required. The amount of clinician and technician time required in the current studies is also substantially lower than the amount of clinician time reported in the existing guided interventions (Cook et al., 2019; Topper et al., 2017). For example, clinicians in Topper et al.'s (2017) study were reported to have spent at least 20 minutes providing feedback to each participant after the completion of each of the six online modules. Differences in the level of detail and the format of the support provided may explain this difference in time spent contacting participants. For example, clinicians in the studies by Topper et al. (2017) and Cook et al. (2019) provided each participant with personalised written feedback which identified improvements and positive steps the participant had made, and suggested areas to focus on in the subsequent module. In contrast, clinicians in the current studies did not have access to participants' completed worksheets and clinician support was provided verbally over the phone. In Cook et al.'s

(2019) study, clinicians sent personalised reminder emails if participants had not logged on for over a week. In comparison, email and SMS reminders were largely automated in the current studies, likely reducing clinician and technician time spent following-up participants. The current studies also evaluated a briefer intervention (3 modules compared to 6 modules) and thus clinicians had to support participants through fewer modules. Finally, the intervention program evaluated in the current thesis was originally developed to be delivered in a self-help format. This meant efforts were made to ensure the program was as comprehensive and straightforward as possible and included a number of examples and suggestions of how to apply each of the treatment skills. This may have facilitated participants' comprehension and completion of treatment activities without additional assistance, potentially reducing the amount of clinician guidance required.

In summary, the three studies presented in this thesis provide additional empirical support for internet interventions targeting rumination and worry as well as new evidence for positive treatment effects in adults and those currently experiencing depression and/or anxiety symptoms. This program of research has also demonstrated that, whilst significant improvements in participants' levels of RNT and symptoms of depression and anxiety can be achieved with both guided and self-help intervention formats, clinician guidance is associated with significantly better treatment outcomes. Having summarised the main findings of the current research program and considered them in the context of the current literature, next I will discuss the implications of these findings.

Implications of the research program

Need and demand for online treatments targeting RNT

There are a number of important implications of the current research program. First, these studies show the need and demand for online interventions targeting rumination and worry. Recruitment targets for both the pilot study and RCT were easily reached; 63

individuals applied for the pilot trial in less than one month while over 500 individuals applied for the RCT, with 352 applications received within a 48-hour period. A further 103 individuals also registered their interest to participate in further research relating to the program once recruitment for the RCT had been closed. At baseline, over 70% of each of the samples recruited met DSM-5 diagnostic criteria for MDD and/or GAD and mean scores on the self-report measures of anxiety (GAD-7) and depression (PHQ-9) were in the moderate severity range in both the pilot trial and the RCT. These observations lend support to the rationale for developing online interventions targeting rumination and worry.

A number of factors may have positively influenced recruitment for the pilot trial and RCT. Firstly, both rumination and worry are commonly experienced by the general population and may not have the same connotations or perceived social stigma of mental illness. Focusing on these processes, rather than depression and/or anxiety, may then have been appealing to the individuals who applied for the studies (Topper et al., 2010; Topper et al., 2017). Secondly, incorporating the language used by participants in Study 1 into the recruitment materials (e.g., advertisements, information about the study) for the pilot trial and RCT may have helped to improve the understandability, relatability, and acceptability of the proposed intervention and encouraged individuals to apply. If true, these factors also have implications for how psychological interventions should be represented to potential service users more broadly. For example, it suggests that reducing any potential sigma associated with a psychological intervention or service (e.g., by omitting clinical diagnoses from its name) and incorporating lay-person language into recruitment materials may help to increase the uptake of psychological interventions and reach more individuals who need support. This is important given many people experiencing mental health difficulties, including depression and anxiety, do not seek treatment (Burgess et al., 2009; Slade et al., 2009).

Third, preference for online treatment programs has been shown to be significantly greater in previous users of online treatments compared to individuals who have not previously engaged in treatment online (Gun, Titov, & Andrews, 2011). Contacting subscribers of a provider of online mental health treatments (THIS WAY UP), who were likely already familiar with online interventions, may thus have also assisted recruitment efforts. Finally, recruitment for the RCT took place during the COVID-19 pandemic which has been associated with increased anxiety, stress, and low mood as well as a significant increase in the demand for mental health support on a population-level (Batterham et al., 2021; Dawel et al., 2020; Newby et al., 2020; Shakespeare-Finch et al., 2020). This significant increase in demand for mental health services and support occurred at a time when more traditional face-to-face mental health services were often unavailable due to various social distancing mandates (Duckett et al., 2020). These factors led to increased awareness, uptake, and acceptability of the use of technology in mental health care and fundamental shifts in the delivery of mental health services (Ben-Zeev, 2020), which may have also facilitated recruitment.

Importance of involving end-users in the design of interventions

To my knowledge, this is the first internet delivered RNT intervention that has involved potential end-users in its development. Understanding how individuals understand and experience rumination and worry is a key component of developing interventions targeting these processes. The findings of Study 1 thus have a number of implications for the design of online and face-to-face interventions targeting rumination and worry that may be developed in future. Specifically, the experiences, triggers, cognitions, and coping strategies reported by participants, as well as the language used to describe these, can be used to create relevant, real-world examples and to help improve the understandability, relatability, and acceptability of intervention programs targeting rumination and worry. Improving the

relevance and relatability of intervention programs is likely to increase user engagement (Beatty & Binnion, 2016) and, by extension, improve treatment outcomes. However, as I did not have a direct comparison between an intervention developed with these end-user insights and experiences versus one without these insights, I am unable to confirm whether this was the case in the current studies. Therefore, while including end-users in treatment development is likely to be advantageous, future studies should compare interventions with and without such input to confirm whether end-user involvement enhances treatment effectiveness.

The findings from this study also provide suggestions of cognitions, behaviours, and situational factors to target in treatment, such as metacognitive beliefs about rumination and worry (Papageorgiou & Wells, 2001, 2003; Wells, 2009). The findings also suggest coping strategies which individuals may find helpful to counteract rumination and worry, such as behavioural approaches focused on absorbing activities (Watkins, 2016). These strategies can then be incorporated into treatment to help manage the high-risk times reported by participants. One of the key clinical implications from Study 1 is the need for clinicians to enquire about their patients' personal understanding of rumination and worry given the variety of these terms provided by participants in Study 1. Doing so would ensure that clinicians and their patients are referring to the same processes throughout assessment and treatment. Further, the finding that almost a third of participants had not heard of rumination before suggests that this term needs to be clearly defined in intervention programs and highlights the value of incorporating psychoeducation and self-monitoring into treatments to improve insight and awareness, as is recommended in existing treatment approaches (Watkins, 2016).

Efficacy of targeting rumination and worry using an online intervention in adults

Another important implication of the current research is the finding that the online intervention program was both efficacious and acceptable. The findings from Study 2 and 3

show that participants experienced significant reductions in transdiagnostic RNT, rumination, and worry, as well as symptoms of anxiety, depression, and distress with a relatively brief (3-sessions over 6-weeks) online intervention. Of note, while previous research has demonstrated that internet interventions targeting rumination and worry can reduce and prevent psychopathology in adolescents and young adults (Cook et al., 2019; Topper et al., 2017), the current research program has demonstrated the efficacy and acceptability of doing so in adults, including those currently experiencing clinically significant anxiety and/or depression symptoms. As noted earlier, participants in the current samples had long histories of persistent and significant episodes of low mood and/or anxiety and the majority of participants met diagnostic criteria for current MDD and/or GAD at baseline (Pilot trial: 74%; RCT: 72%). In both the pilot trial and RCT, medium to large improvements were observed for symptoms of depression, generalised anxiety, and general psychological distress. Small to large effects for insomnia were also observed in the RCT. The current findings therefore suggest that online programs targeting rumination and worry can be used to not only prevent the onset of psychopathology (Cook et al., 2019; Topper et al., 2017) but also to treat and reduce *current* depression and anxiety. These findings are important given the well-established role that rumination and worry play not only in the onset of depression and anxiety disorders, but also in the severity, maintenance, and relapse risk of these disorders (Ehring & Watkins, 2008; Ehring et al., 2011; Kircanski et al., 2015; Thomsen, 2006).

The current findings also provide further empirical support for targeting and reducing the shared cognitive processes underlying the development and maintenance of depression and anxiety disorders as a means to improve treatment effects and durability (Ehring & Watkins, 2008; Ehring et al., 2011; Hofmann & Hayes, 2019; McEvoy et al., 2009; McEvoy et al., 2013; Topper et al., 2010). Although beyond the scope of the current thesis, mediation

analyses are needed to confirm the directionality of these effects and determine whether reductions in RNT mediated the effect of the intervention program on depression and anxiety symptoms. Studies are also needed to compare treatment effects between the RNT intervention and existing psychological interventions. These studies should also investigate and compare the durability of the observed treatment effects.

Disseminating the intervention

Although the results of the RCT show that the clinician-guided format led to greater changes in symptoms, both the pilot trial and RCT findings also support the use of self-help RNT interventions. In both the pilot trial and RCT, participants who underwent the self-help RNT intervention experienced significant improvements in RNT and symptoms of depression and anxiety which were maintained at follow-up. As noted earlier, adherence to the self-help intervention also did not differ significantly from the adherence level in the clinician guided group.

These findings have a number of implications for how the program could be disseminated. Firstly, the finding that the program is efficacious and acceptable in both a guided and self-help format provides individuals with a choice about how they wish to complete the intervention program. This ability to choose is valuable given patients' treatment preferences have been shown to impact treatment outcome and adherence in both face-to-face psychotherapy and when treatment is delivered online. Studies have shown that participants who were matched to their preferred treatment showed greater improvements and lower levels of treatment drop out (Johansson, Nyblom, Carlbring, Cuijpers, & Andersson, 2013; Swift & Callahan, 2009; Swift, Callahan, & Vollmer, 2011). Moreover, not all end-users of the program may want clinician guidance, and some may prefer to complete the program in a self-help format. In the current sample, approximately 20% of participants in each of the clinician guided and self-help groups reported a preference to complete the

program without any additional support and not all participants in the clinician guided group made use of the clinician support throughout the treatment period. Males in particular have also been shown to report a preference for self-help treatments and to self-manage their symptoms alone (e.g., Ellis et al., 2013). The self-guided format therefore offers an efficacious treatment option for those who prefer to complete the program without clinician guidance. The self-guided format is also not constrained by the availability of trained clinicians and offers almost limitless scalability for widespread dissemination and thus, although associated with slightly smaller effect sizes compared to the guided format, could be used to disseminate RNT interventions on a large-scale. It is also possible that a self-help intervention could be used as a first, low-intensity step in a stepped care model of treatment. Clinician support could then be added in response to the users' engagement and symptom improvement. For example, participants completing the program in a self-guided format who are not experiencing satisfactory symptom improvement could be "stepped-up" to more intensive clinician support. Finally, the self-guided version also provides an efficacious treatment option where clinician guidance may not be feasible or affordable, such as in rural and remote locations (Green, Hunt, & Stain, 2012; Sinclair, Holloway, Riley, & Auret, 2013).

The intervention program will be disseminated via the THIS WAY UP online platform (www.thiswayup.org.au) in both a clinician guided and self-help format. THIS WAY UP is a well-established, government funded, digital mental health service and part of the Clinical Research Unit for Anxiety and Depression (CRUfAD), a joint initiative of St Vincent's Hospital Sydney and the University of New South Wales and where this research was conducted. THIS WAY UP has a range of existing evidenced-based internet interventions for depression and several anxiety disorders created by a team of researchers and clinicians. These courses are available to members of the general public across Australia and can be completed under the supervision of their regular clinician (e.g., psychologist,

psychiatrist, GP, and other health professionals) or in a self-help format without need for a referral. Some of the courses are provided at no cost to the user whilst others cost AUD$59 for 90-days of access. Both formats of the intervention will be displayed on the THIS WAY UP website and will be marketed using social media, google advertisements, traditional media (e.g., radio), and in the regular newsletter sent to the subscribers and the 27, 198 clinicians using the platform.

Integrating the intervention program into a broader model of care

One of the key aims of delivering treatments online is to improve access to evidence-based treatment, especially for those who may otherwise be unable to access support due to various structural, economic, or logistical barriers. Online interventions also represent an efficient and cost-effective way of disseminating treatment given they require substantially less clinician time compared to face-to-face psychotherapy (Andersson et al., 2014; Carlbring et al., 2018; Spek et al., 2007). There are several ways that clinicians could potentially integrate this RNT intervention program into their clinical practice (for an overview, see Newby, Mason, et al., 2021; Reynolds, Griffiths, Cunningham, Bennett, & Bennett, 2015). Firstly, as preliminary findings suggest that existing CBT protocols are not very effective in reducing RNT processes (Ciesla & Roberts, 2002; Jones et al., 2008; Schmaling et al., 2002), clinicians could recommend that individuals experiencing elevated levels of rumination and/or worry complete the program as a standalone intervention in either a clinician guided or self-help format. Clinicians and patients can then assess whether additional face-to-face services are still required upon completion of the intervention program, potentially easing the demand on limited face-to-face services.

In addition to predicting poorer and slower treatment response to existing CBT interventions and reduced likelihood of remission, pre-treatment rumination levels have been correlated with higher levels of depressive symptoms following treatment, delayed remission

of symptoms, and greater likelihood of relapse following CBT treatment (Ciesla & Roberts, 2002; Jones et al., 2008; Michalak et al., 2011; Schmaling et al., 2002). Similarly, worry has been shown to predict poorer treatment outcomes (Mörtberg & Andersson, 2014). Clinicians could thus recommend the intervention to individuals on their waiting lists to help reduce rumination and worry in preparation for face-to-face treatment and explore whether this helps increase the success of the face-to-face therapy (e.g., Duffy, Enrique, Connell, Connolly, & Richards, 2020). This approach of using internet interventions as a 'prequel' to therapy also helps clinicians to manage typically long waiting lists and helps provide patients with immediate access to support (Duffy et al., 2020; Hadjistavropoulos, Nugent, Dirkse, & Pugh, 2017; Newby, Mason, et al., 2021; Wilhelmsen et al., 2013).

The significant proportion of participants who were engaged in concurrent psychotherapy during the current research studies also warrants investigation of the intervention as an adjunct to face-to-face treatment sessions. Blending the intervention program with face-to-face sessions, such that patients read the lesson materials before or after treatment sessions, may help patients consolidate and augment their learning, potentially enhancing treatment outcomes, and helps clinicians reserve the limited time in session for case formulation, troubleshooting difficulties and patient avoidance, and engaging in complex and/or experiential exercises (Newby, Mason, et al., 2021). As the number of face-to-face treatment sessions available under public health or insurance funding schemes per calendar year is limited in Australia, this blended care model could also be used to help space out the limited treatment sessions (Newby, Mason, et al., 2021; Reynolds et al., 2015).

Many individuals also experience residual symptoms following standard CBT treatment for depression and/or anxiety (Dimidjian et al., 2006; Fava et al., 1994; Hofmann et al., 2012; Kennedy et al., 2004; Paykel et al., 1995; Scott, 2006) which are associated with significant ongoing distress and impairment and an increased risk of relapse (Beshai et al.,

2011; Judd et al., 1999; Kennedy et al., 2004; Riso et al., 2003). Rumination in particular has been shown to be a common residual symptom following standard CBT for depression, remaining elevated after both full and partial remission of depressive symptoms (DeRubeis et al., 2005; Judd et al., 1999; Riso et al., 2003). The intervention program could therefore also be used in clinical practice to address residual symptoms at the end of face-to-face treatment. Finally, the intervention could be used as a relapse prevention tool to help patients maintain treatment gains and encourage continued practice of the skills learned in treatment, especially as users can repeatedly review the downloadable program materials. Future research could then also evaluate how effective the program is as a relapse prevention tool.

In summary, there are several ways in which the intervention program can be incorporated into the broader model of care. However, as there are currently no effectiveness studies on internet-delivered interventions targeting rumination and worry, a key next step is to investigate how best to integrate the intervention program with other existing treatment options and to identify who is going to benefit most from each of the options outlined above (e.g., standalone intervention, blended care). While the COVID-19 pandemic has increased awareness and acceptability of online interventions (Ben-Zeev, 2020), efforts are still needed to address clinician and user reluctance and misconceptions about online treatments (Apolinário-Hagen, Harrer, et al., 2018; Apolinário-Hagen, Kemper, & Stürmer, 2017; Davies et al., 2020; Mohr, Siddique, et al., 2010; Moskalenko, Hadjistavropoulos, & Katapally, 2020; Topooco et al., 2017). Clinician workshops designed to train and upskill clinicians to integrate online programs into their clinical practice may help to facilitate the dissemination and integration of the intervention (Donovan, Poole, Boyes, Redgate, & March, 2015; Hadjistavropoulos, Thompson, Klein, & Austin, 2012) while educational information can improve perceptions of online treatments and address clinician and patient

reluctance (Apolinário-Hagen, Fritsche, Bierhals, & Salewski, 2018; Davies et al., 2020; Ebert et al., 2015; Soucy, Owens, Hadjistavropoulos, Dirkse, & Dear, 2016).

Geographic reach

A final important implication is the reach offered by the current intervention due to its online mode of delivery. As noted throughout this thesis, delivering treatment online overcomes many of the barriers to accessing face-to-face mental health support such as cost (including out-of-pocket costs), difficulty attending treatment during regular business hours, long waiting lists, and the limited availability of trained clinicians (Andersson & Titov, 2014; Mohr et al., 2006; Mohr, Ho, et al., 2010). Delivering the intervention online also means that it can be easily disseminated to provide timely and affordable access to evidence-based treatment on a population-level, including in rural and remote locations which often lack trained practitioners and specialist services (Green et al., 2012; Sinclair et al., 2013). Indeed, I was able to recruit and provide treatment to participants from across all of the Australian states and territories while located in Sydney and participants in the treatment groups achieved significant and sustained improvements with no face-to-face clinical contact.

The findings from the current study, whilst encouraging, need to be interpreted in the context of several limitations which I will now outline.

Limitations and suggestions for improvement

Participant population and generalisability

In all three studies, the vast majority of participants were female, born in Australia, well-educated, and spoke English as their primary language. Participants also had to meet specific inclusion (e.g., fluent in written and spoken English, internet and computer access) and exclusion criteria (e.g., diagnoses of schizophrenia, psychosis, and/or bipolar disorder) to participate in the study. The samples presented in this thesis may therefore not be representative of the general population, limiting the generalisability of the current findings.

Future research should involve individuals from culturally diverse, non-Western backgrounds (Harper Shehadeh, Heim, Chowdhary, Maercker, & Albanese, 2016). This includes research into their personal experiences with, and understandings of, rumination and worry as well as investigating treatment effects in these populations using culturally adapted versions of the intervention program (for suggestions on how to adapt interventions, see Bernal, Jiménez-Chafey, & Domenech Rodríguez, 2009; Bernal & Sáez-Santiago, 2006).

The findings of the current study may also not generalise to males. However, it should be noted that females consistently report higher levels of rumination and worry (e.g., Nolen-Hoeksema, Larson, & Grayson, 1999; Robichaud, Dugas, & Conway, 2003) and thus recruiting participants on the basis of engaging in RNT will inevitably result in a higher proportion of female participants. Females have also been shown to report a stronger preference for online mental health interventions compared to males (Batterham & Calear, 2017), which may also have influenced the proportion of males in the current samples. Further research is thus needed to understand how to appeal to and engage male participants in RNT interventions, as well as online treatments more broadly. Future studies should also consider the language used in recruitment materials as this has been shown to impact recruitment and engagement of men in online mental health studies (Choi et al., 2017) and include additional referral pathways beyond social media self-referral as males typically seek support for their mental health following encouragement from loved ones or their GP (Cusack, Deane, Wilson, & Ciarrochi, 2004).

Participants were self-referred (and therefore self-motivated) and were primarily recruited via social media advertisements. As recruitment source can influence treatment effects and engagement (Arndt, Rubel, Berger, & Lutz, 2020; Klein et al., 2017; Lindner, Nyström, Hassmén, Andersson, & Carlbring, 2015; Romijn et al., 2019), future research

should incorporate additional recruitment strategies and referral pathways, such as GPs, and investigate the impact of these on treatment adherence and outcomes.

The participants who took part in these studies also had extensive symptom and treatment histories. The majority of participants in both the pilot trial (92.3%) and RCT (94%) reported previously experiencing more than one episode of significant and persistent low mood and/or anxiety. Most participants had also previously sought treatment (e.g., psychotherapy, medications) for anxiety and/or depression (Pilot trial: 80.8%; RCT: 89.7%). Our recruitment strategy of contacting subscribers of THIS WAY UP, a provider of online mental health treatments, also meant that a number of participants likely had prior experience with internet-delivered psychological interventions. Whilst this demonstrates that the intervention is robust amongst those with long and chronic histories, these factors may limit the generalisability of our findings to treatment naïve populations (e.g., Gun et al., 2011) and thus further investigation of treatment effects in treatment naïve samples is warranted.

Finally, applicants with severe depression symptoms, active suicidality, and/or psychotic disorders were excluded in Studies 2 and 3. This is consistent with the broader literature on internet delivered treatment interventions (McCall, Hadjistavropoulos, & Loutzenhiser, 2019; Wilks, Zieve, & Lessing, 2016), however, may limit the generalizability of the current findings to more clinically severe populations. These exclusion criteria are often applied to research studies due to safety and risk concerns (Andrews & Williams, 2015). However, studies that have included individuals with severe symptoms and/or reporting suicidal ideation have demonstrated that online interventions can be efficacious for these individuals in both research settings (McCall et al., 2019; Mohr, Kwasny, Meyerhoff, Graham, & Lattie, 2021; Weisel et al., 2018; Williams & Andrews, 2013) and when prescribed by primary care clinicians (Hadjistavropoulos, Pugh, Hesser, & Andersson, 2016; Watts, Newby, Mewton, & Andrews, 2012). It has also been suggested that excluding

individuals with severe symptoms and/or suicidality from online interventions may in fact be more harmful, as this may lead to hopelessness, disillusionment with support services and treatment options, and may negatively impact future treatment-seeking behaviour (McCall et al., 2019). It is also likely that individuals excluded from online psychological interventions may be unable to access alternative support (McCall et al., 2019) due to the well-documented barriers to accessing face-to-face mental health treatment services (Andersson & Cuijpers, 2009; Andersson & Titov, 2014; Mohr et al., 2006; Mohr, Ho, et al., 2010). Studies are now needed to investigate treatment effects and the safety and acceptability of the intervention program in populations with more clinically severe symptoms of depression, those with psychotic disorders, and suicidality, and should incorporate appropriate risk-management protocols, although it is noted that this can be challenging and requires increased resources to do so.

Control group

As the aim of the pilot study (Study 2) was to investigate the preliminary efficacy and acceptability of the online intervention, a one-group design was utilised. A control group was included in the larger RCT conducted in Study 3 to address this limitation; however, the intervention groups were compared against an inactive control (TAU) rather than an active or attention control condition. Further, participants in both Study 2 and 3 were not blind to their treatment condition, as is often the case in psychological intervention research. I therefore cannot exclude the possible effects of other variables such as expectancy effects or response bias on treatment outcomes nor conclude that the observed outcomes were due solely to the intervention program. Future research should compare the intervention program to an attention control or placebo condition as this will enable researchers to better determine whether treatment outcomes are due to specific effects of the intervention itself or non-specific treatment effects such as positive expectancy bias. Further, as per the Australian

National Health and Medical Research Council (2018) ethical guidelines, novel treatments should be compared to existing evidence-based treatments rather than non-treatment or placebo conditions where currently available treatments have been shown to be effective. Given there is strong empirical support for internet-delivered CBT (iCBT) for both depression and anxiety disorders (Andersson, Carlbring, et al., 2019; Andrews, Basu, et al., 2018; Andrews et al., 2010), future research should also directly compare the intervention program evaluated in the current thesis to established iCBT programs using a randomised controlled trial. Comparing the intervention program to an established treatment would not only be a more rigorous evaluation of the program compared to a waitlist or inactive control condition (Chambless & Ollendick, 2001), but would also provide an empirical test of whether directly targeting the mechanisms underlying the development and maintenance of depression and anxiety disorders is associated with greater treatment efficacy and durability of treatment effects compared to standard CBT approaches (Ehring & Watkins, 2008; McEvoy et al., 2009; Topper et al., 2010).

Outcome measures

The conclusions from the current research were strengthened by the inclusion of clinician-administered diagnostic interviews, including blinded diagnostic interviews at follow-up in the RCT (Study 3), which offer a more objective measure of depression and anxiety symptoms compared to self-report measures. However, treatment outcomes were predominately assessed through retrospective self-report, which may be biased by metacognitive beliefs, state factors, and memory and attentional biases (Stone et al., 1998; Watkins & Roberts, 2020). Further, as participants were not blind to their treatment condition, their responses may have been influenced by demand characteristics, particularly in the clinician guided group. This reliance on self-report measures also limits our understanding of which of the skills taught in the intervention participants utilised and

benefited from most, and also how they used these skills. For example, it is unclear whether participants utilised the treatment skills to prevent the onset of rumination and worry or to interrupt these processes. Future studies would benefit from incorporating real-time assessments, such as ecological momentary assessment (EMA; Stone, Shiffman, Atienza, & Nebeling, 2007), which are better able to capture ecologically valid data, momentary experiences, contextual information (e.g., triggers), and skills practice whilst minimising retrospective biases (Moberly & Watkins, 2008; Rosenkranz et al., 2020; Samtani & Moulds, 2017).

The current findings suggest that the intervention program leads to transdiagnostic improvements, with participants experiencing significant reductions in symptoms of depression and generalised anxiety. However, only symptoms of MDD and GAD were assessed. Future studies should thus also assess symptoms of other disorders in which RNT has been implicated (e.g., social anxiety, OCD, PTSD) to better establish whether the program also leads to broader improvements across these disorders. The absence of mediation analyses is a further limitation of the current thesis as it precludes conclusions about the directionality of the observed treatment effects. While investigation into mediating variables and possible mechanisms of change was beyond the scope of the current thesis, future studies should include also mediation analyses this would allow researchers to determine whether reductions in RNT lead to the observed reductions in anxiety and depression symptoms or vice versa. Further, reasons for drop out were not assessed. Future research would benefit from assessing reasons for drop out (e.g., Gerhards et al., 2011; Johansson, Michel, Andersson, & Paxling, 2015) as this would help to identify and address barriers to treatment completion and help refine the intervention to prevent drop-out. Finally, replication of the current findings by independent research teams is necessary to rule out the effects of therapist bias and allegiance (Dragioti, Dimoliatis, Fountoulakis, & Evangelou,

2015) and confirm the superiority of the clinician guided format over self-help in a larger sample.

Intervention contamination

A further consideration when interpreting the findings of the current research is the possibility of contamination of the intervention program given participants reported current and past psychotherapy experience. This may have resulted in participants using a combination of the techniques taught in the intervention program and strategies learned in current/past psychotherapy treatment, potentially inflating estimates of the intervention. While attempts were made to control for this by only including participants who were on stable doses of medications and who had not started CBT treatment in the month prior to participating, these confounds mean that we cannot conclude that the observed treatment effects are solely due to the intervention program. In addition, there were no fidelity checks of the clinician support provided to participants. However, the automated nature of delivering treatment online results in a relatively high degree of treatment fidelity (Andrews et al., 2018).

Although a number of limitations were present, the findings of the current research are promising and provide an important extension to the literature in this field. They also provide a foundation for a number of avenues for future research, several of which have already been highlighted throughout this thesis. In this final section, I will outline some additional avenues for future research relating to the intervention program, as well as internet interventions more broadly.

Suggestions for future research

Efficacy and Effectiveness

Research is needed to further establish the efficacy of the intervention program. One of the strengths of the studies by Topper et al. (2017) and Cook et al. (2019) was the

inclusion of long follow-up periods, with follow-up assessments conducted at 12 months and 15 months, respectively. Although the follow-up period in the current research was extended from 1-month in the pilot trial to 3-months in the RCT, it is unknown whether the observed reductions in RNT, depression, and anxiety are sustained longer term. Studies with long-term follow-up periods (e.g., 12 to 24 months) are thus also needed for the current intervention to better establish the durability of positive treatment effects in adults. Depression and anxiety are known to follow chronic, relapsing courses (Bruce et al., 2005; Judd, 1997). While this research program demonstrated the efficacy of the program in reducing *current* symptoms of depression and anxiety, a longer follow-up period would also allow researchers to investigate whether the intervention has prophylactic effects. For example, researchers could examine whether the intervention program reduces rates of onset and recurrence of depression and anxiety in the long term compared to TAU. These findings would then have implications for how and when the intervention program can be integrated into routine care, as discussed in an earlier section.

As suggested earlier, future research should also examine the efficacy of the intervention compared to existing internet-delivered interventions for depression and/or anxiety. Investigating the programs' efficacy relative to face-to-face psychotherapy and pharmacotherapy is another important avenue for future research. Topper et al. (2017) found no significant difference between their face-to-face group-delivered and internet-delivered intervention formats, suggesting that delivering treatment online was just as effective as the face-to-face format in adolescents and young adults. However, no studies have compared online interventions targeting rumination and worry to pharmacotherapy. Given a significant proportion of applicants and participants in both trials were currently engaged in psychotherapy and/or taking medications for depression and/or anxiety, studies should also investigate the efficacy of the intervention as an adjunct to face-to-face psychotherapy and/or

pharmacotherapy and explore how current psychotherapy/pharmacotherapy impacts treatment outcomes.

One of the key advantages of delivering treatment online is that it can be disseminated on a large scale to provide relatively easy and affordable access to evidence-based treatment on a population level. However, it is unclear if the findings of the current studies also generalise outside of tightly controlled research trials to usual care settings and, to my knowledge, no studies have examined the effectiveness of internet-delivered interventions simultaneously targeting rumination and worry. Routine care settings typically do not include many of the factors shown to improve adherence, such as diagnostic interviews, clinician support, regular assessment and monitoring, or strict inclusion/exclusion criteria and study timelines, and thus adherence is typically poorer with earlier drop out more common (Hilvert-Bruce et al., 2012; Mewton et al., 2012; Williams & Andrews, 2013), particularly for unguided interventions (e.g., Morgan et al., 2017). Research trials are also often conducted with motivated, treatment-seeking samples. As these factors may impact treatment outcomes, future research is also needed to establish the effectiveness of both the guided and self-help formats of this intervention and determine whether the current findings can be replicated in primary or usual care settings. Finally, given the potential for the online intervention to be disseminated on a population level, evaluating the cost-effectiveness of the intervention (in both guided and self-help formats) compared to other treatments and usual care is important to explore if it is a cost-effective alternative. Cost-effectiveness data is also crucial information used by health systems and policy makers when considering whether or not to adopt treatment interventions (Mitchell et al., 2021), with a lack of, or insufficient, cost data a major barrier to the uptake of online mental health interventions (e.g., Gehring et al., 2017; Lennon et al., 2017).

Mechanisms of change

The current research program sought to evaluate the efficacy of the online intervention in reducing RNT and symptoms of depression and anxiety, however, investigating possible mechanisms of change was beyond the scope of the current thesis. Online interventions are considered ideal for this research as they allow for rigorous trial designs with tight experimental controls, are typically low-cost, and are able to recruit large samples quite quickly. Only one of the previous studies evaluating an internet-delivered intervention targeting rumination and worry has examined this so far, with reductions in rumination and worry shown to mediate the effect of the intervention on prevalence rates of MDD and GAD (Topper et al., 2017). More research is now needed to understand *how* the intervention program evaluated in the current thesis achieved the observed treatment outcomes and to identify the variables which mediate symptom improvement (Kazdin, 2007). This would also allow researchers to examine whether the mechanisms of change in the current study replicate Topper et al's (2017) findings and determine whether the intervention program does, as hypothesised, lead to improvements in depression and anxiety symptoms by targeting and reducing the cognitive processes of rumination and worry shared across MDD and GAD.

There are several possible reasons for the limited evidence for RNT as a mediating variable in reducing anxiety and depression in online interventions. Firstly, the inclusion of RNT measures in online treatment evaluations is rare, with primary outcomes typically focused on symptom severity and quality of life rather than mechanistic variables. Second, as stated throughout this thesis, there is a lack of research in online interventions targeting RNT more generally. Thirdly, only one of the previous studies evaluating an online intervention targeting rumination and worry (Topper et al., 2017) included the mid-treatment evaluations required to conduct mediation analyses. Therefore, future studies should include mid-

treatment outcome measures and, ideally, also examine lesson-by-lesson or week-by-week changes in outcomes to facilitate exploration of mechanisms of change.

The intervention program evaluated in the current thesis was multi-component in nature and included strategies drawn from a number of CBT-based treatment perspectives (Segal et al., 2002; Watkins, 2016; Watkins et al., 2012; Wells, 2009). However, it is unclear which treatment components were necessary or sufficient. Dismantling studies which evaluate and compare the specific effects of each treatment component and investigate the mechanism by which each achieves treatment change could be used to better understand which treatment components actively contribute to the observed reductions in RNT and symptoms of depression and anxiety. This understanding could then be used to refine and improve the intervention program and treatment outcomes. It would also enable researchers to distil the intervention down to the core, most efficacious components, which in turn would likely lead to a more cost-effective and time-efficient intervention and may help to improve adherence. Studies should then investigate the relative efficacy of the simplified intervention focused on these core components compared to a larger, multi-component intervention.

Identifying predictors and moderators of treatment outcome for online interventions targeting rumination and worry

Several studies have examined potential moderators and predictors of treatment outcomes for iCBT interventions for anxiety and depression, such as symptom severity and co-morbidity, demographic characteristics, treatment preferences, previous treatment experiences, expectancies about treatment benefits, self-efficacy, and motivation (e.g., Andersson, Carlbring, Berger, Almlöv, & Cuijpers, 2009; Beatty & Binnion, 2016; Hadjistavropoulos et al., 2016; Karyotaki, Efthimiou, Miguel, Bermpohl, Furukawa, Cuijpers, Riper, et al., 2021; Schønning & Nordgreen, 2021), however, findings have been inconsistent across trials (Beatty & Binnion, 2016). As the sample size in the current studies

did not allow for these analyses, future research with larger samples is needed to explore predictors and moderators of treatment outcomes of the intervention program to determine the individuals who are likely to benefit from completing it. Identifying these predictors and moderators will also help inform clinicians' treatment planning and provide evidence to guide individuals in choosing between the clinician guided and self-help intervention formats. This means that treatment can be better tailored to individual characteristics and needs, ensuring that treatment is patient-led and patient-centered. Matching treatment to user preferences and characteristics is also likely to increase adherence and positively influence treatment outcomes (Johansson et al., 2013; Batterham & Calear, 2017).

Clinician support

The current research demonstrated that both the guided and self-help format of the intervention are efficacious and acceptable. Further research is now needed to better understand why the clinician guided format was associated with significantly better treatment outcomes compared to self-help. A recent large-scale individual patient meta-analysis of 36 RCTs of internet-delivered CBT for depression with 8,107 participants found that, while guided iCBT worked better for individuals with severe depression symptoms (PHQ-9 total score > 9), unguided iCBT worked as well as guided for less severe symptoms (PHQ-9 score = 5-9; Karyotaki, Efthimiou, Miguel, Bermpohl, Furukawa, Cuijpers, Riper, et al., 2021). Future research should therefore also identify the characteristics of individuals likely to benefit from this additional support for the current intervention. Such insights would facilitate personalised treatment selection and allow clinicians and patients to make an evidence-based decision about which intervention format may be most suitable for them (Karyotaki, Efthimiou, Miguel, Bermpohl, Furukawa, Cuijpers, Riper, et al., 2021).

Future research could also ask more nuanced questions about this additional support. This includes exploring and comparing the effects of different types of guidance (e.g., risk

monitoring, helping to problem solve skills, or providing encouragement or guidance in applying the treatment skills) and different modes of providing this assistance (e.g., via telephone, email, SMS, or video), as well as determining who benefits most from these different types and modes of support. In addition to extending the literature in this area, this would provide clinicians with evidence-based recommendations of how best to incorporate online programs into their clinical practice. Delivering interventions with clinician guidance is dependent on the availability of appropriately trained clinicians and is typically associated with monetary cost, reducing the scalability and cost-effectiveness of an intervention. It is thus also important to investigate the amount of clinical support required to generate optimal treatment benefits and adherence. Doing so will also inform decisions about how best to balance the limited clinical resources available with delivering the treatment at scale.

Approximately 20% of participants in both the clinician guided and self-help groups reported a preference to complete the program in a self-help format and some participants in the clinician guided group did not respond to attempts to contact them. Delivering online interventions with clinician support to users who may not want or need additional support is an inefficient use of limited clinical resources. Another future direction is thus to explore whether scheduled or flexible clinician support while completing the online intervention is associated with superior treatment outcomes. There have been promising results for a 'patient-centred' treatment model in which clinician support is only provided when requested by the user or when clinically indicated, with emerging research showing that this model is associated with significant symptom improvements and comparable treatment outcomes to standard clinician guided models where clinician support is provided consistently on a weekly basis (e.g., Berger, Caspar et al., 2011; Dear et al., 2015; Hadjistavropoulos, Schneider, et al., 2017; Hadjistavropoulos et al., 2019). Importantly, no differences in patient satisfaction were observed between the standard and optional or flexible support models in

these studies. As noted by these researchers, this patient-centred model is an efficient use of limited clinician time and resources and represents the optimal balance of user preference and independence with appropriate clinical care. However, in one study, program completion was significantly lower in participants receiving flexible support compared to standard support (57% vs 82%; Hadjistavropoulos, Schneider, et al., 2017) and therefore it has been suggested that flexible support may work best for users who are at low risk of treatment drop-out. Patient preferences for flexible or standard clinician support should also be assessed and factored into treatment planning (Hadjistavropoulos et al., 2019).

Improving adherence and engagement

A key future direction for the intervention program, and online treatments more broadly, is to continue to improve treatment adherence and program completion rates (Christensen et al., 2009). Investigating and addressing the factors which predict and motivate adherence (e.g., Christensen et al., 2009; Donkin & Glozier, 2012; Gulliver et al., 2021; Wilhelmsen et al., 2013) is critical to increase the proportion of users completing a treatment program and receiving a full "dose" of treatment. For example, a quarter of participants in each of the treatment groups reported that there had been "a bit too little time" and a consistently suggested improvement to the program was to increase the number of lessons so as to reduce the amount of content covered in each. Participants also reported a preference for more time between each lesson to allow them to better consolidate treatment material and practice the treatment skills. Therefore, while shorter programs may be more appealing to users, further research is needed to investigate the optimal number of treatment lessons and treatment duration, as well as how this may impact adherence. Studies should also explore whether some users require more lessons compared to others and individual predictors of this. Other existing suggestions to improve adherence include incorporating therapist guidance, automated email and/or SMS reminders, motivational interviewing

techniques, and a financial cost to the user (Clarke et al., 2005; Hilvert-Bruce et al., 2012; Titov et al., 2010; Titov et al., 2013), several of which were incorporated into the current research program (e.g., automated reminders, therapist guidance).

As already discussed, the insights and participant language and terms from the qualitative study presented in Chapter 2 were incorporated into the intervention program to hopefully increase participants' engagement with program materials and ensure that the content was relevant and relatable. This appears to have been successful, with acceptable levels of participant satisfaction, and participants reporting that the program was easy to understand and that they related to the program characters and examples. The most commonly reported dislikes about the intervention related instead to technical aspects of the programs' delivery. For example, several participants across both trials reported they would have preferred that the program was mobile friendly and that it had been delivered as a smartphone application (app). Future research should thus also investigate how to make the actual delivery format of the program more engaging and determine whether this improves adherence (Brown et al., 2016; Hadjistavropoulos et al., 2018; Walsh & Richards, 2017). Given the preference for apps reported by participants in the current research, studies could also compare treatment effects and adherence when the intervention program is delivered as an app compared to the existing computer-based format to inform treatment dissemination and user choice. The image- and text-based format of the intervention, typical of many existing online mental health interventions, may also not be appealing to all users, especially if text-based formats are not their preferred learning style or if they have difficulties with reading and/or writing. Future research could thus also investigate treatment effects and adherence when the intervention is delivered in audio and video formats (e.g., Stawarz, Preist, Tallon, Wiles, & Coyle, 2018; Walsh & Richards, 2017) and explore matching the delivery format to user preferences and optimum learning styles. More research is also

needed to systematically assess reasons for drop-out from the intervention and online programs more broadly (e.g., Gerhards et al., 2011; Johansson, Michel, Andersson, & Paxling, 2015; Karyotaki et al., 2015) as this would help to identify predictors of this and inform strategies to promote user retention and engagement.

Side effects and contraindications

While the efficacy of online psychological interventions for anxiety and depression is now well-established (e.g., Andersson, Carlbring, et al., 2019; Andrews, Basu, et al., 2018; Cuijpers et al., 2019), not all individuals who complete an online intervention will benefit from doing so and some experience negative or unwanted side effects (Boettcher, Rozental, Andersson, & Carlbring, 2014; Ebert et al., 2016; Karyotaki et al., 2018; Rozental, Boettcher, Andersson, Schmidt, & Carlbring, 2015; Rozental, Magnusson, Boettcher, Andersson, & Carlbring, 2017). Indeed, while the results from the current research suggest that the intervention program is efficacious, a minority of participants in both the clinician guided (3/34, 9%) and self-help groups (6/37, 16%) reported experiencing negative or unwanted side effects, such as increased anxiety as a result of completing self-monitoring. This is only reflective of those who completed the post-treatment questionnaires and, as such, it is unknown whether side effects also contributed to attrition. The duration and long-term impacts of these side effects is also unclear.

It is not unusual for an individuals' symptoms to worsen when starting a psychological intervention, especially as they start to reflect on the nature, extent, and day-to-day impact of their difficulties (Foulkes, 2010). However, research into the occurrence, characteristics, and scope of potential negative side effects associated with online mental health interventions is a relatively novel area and reporting of side effects in clinical trials is inconsistent (Boettcher et al., 2014; Emmelkamp et al., 2014). Investigating the potential negative effects of online interventions is essential to ensure that individuals can make

informed, evidence-based healthcare decisions and to better support users in reducing any potential side effects (Rozental et al., 2014) and should be addressed in future intervention research. It may also be helpful to inform future users that they may experience a temporary increase in anxiety as a result of engaging in the intervention to help prepare them for this and to normalise this experience.

In addition to identifying what negative effects may be associated with online treatment, it is also important to explore possible predictors and mediators of negative effects (Rozental et al., 2014). For example, an individual patient data meta-analysis of 29 clinical trials of iCBT with 2,866 patients found that being older, well educated, in a relationship, and experiencing higher pre-treatment symptom levels was associated with lower odds of deteriorating during treatment (Rozental et al., 2017). These findings were consistent with a meta-analysis of 2,705 participants across 10 RCTs which found that higher education level and older age was related to a decreased risk of dropout from self-guided internet-delivered interventions for depression (Karyotaki et al., 2015). Identifying possible predictors and mediators of negative side effects, as well what causes these, could be used to improve treatments, ideally reducing the likelihood of negative side effects. Doing so would also help to identify possible contraindications for an interventions' use. Given the increasing development and use of online interventions, studying the negative effects of online interventions is arguably just as important as examining their positive effects. Therefore, future research should systematically investigate the side effects of the intervention program and predictors of these, as well as online interventions more broadly.

Concluding remarks

The research presented in this thesis centred on exploring the impact of using an internet-delivered intervention to target and reduce repetitive negative thinking, a core underlying process implicated in the development and maintenance of depression and anxiety

disorders. This thesis provided the first evidence that targeting rumination and worry, both types of repetitive negative thinking, using an online intervention is efficacious, feasible, and acceptable in adults, including those who are currently experiencing clinically significant symptoms of depression and/or anxiety. This thesis also provided the first direct comparison of treatment outcomes and adherence between guided and self-help intervention formats and, in doing so, is the first to demonstrate the superiority of the clinician guided format. These findings add to the growing body of literature suggesting that internet-delivered interventions can successfully simultaneously target and reduce rumination and worry and that doing so is associated with significant improvements in depression and anxiety symptoms. However, as this field is still in its infancy, further research is needed to investigate whether treatment benefits are sustained long term.

In summary, the novel internet-delivered intervention developed and evaluated in the current thesis provides a promising, scalable approach to reducing rumination and worry, and potentially increasing treatment uptake. Further research is now needed to replicate the current findings in diverse and representative samples by independent research teams. Identifying predictors and moderators of treatment outcomes will also inform refinements to the intervention and enable treatment matching to help improve treatment outcomes and adherence, while also moving the field towards a personalised approach to intervention.

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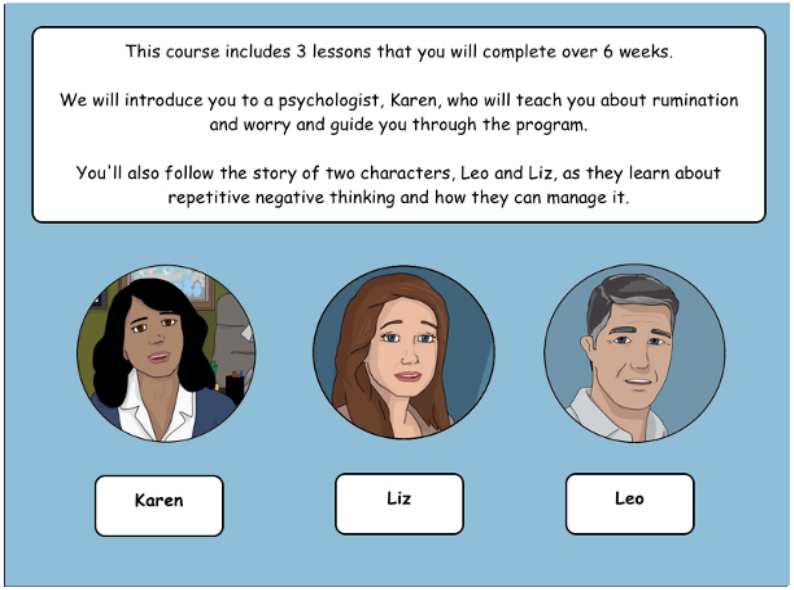
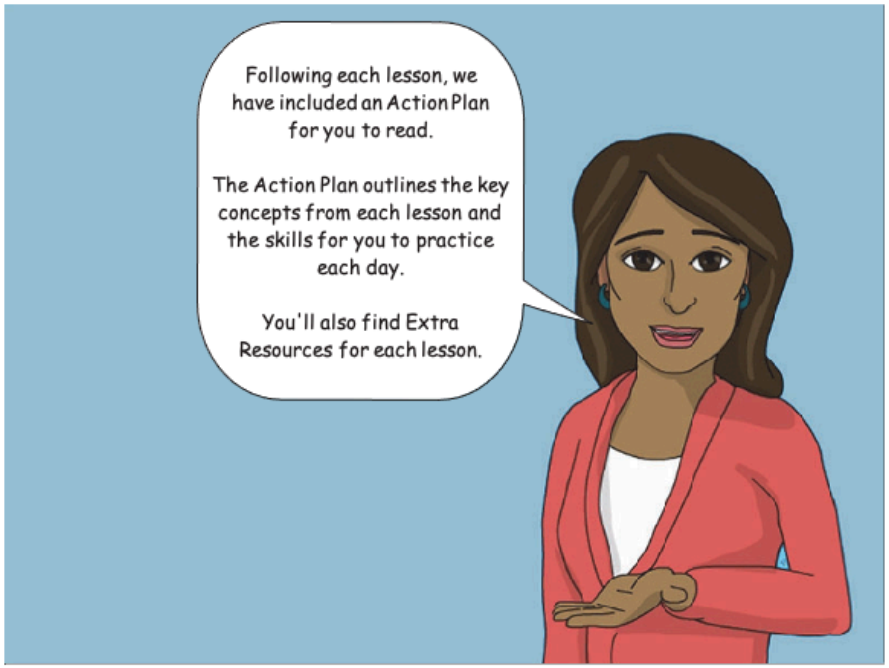
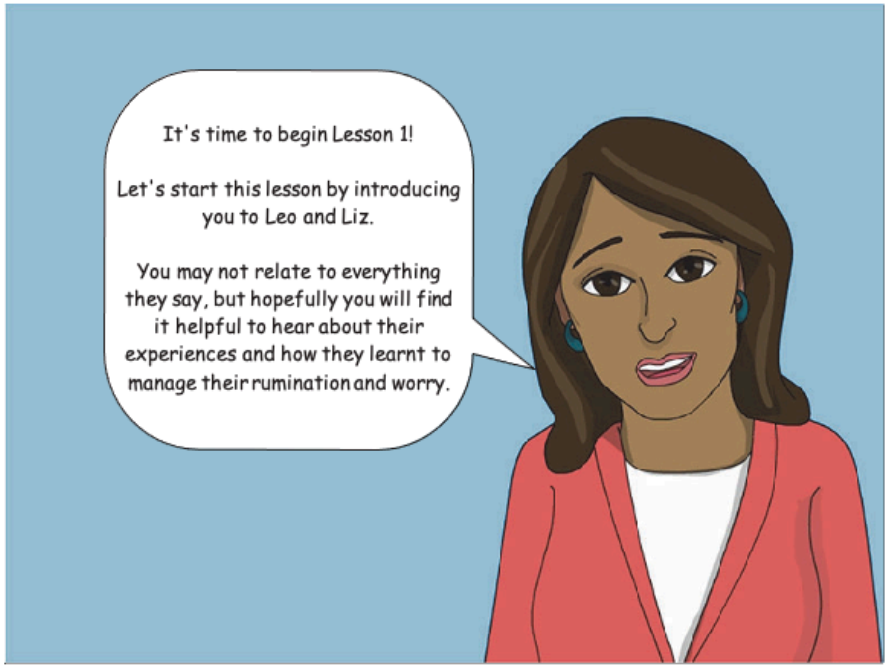
Appendix A: Example of Lesson Slides (Lesson 1)

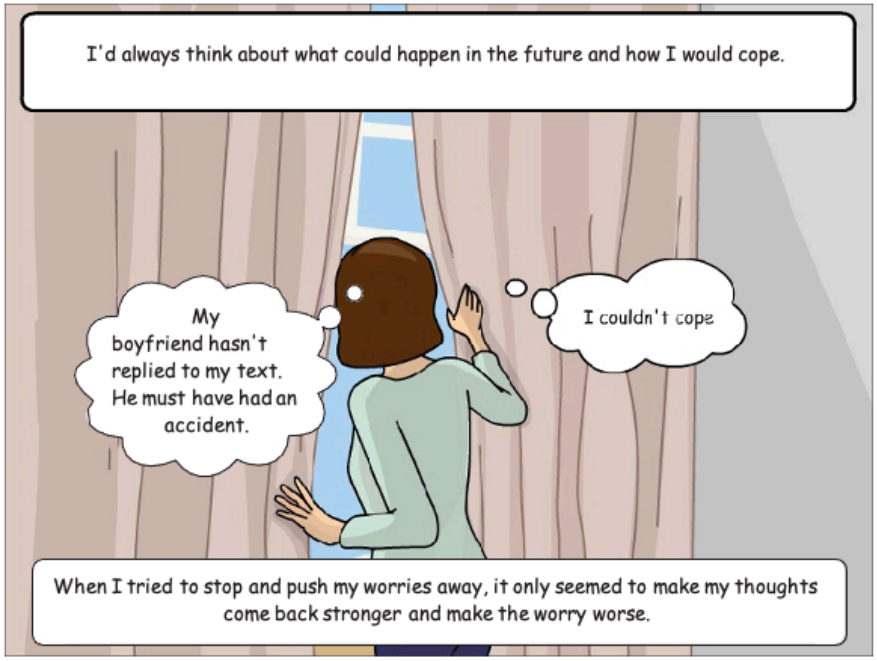


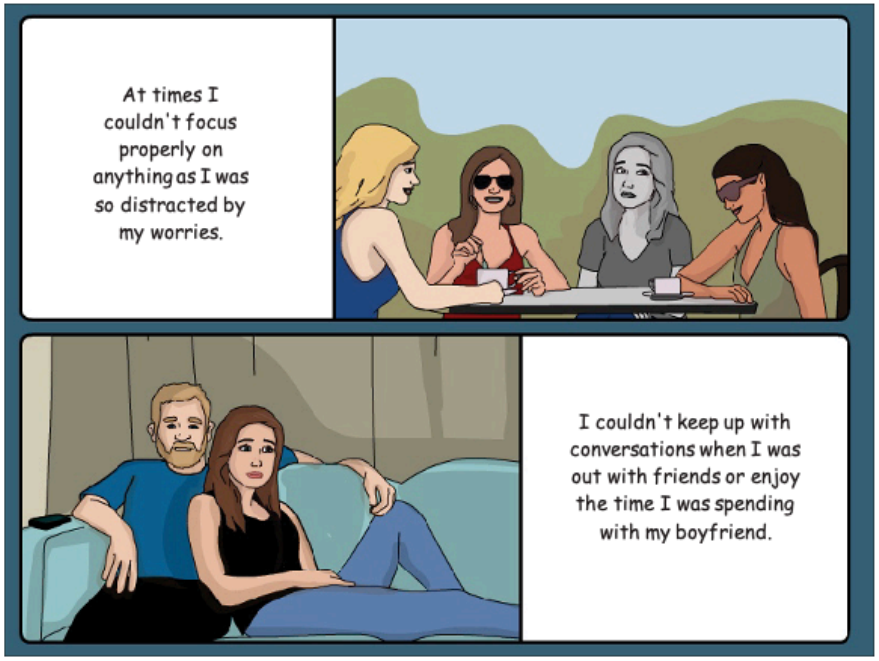

Following each lesson, we have included an Action Plan for you to read.
The Action Plan outlines the key concepts from each lesson and the skills for you to practice each day.
You'll also find Extra Resources for each lesson.

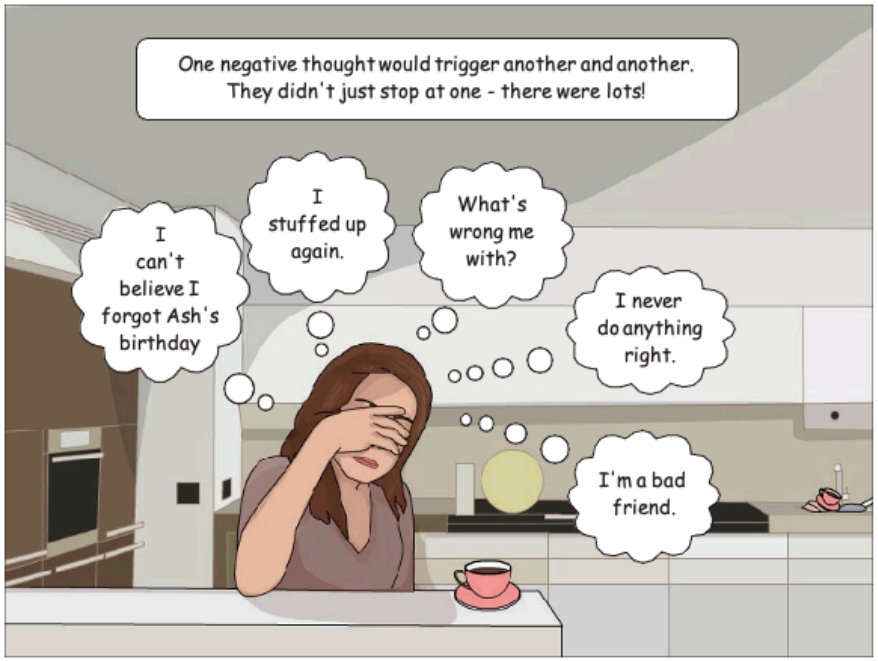

To get the most benefit out of this program, it's really important that you take the time to read over the Action Plan for each lesson and complete the exercises.


It's time to begin Lesson 1!
Let's start this lesson by introducing you to Leo and Liz.
You may not relate to everything they say, but hopefully you will find it helpful to hear about their experiences and how they learnt to manage their rumination and worry.

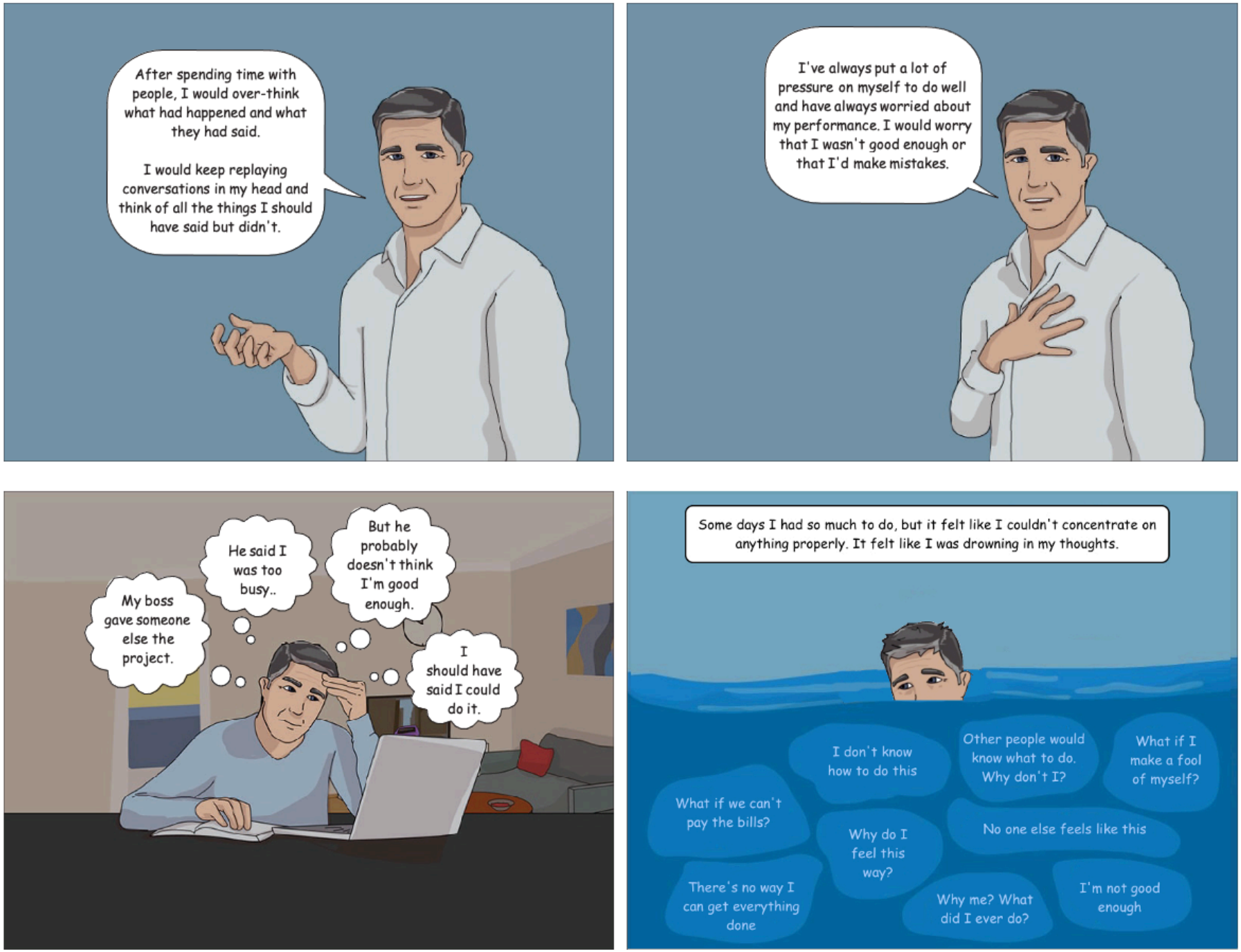

Hi, my name is Liz.
I've always been a worrier. I would worry about everything - my family, health, work, finances.
Some days it felt like I just couldn't stop worrying... it was uncontrollable!

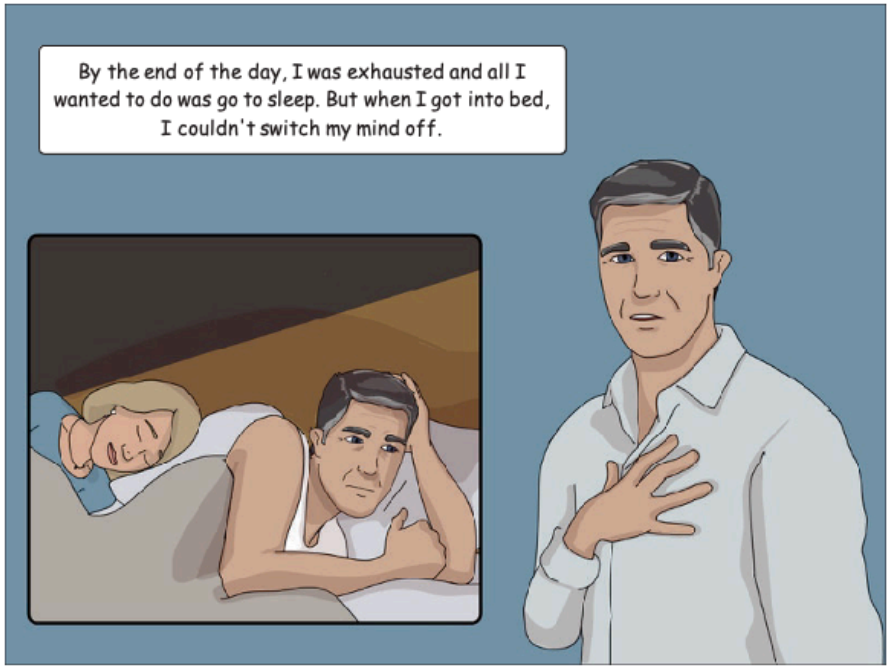

I'd always think about what could happen in the future and how I would cope.
My boyfriend hasn't replied to my text. He must have had an accident.
I couldn't cope
When I tried to stop and push my worries away, it only seemed to make my thoughts come back stronger and make the worry worse.


At times I couldn't focus properly on anything as I was so distracted by my worries.
I couldn't keep up with conversations when I was out with friends or enjoy the time I was spending with my boyfriend.

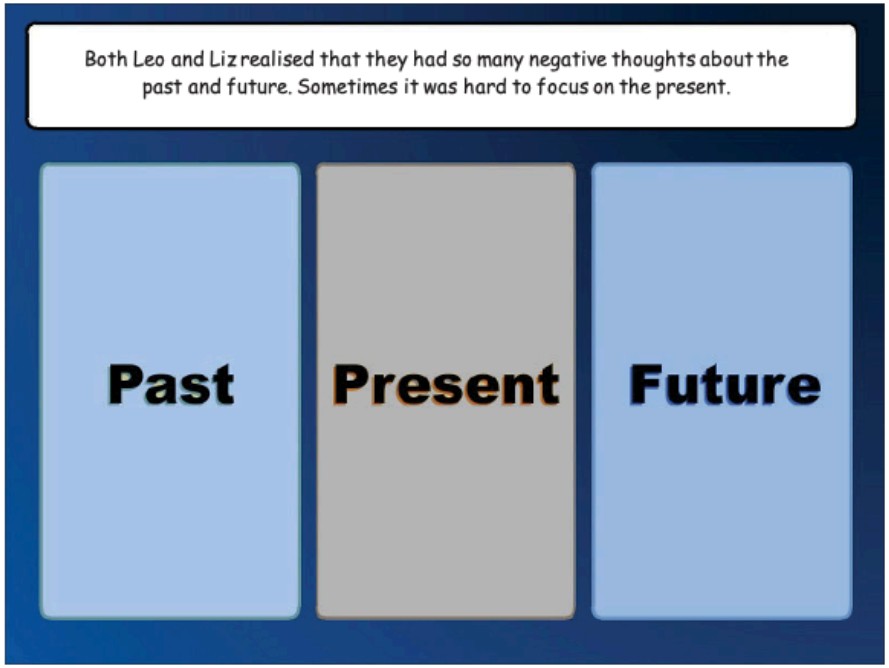

One negative thought would trigger another and another. They didn't just stop at one - there were lots!
I can't believe I forgot Ash's birthday
I stuffed up again.
What's wrong me with?
I never do anything right.
I'm a bad friend.

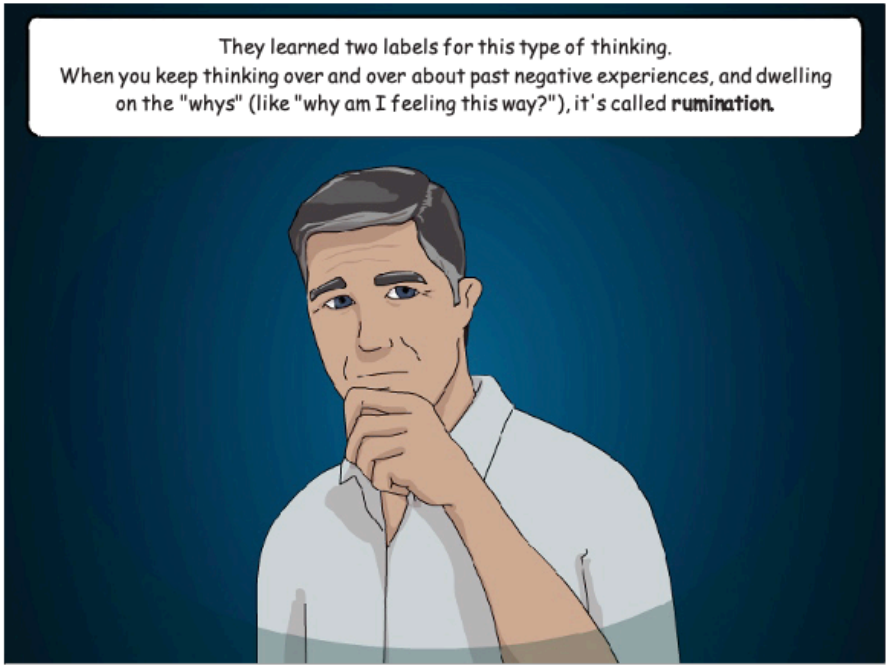

Hi there, I'm Leo. Ever since I was young, I've always been a deep thinker.
I would think over and over about things that had happened and would spend ages thinking about how I was feeling and why.


After spending time with people, I would over-think what had happened and what they had said.
I would keep replaying conversations in my head and think of all the things I should have said but didn't.
I've always put a lot of pressure on myself to do well and have always worried about my performance. I would worry that I wasn't good enough or that I'd make mistakes.
My boss gave someone else the project.
He said I was too busy..
But he probably doesn't think I'm good enough.
I should have said I could do it.
Some days I had so much to do, but it felt like I couldn't concentrate on anything properly. It felt like I was drowning in my thoughts.
I don't know how to do this
Other people would know what to do. Why don't I?
What if I make a fool of myself?
What if we can't pay the bills?
Why do I feel this way?
No one else feels like this
There's no way I can get everything done
Why me? What did I ever do?
I'm not good enough


By the end of the day, I was exhausted and all I wanted to do was go to sleep. But when I got into bed, I couldn't switch my mind off.


Some days I felt like I wasn't coping. Everyone else seemed to manage their busy lives - why couldn't I?

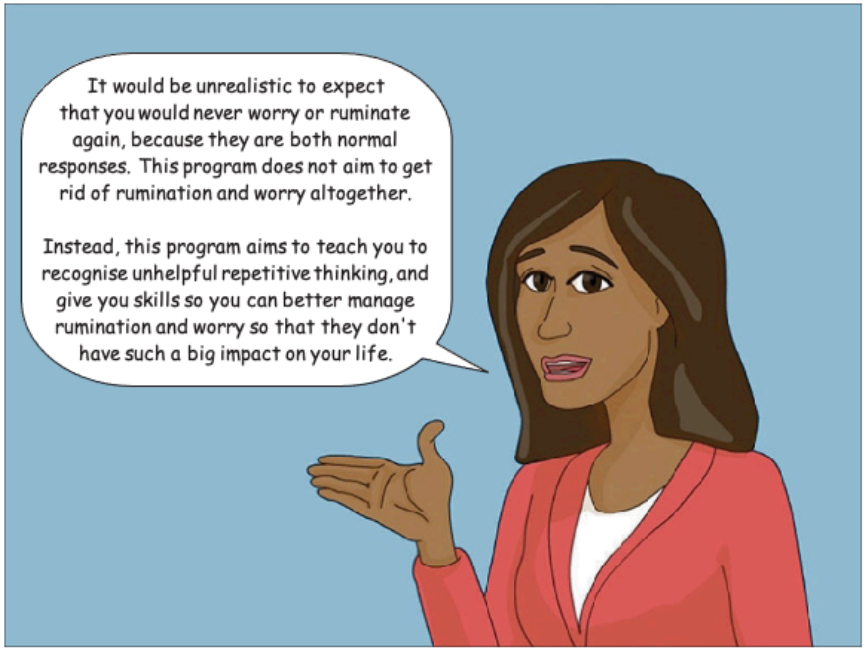

Both Leo and Liz realised that they had so many negative thoughts about the past and future. Sometimes it was hard to focus on the present.
Past
Present
Future


They learned two labels for this type of thinking.
When you keep thinking over and over about past negative experiences, and dwelling on the "whys" (like "why am I feeling this way?"), it's called **rumination**.


And when you think of all the bad things that could happen in the future and the "what ifs", it's called **worry.**
We also learned that rumination and worry were different to planning or problem solving.
Although we often engaged in these types of thinking with the intention of planning or problem solving, both worry and rumination are passive.
That is, rather than helping us to take active steps, the same thoughts just went round and round in our heads, without a solution.
You've just met Leo and Liz.
Now it's time to meet Karen- a psychologist who will guide you through the program.
Hi, I'm Karen!
Let's get started.

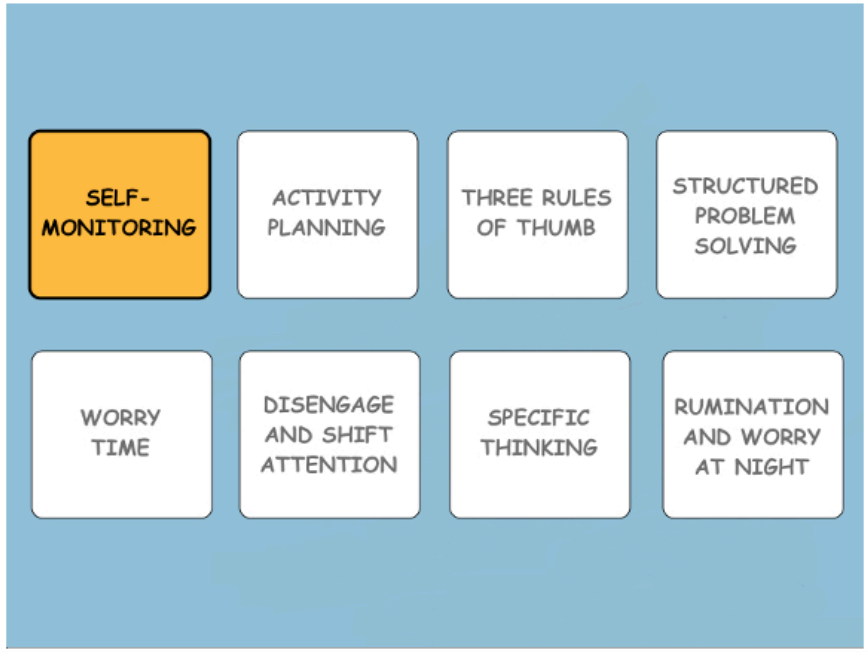

About Rumination and Worry.
Rumination and worry are both types of "repetitive negative thinking".
Rumination tends to be more focused on the past.
It typically involves someone thinking really deeply about something or going over and over past negative experiences. It also refers to over-analysing situations once they are over.
Rumination can also involve dwelling on past failures or regrets and negative aspects of yourself, or thinking a lot about your mood and why you might feel that way.
Worry tends to be more focused on the future.
It often involves people going over and over in their minds about negative things that might happen in the future and how they would cope with them.


Ruminating and worrying are common and normal.
Most people have occasional worries before important events or during times of stress. It's also common to focus on a problem to try and work it through and make sense of it.
However rumination and worry can also become unhelpful.
This can happen when:
- there is too much thinking and little action
- we dwell on things that we have no control over or questions that are unanswerable
- the negative thinking interferes with daily tasks, work, and social activities
- it is difficult to control and stop.
Unhelpful rumination and worry can also lead to negative consequences.
These can include:
- making it hard to focus on the "here and now" or enjoy the present moment
- increasing negative thoughts about yourself, the world, and the future
- interfering with effective problem solving
- increasing negative feelings and lowering motivation levels
- increasing bodily tension, tiredness, and interfering with sleep.
Although there are some small differences between rumination and worry, rumination and worry share more similarities than differences.
Most people who worry also tend to ruminate and vice versa.
The same strategies work for managing both rumination and worry. This is why we have included techniques designed to help you manage both, rather than providing separate techniques for each.


It would be unrealistic to expect that you would never worry or ruminate again, because they are both normal responses. This program does not aim to get rid of rumination and worry altogether.
Instead, this program aims to teach you to recognise unhelpful repetitive thinking, and give you skills so you can better manage rumination and worry so that they don't have such a big impact on your life.


Over time, and with practice, you may also be able to recognise the times or situations when you are most likely to ruminate and worry.
You can then put the strategies that we'll teach you throughout the program in place at these times.


Let's see how you can start to tackle your rumination and worry...


SELF-MONITORING
ACTIVITY PLANNING
THREE RULES OF THUMB
STRUCTURED PROBLEM SOLVING
WORRY TIME
DISENGAGE AND SHIFT ATTENTION
SPECIFIC THINKING
RUMINATION AND WORRY AT NIGHT

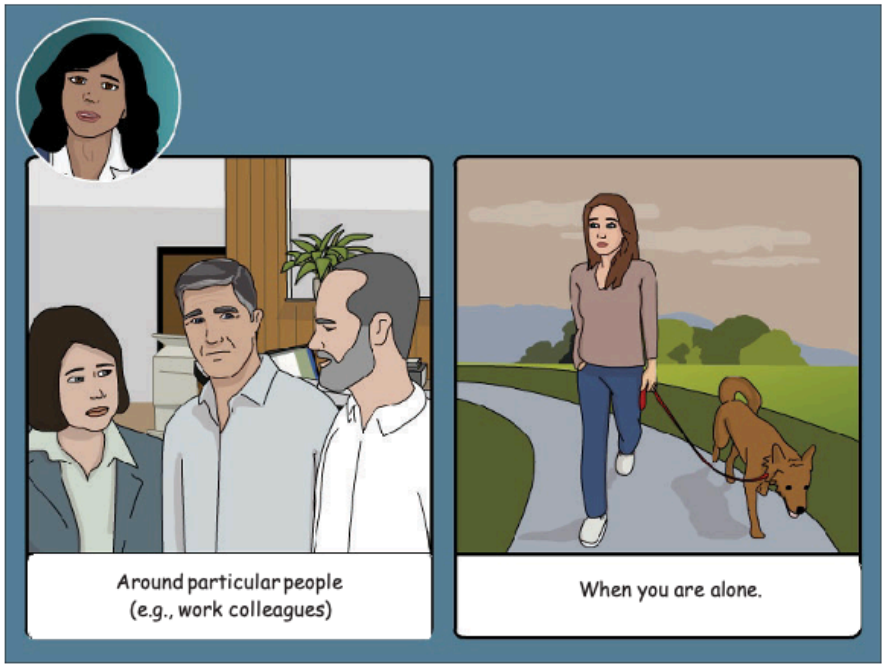

Self-Monitoring.
We think of rumination and worry as a mental habit.


The first step in changing a habit like rumination and worry is to notice when you are doing it.
To help you do this, we have included a Self-Monitoring Form in the Extra Resources.

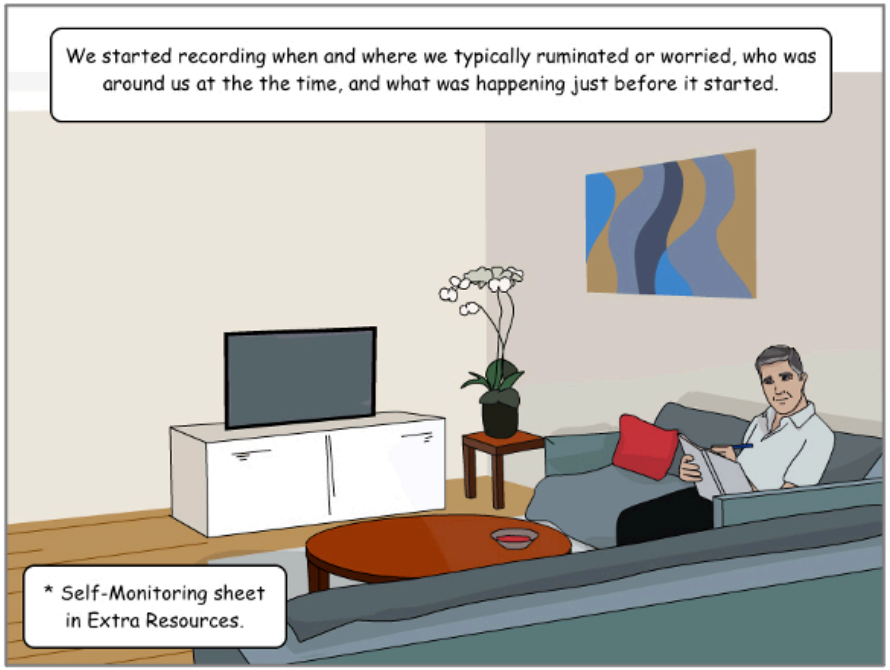

Once you become more aware of when you are ruminating or worrying, you can find out what triggers this type of thinking for you - the tell-tale signs that warn you that it's about to happen or "early warning signs".
You can then put strategies in place to help interrupt your negative repetitive thinking at these times.

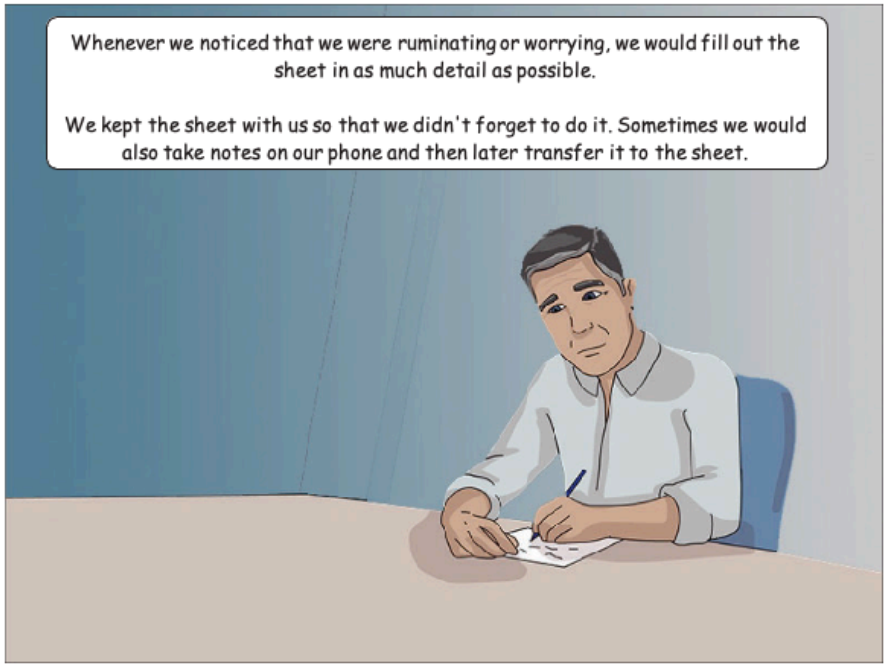

Sometimes you may not even realise that you are stuck in your thoughts until you notice all of a sudden that you've lost lots of time just thinking about things or that you've been feeling low or anxious.

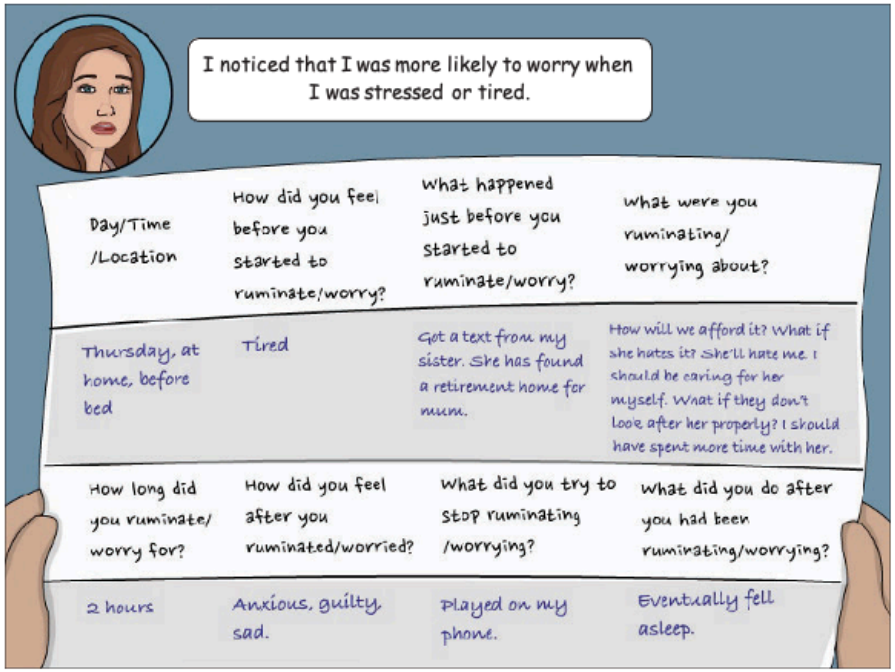

Rumination and worry don't just come from out of the blue. They are **mental habits** that occur at specific times and places.
We know from research that rumination and worry are more likely to happen following certain events or situations, at particular times of the day or during certain routines.
For example, you might worry or ruminate more:
At night before you go to sleep.
At work.
Before you enter a situation (e.g., giving a presentation).
Once an event is over.
In a particular place, like your bedroom.
When you feel down, overwhelmed, stressed or anxious.

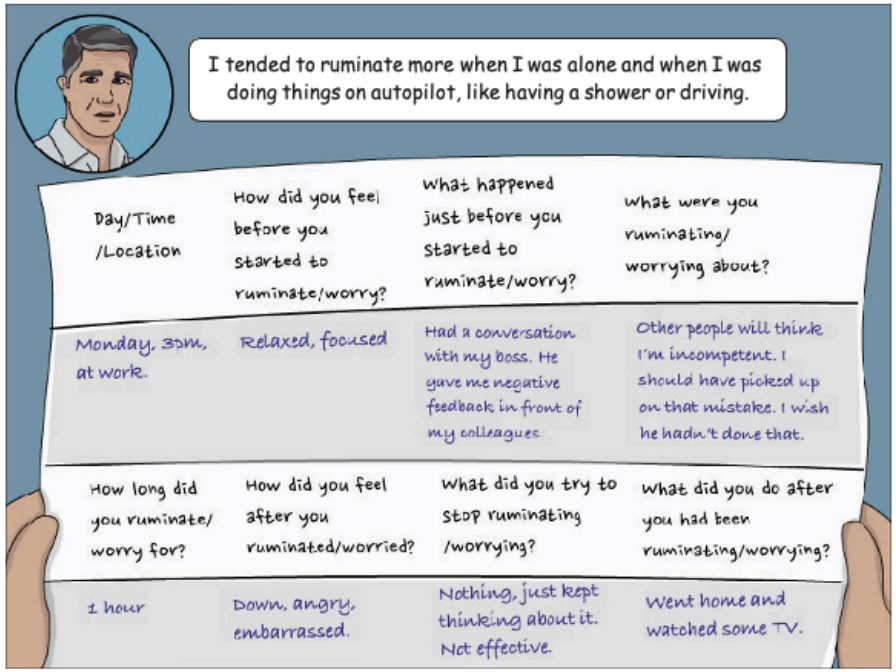

Around particular people
(e.g., work colleagues)
When you are alone.

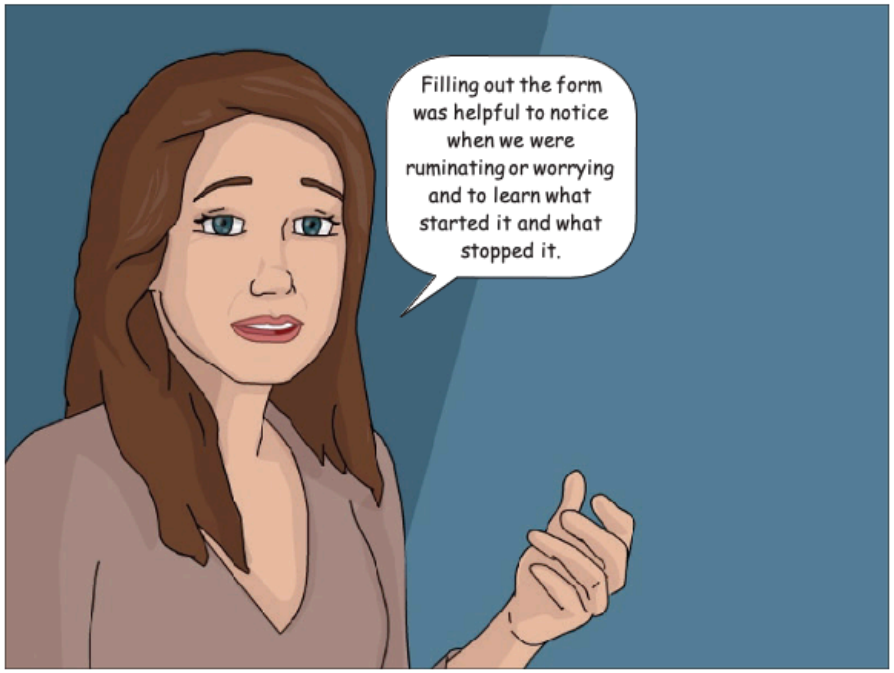

Let's see how Liz and Leo started to recognise their rumination and worry...


We started recording when and where we typically ruminated or worried, who was around us at the the time, and what was happening just before it started.
* Self-Monitoring sheet in Extra Resources.

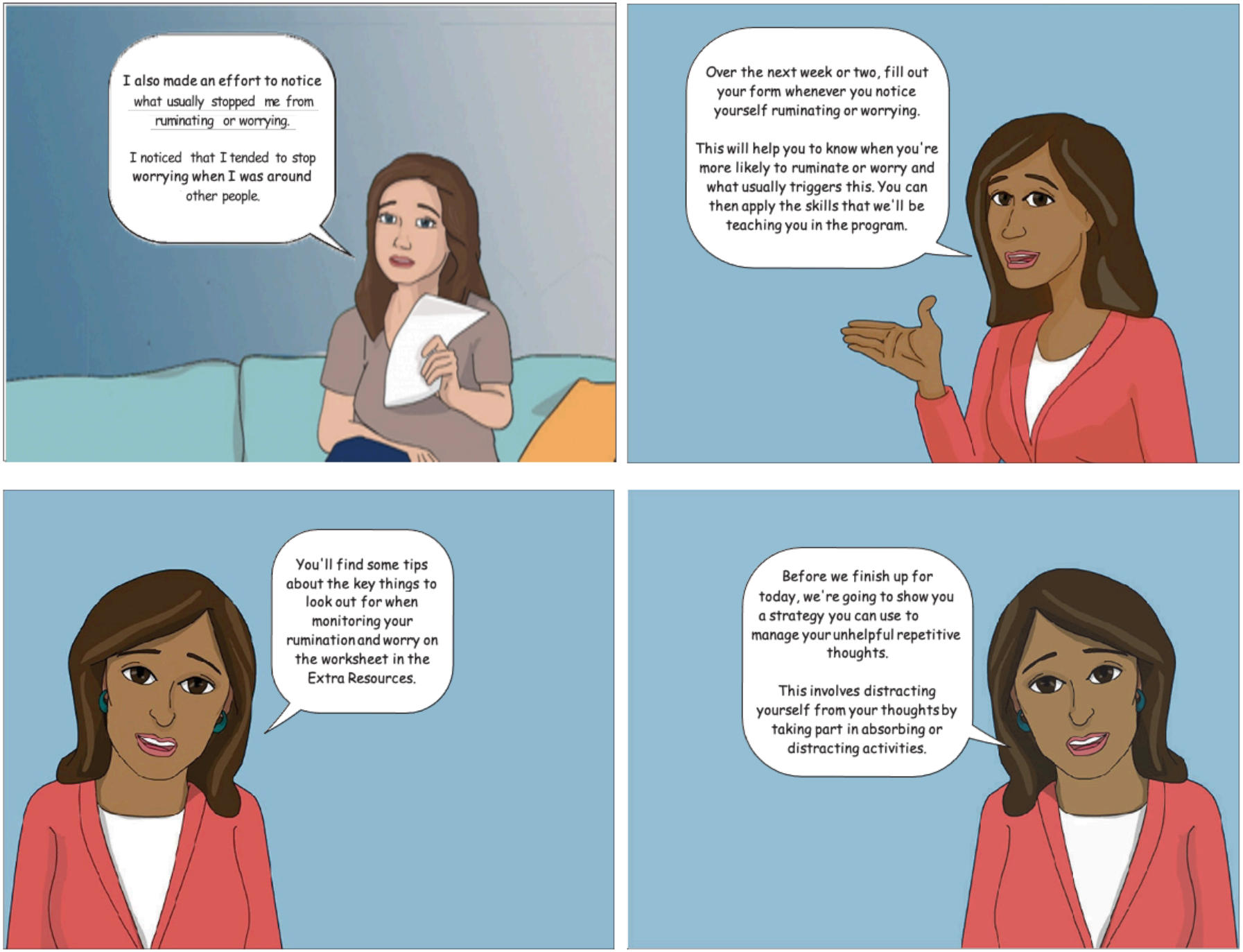

Whenever we noticed that we were ruminating or worrying, we would fill out the sheet in as much detail as possible.
We kept the sheet with us so that we didn't forget to do it. Sometimes we would also take notes on our phone and then later transfer it to the sheet.

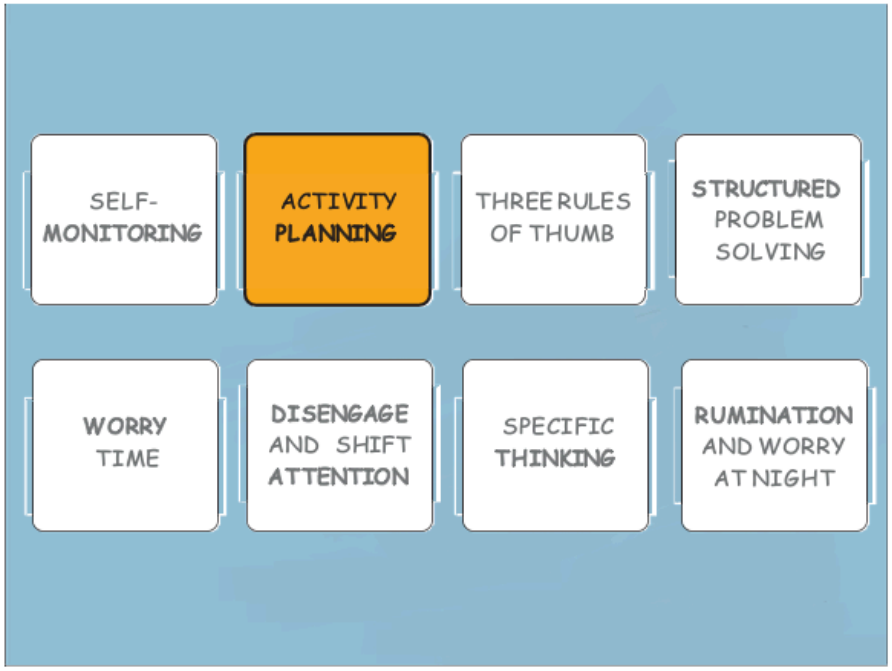

I noticed that I was more likely to worry when I was stressed or tired.
Day/Time /Location
How did you feel before you started to ruminate/worry?
What happened just before you started to ruminate/worry?
What were you ruminating/ worrying about?
Thursday, at home, before bed
Tired
Got a text from my sister. She has found a retirement home for mum.
How will we afford it? What if she hates it? She'll hate me. I should be caring for her myself. What if they don't look after her properly? I should have spent more time with her.
How long did you ruminate/ worry for?
How did you feel after you ruminated/worried?
What did you try to stop ruminating /worrying?
What did you do after you had been ruminating/worrying?
2 hours
Anxious, guilty, sad.
Played on my phone.
Eventually fell asleep.


I tended to ruminate more when I was alone and when I was doing things on autopilot, like having a shower or driving.
Day/Time /Location
How did you feel before you started to ruminate/worry?
What happened just before you started to ruminate/worry?
What were you ruminating/ worrying about?
Monday, 3pm, at work.
Relaxed, focused
Had a conversation with my boss. He gave me negative feedback in front of my colleagues
Other people will think I'm incompetent. I should have picked up on that mistake. I wish he hadn't done that.
How long did you ruminate/ worry for?
How did you feel after you ruminated/worried?
What did you try to stop ruminating /worrying?
What did you do after you had been ruminating/worrying?
1 hour
Down, angry, embarrassed.
Nothing, just kept thinking about it. Not effective.
Went home and watched some TV.


Filling out the form was helpful to notice when we were ruminating or worrying and to learn what started it and what stopped it.


We also started to recognise that when we worried or ruminated, it actually made us feel worse and brought on more negative thoughts.


I also made an effort to notice what usually stopped me from ruminating or worrying.
I noticed that I tended to stop worrying when I was around other people.
Over the next week or two, fill out your form whenever you notice yourself ruminating or worrying.
This will help you to know when you're more likely to ruminate or worry and what usually triggers this. You can then apply the skills that we'll be teaching you in the program.
You'll find some tips about the key things to look out for when monitoring your rumination and worry on the worksheet in the Extra Resources.
Before we finish up for today, we're going to show you a strategy you can use to manage your unhelpful repetitive thoughts.
This involves distracting yourself from your thoughts by taking part in absorbing or distracting activities.


SELF-MONITORING
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SPECIFIC THINKING
RUMINATION AND WORRY AT NIGHT


Activity Planning.
Doing something active, distracting and absorbing is a very simple but effective way of taking your focus off your thoughts when they are not helpful.


When you find yourself getting caught up thinking repeatedly about future scenarios or dwelling on negative things about yourself or your life, get involved in fun or rewarding activities that take your attention away from your thoughts and onto external things.

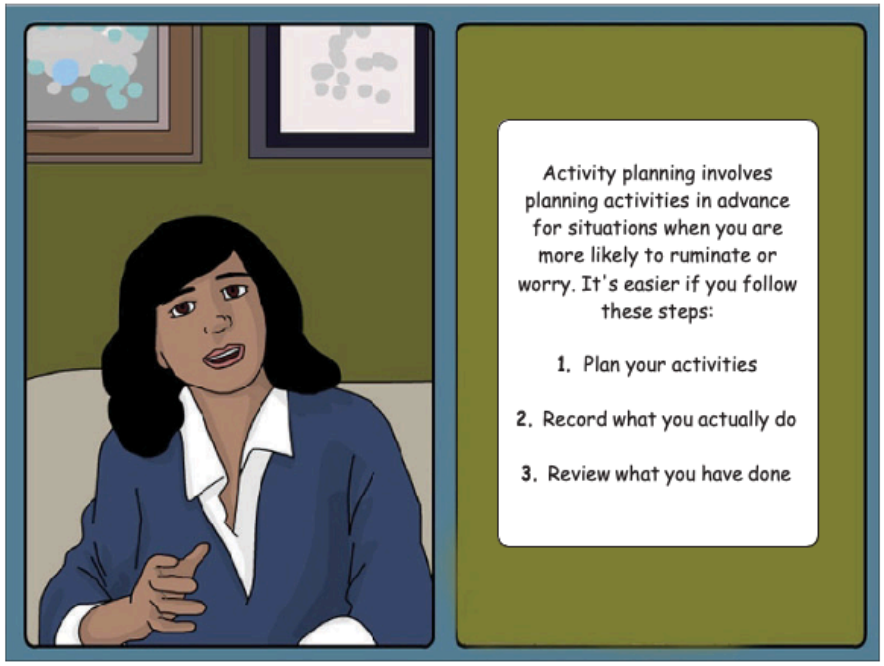

Absorbing activities can include those that involve learning or applying your knowledge, participating in physical activities like dance, sport or other challenging physical activities or doing something creative or musical.


For example, you could exercise, you could meet up with friends, watch TV, or listen to distracting music or a podcast. Anything that you find distracting and absorbing enough that you don't focus on your thoughts!

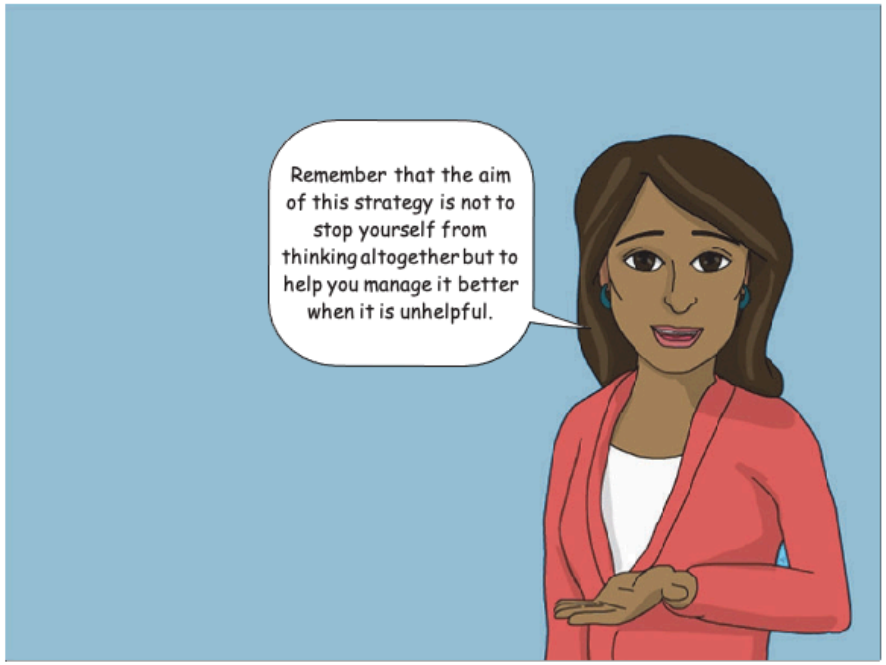

Take a look back at your Self-Monitoring Sheet now and see what sort of things you were doing when you were not ruminating or worrying.
This can give you a good idea of what sorts of activities may work for you.


You can also plan ahead to engage in absorbing and distracting activities for times when you are most likely to ruminate or worry based on your monitoring.
Scheduling in activities for these "high-risk" times can help prevent rumination and worry from occurring and give you a break from your repetitive negative thoughts.
*Activity Planner is in the Extra Resources.

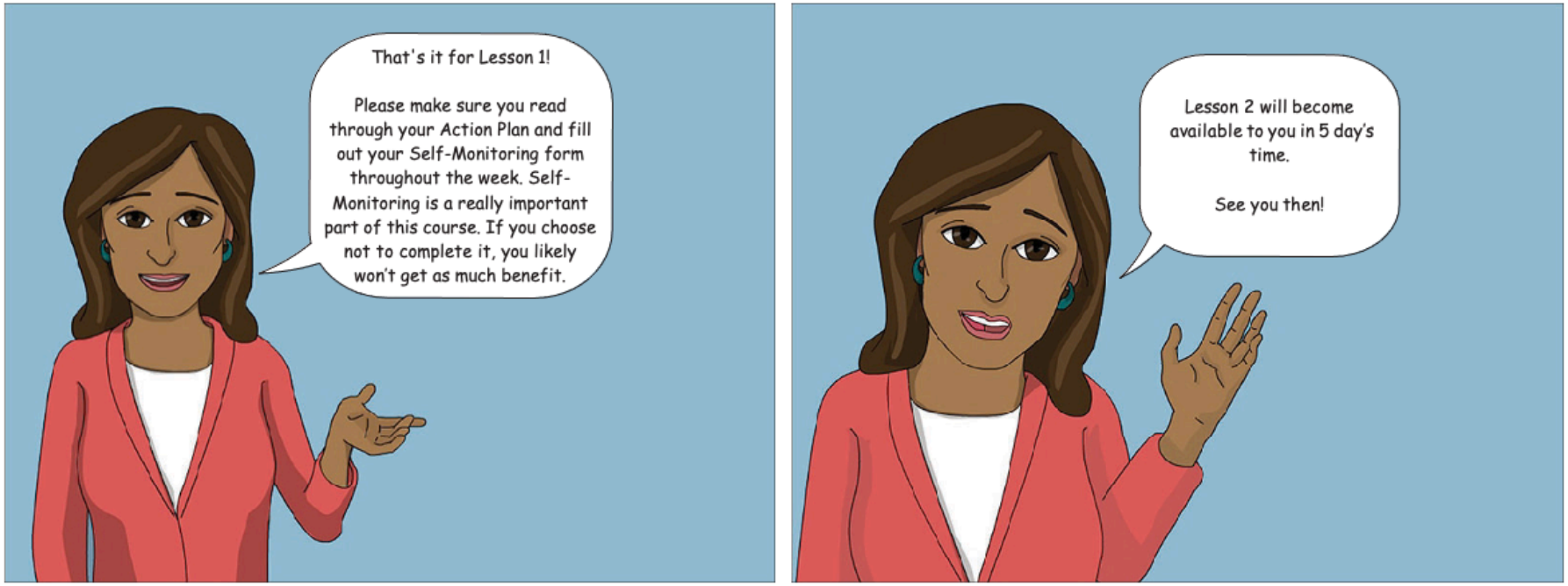

For example, if you know that you are more likely to ruminate when you are stressed or by yourself, you can plan to be doing something distracting at these times instead.


Activity planning involves planning activities in advance for situations when you are more likely to ruminate or worry. It's easier if you follow these steps:
1. Plan your activities
2. Record what you actually do
3. Review what you have done


You've just seen how you can schedule in activities for your high-risk times to prevent you from starting to worry/ ruminate or to stop yourself from worrying/ruminating if it's not being helpful.


Remember that the aim of this strategy is not to stop yourself from thinking altogether but to help you manage it better when it is unhelpful.


Make sure you check out the Activity Planner in the Extra Resources.
You'll also find a list of some examples of absorbing and distracting activities to get you started.


That's it for Lesson 1!
Please make sure you read through your Action Plan and fill out your Self-Monitoring form throughout the week. Self-Monitoring is a really important part of this course. If you choose not to complete it, you likely won't get as much benefit.
Lesson 2 will become available to you in 5 day's time.
See you then!

Appendix B: Example of Lesson Summary and Action Plan (Lesson 1)

Managing Rumination and Worry
Lesson 1 Summary

- Repetitive negative thinking involves dwelling on negative feelings, events and situations. There are two main types of repetitive negative thinking – rumination and worry.
  - **Rumination** generally involves thinking over and over about past negative experiences that have happened to you, over-analysing events and conversations as well as dwelling on your past mistakes and regrets. You may also find yourself thinking deeply about your current mood, why you might feel like this and what it means about you.
  - **Worry** generally involves thinking over and over about negative things that might happen in the future and how you would cope if these negative things did occur.
- It's **common** and **normal** for people to ruminate and/or worry but it can sometimes end up being unhelpful. Thankfully, there are some very simple strategies that you can use to better manage your ruminating and/or worrying.
- You can think of ruminating and worrying as a **mental habit** that is more likely to occur at certain times and places. Learning to become more aware of when you are ruminating/worrying and what tends to trigger this type of thinking for you is the first step in better managing your rumination and worry.
- A very simple way to stop yourself from ruminating or worrying is to do a **distracting and absorbing activity**. You can also plan these activities for your "high-risk" times (the times when you are more likely to think in unhelpful ways) to prevent yourself from starting to worry or ruminate.

Lesson 1: My Action Plan

- ☐ Re-read Lesson 1 – the more you go over it, the more you will be able to remember!
- ☐ Fill out your Self-Monitoring form (found in the Extra Resources) whenever you find yourself ruminating and/or worrying. You can also record this information on the Notes section of your phone and then transfer it into the worksheet later if you don't always have the worksheet on you.
- ☐ Use the Activity Planner in the Extra Resources to plan distracting activities for the times when you are most likely to ruminate and/or worry.

Appendix C: Example of Extra Resource (Lesson 2)

Structured Problem Solving

Active problem solving is different to worrying or ruminating. Worrying and ruminating are typically passive, unhelpful processes where we flip from one thought to the next without fully processing them. They just go round and round in our heads, without coming up with a solution or a plan for action.

In contrast, active problem solving is when we spend some time thinking about what we can do to solve, or partially solve a specific problem that is troubling us.

It's easy to get overwhelmed and caught up in a problem, and not know how to move forward. Often the hardest thing is getting started. Structured Problem Solving can help you focus on **what you can do to make things better, rather than worrying or ruminating about the problem.** It's a useful way of defining problems, identifying potential solutions and means to achieve them, and a way of considering how to carry out a plan of action.

Structured Problem Solving is a way to get started on dealing with a concern in a proactive and effective way. It involves 6 key steps:

STRUCTURED PROBLEM SOLVING

1. **Identify the problem**
2. **Generate possible solutions**
3. **Evaluate the solutions**
4. **Choose a solution**
5. **Make a plan to implement the solution**
6. **Review your progress**

Step 1: Identify the problem

Identify **one** specific problem that is causing you difficulty, which you are finding hard to resolve or is causing you stress or worry.

- Get a clear definition of the problem and make the problem as specific as possible. The more specific, the better.
- Only consider one problem at a time. If other problems arise in the course of the problem solving session, set them aside for a problem solving session in the future.
- Avoid attempting to solve the problem at this stage.

Step 2: Generate solutions through brainstorming

Brainstorm as many possible solutions as you can.

- Rather than trying to think of the best or ideal solution, **list any ideas that come to mind,** including those which may not be that useful or may even be absurd.
- Use your imagination! Even though a solution may seem ridiculous at first, the idea may help to generate better solutions than those that are more immediately obvious.
- At this stage of problem solving, do not evaluate the solutions, simply list them.

Step 3: Evaluate the solutions

Briefly **consider the advantages and disadvantages of each solution**.

- *Quickly* run through the list of solutions, noting the advantages and disadvantages of each.
- No solution will be ideal since every good idea will have some faults. The aim is simply to consider the advantages and disadvantages of each option.

Step 4: Choose the optimal solution

Pick a solution or a combination of solutions which will solve the problem (or begin to solve the problem).

- It is often helpful to choose a solution that can be readily applied and which is **not too difficult to implement**, even though this solution may not be the ideal solution.
  - That way you can get started straight away.
  - This approach is preferable to choosing a solution which is doomed to failure because you have been overly ambitious.

Step 5: Planning

A detailed plan of action will increase the likelihood that the problem will be solved. Even if your solution is excellent, it will not be of any use if it is not put into practice.

- Plan out step-by-step how you will **carry out your solution**, and when you will do it.
- To help make a plan, consider the following questions:
  - Do you have all the necessary resources (e.g., time, skills, information, equipment) or do you need to arrange them?
  - Do you have the agreement or cooperation of other people who might be involved in the plan?
  - Do you know exactly what needs to be done, and when you will do it?

Remember, although the problem may not be solved immediately, the solution might have made a difference, and what is learned from this attempt might be useful the second time around.

Step 6: Review your progress

This stage needs to be planned in advance. It is an opportunity to assess progress by determining **what has been achieved and what still needs to be done**. Often, problems are not completely solved after the first round of Structured Problem Solving. Use this step to reflect on what you have learned, and to make plans for your next solution. If there is more you need to do or achieve, start the Structured Problem Solving process again.

Remember to use the Structured Problem Solving Worksheet (below) to help you apply the technique. Set aside some time to work on one problem at a time. It may also be useful to enlist the help of a friend or family member with this – sometimes another person can think of a solution you may not have considered.

Structured Problem Solving Form – Liz's Example

Before you fill in your own worksheet, let's revise Liz's problem solving from today's Lesson.

<table>
<tr><th></th><th colspan="2">Liz's Responses</th></tr>
<tr><td>Step 1: What is the problem? Think about this carefully and write down exactly what the problem is – the more narrowly you can define it, the better.</td><td colspan="2">I feel hurt after a conversation with my friend and I don't know why she said what she did. The goal is to understand why she said what she did.</td></tr>
<tr><td>Step 2: List all possible solutions. Put down all ideas, even bad ones. Remember not to evaluate at this stage.</td><td colspan="2">Pretend the conversation never happened
Stop being friends with her
Continue to ruminate about what happened
Talk to her about what happened and how I felt</td></tr>
<tr><td rowspan="5">Step 3: Evaluate each possible solution. Quickly go down the list of all possible solutions and consider the advantages and disadvantages of each one.</td><td>Pros</td><td>Cons</td></tr>
<tr><td>1. Avoids conflict and having an awkward conversation</td><td>I still wouldn't have any answers; I'd still feel hurt and this could impact our friendship.</td></tr>
<tr><td>2. I wouldn't have to confront her or pretend like everything is OK.</td><td>We've been friends for so long; I'd miss having her as a friend.</td></tr>
<tr><td>3. I might be able to come up with some reasons for why she said what she did.</td><td>I wouldn't be able to confirm any of the reasons I come up with so I'd still feel down.</td></tr>
<tr><td>4. I would be able to hear directly from her, rather than making assumptions; we can clear the air and move on.</td><td>It will be uncomfortable; it requires a difficult conversation.</td></tr>
<tr><td>Step 4: Choose the best or most practical solution. Choose the solution that can be carried out to most easily solve (or begin to solve) the problem.</td><td colspan="2">I will talk to her about what she said and how I felt.</td></tr>
</table>

Step 5: **Plan how to carry out the best solution.** Plan out step-by step **how** you will carry out your solution, and **when** you will do it.	1. *Write down what I'm struggling with and what I would like the outcome of the conversation to be so that I don't forget anything when we meet* 2. *Practice what I'm going to say in front of the mirror and with my husband so I'm more comfortable saying what I want to.* 3. *Contact my friend and ask her if we can meet for coffee.* 4. *Meet her and explain how her comments hurt my feelings.* 5. *Ask her to explain what she meant when she said those things.*
Set aside a time to do step 6 (review of progress):	*This weekend.*
Step 6: **Review progress.** Focus on the things you have achieved first, and be pleased with any progress you have made. Next, consider what still needs to be done. You may wish to complete worksheet again to help you keep moving forward. What has been achieved? What still needs to be done?	*It was difficult to tell my friend that she'd hurt my feelings. She explained that she hadn't meant what she'd said to be hurtful and apologised.* *It felt a lot better to know that she didn't actually feel that way and to clear the air.*

Structured Problem Solving Form – Your copy

Fill in each step of the worksheet to begin to address one of your problems.

	Your Responses	
Step 1: **What is the problem?** Think about this carefully and write down exactly what the problem is – the more narrowly you can define it, the better.		
Step 2: **List all possible solutions.** Put down all ideas, even bad ones. Remember not to evaluate at this stage.		
Step 3: **Evaluate each possible solution.** *Quickly* go down the list of all possible solutions and consider the advantages and disadvantages of each one.	**Pros**	**Cons**
Step 4: **Choose the best or most practical solution.** Choose the solution that can be carried out to most easily solve (or begin to solve) the problem.		

6

Step 5: **Plan how to carry out the best solution.** Plan out step-by step **how** you will carry out your solution, and **when** you will do it.	
Set aside at time to do step 6 (review of progress):	
Step 6: **Review progress.** Focus on the things you have achieved first, and be pleased with any progress you have made. Next, consider what still needs to be done. You may wish to complete worksheet again to help you keep moving forward. What has been achieved? What still needs to be done?	

A final note on problem solving…

When you have come up with a solution, break it down into small, manageable steps and just get started! Simply starting to implement your solution, even if it's not perfect, will give you a better sense of control over your situation.

It is also likely to help you to feel that your current difficulties are more tangible. Having a good sense of your problem and goal makes it much easier to manage than simply being concerned with vague worries "floating" in your head.