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TRANSDIAGNOSTIC INTERNET TREATMENT FOR ANXIETY AND DEPRESSION

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Abstract: Anxiety and depression are common, chronic, disabling and frequently comorbid, but many people experience barriers accessing treatment. Internet-delivered psychological treatments (iPT) have considerable potential to increase access, while transdiagnostic (TD) interventions, which aim to simultaneously treat multiple disorders, represent an emerging approach that may facilitate the treatment of comorbidity. The present paper describes a conceptual and pragmatic rationale for combining iPT and TD approaches. It also describes the authors' experiences in developing and evaluating TD iPT protocols for anxiety and depression. The results of 4 randomised controlled trials and one open trial ($N = 572$) are reviewed. The results of these trials are encouraging and indicate TD iPT can significantly reduce symptoms of both principal and comorbid disorders. However, independent replication of the existing findings is required and many outstanding questions remain. We watch with interest how further conceptual and technological developments influence the content and delivery of these interventions.

Keywords: Internet-delivered psychological therapy (iPT); randomised controlled trial (RCT); anxiety; depression; transdiagnostic; treatment; internet.

Tratamiento transdiagnóstico por internet de la ansiedad y la depresión

Resumen: La ansiedad y la depresión son fenómenos comunes, crónicos, incapacitantes y frecuentemente comórbidos, pero muchas personas tienen dificultades para acceder a su tratamiento. Los tratamientos psicológicos administrados por internet poseen un gran potencial para incrementar el acceso de los pacientes, mientras que las intervenciones transdiagnósticas, que se dirigen a tratar simultáneamente múltiples trastornos, representan un enfoque emergente que podría facilitar el tratamiento de dicha comorbilidad. El presente trabajo describe los fundamentos conceptuales y pragmáticos para la aplicación del transdiagnóstico a través de internet. También se describe la experiencia de los autores en el desarrollo y evaluación de protocolos transdiagnósticos administrados por internet para el tratamiento de la ansiedad y la depresión. Se revisan los resultados procedentes de 4 ensayos controlados aleatorizados y un ensayo abierto ($N = 572$). Los resultados de estos ensayos son alentadores e indican que el transdiagnóstico administrado por internet puede reducir significativamente tanto los síntomas de los trastornos principales como de los trastornos comórbidos. Sin embargo, aparte de que existen cuestiones sin resolver, se requiere una replicación independiente de los resultados existentes. Observamos con interés la forma en que los futuros desarrollos teóricos y tecnológicos influyan sobre el contenido y administración de estas intervenciones.

Palabras clave: Terapia psicológica por internet; ensayo controlado aleatorizado; ansiedad; depresión; transdiagnóstico; tratamiento; internet.

INTRODUCTION

The World Mental Health Surveys indicate that globally, each year, more than 500 million

people meet diagnostic criteria for an anxiety disorder or major depression (Kessler et al.,

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2009). These conditions are typically chronic with an onset in early life (Kessler & Greenberg, 2002; Rapee & Bryant, 2009), disabling (Alonso & Lépine, 2007; Australian Institute of Health and Welfare, 2008), and are associated with considerable personal and economic costs to the individual, community, and society (Andlin-Sobocki, Jönsson, Wittchen, & Olesen, 2005; Andlin-Sobocki & Wittchen, 2005). Anxiety disorders and depression frequently co-occur, that is, they are highly comorbid, with estimates indicating that up to 45% of people with one disorder are likely to meet diagnostic criteria for another disorder (Kessler, Chiu, Demler, & Walters, 2005).

Anxiety disorders and depression can be treated effectively with disorder-specific psychological treatments (Nathan & Gorman, 2007). However, there is growing interest in the development and evaluation of treatment protocols that target the core symptoms and underlying vulnerabilities of several disorders simultaneously; that is, unified or transdiagnostic (TD) treatments (Barlow, Allen, & Choate, 2004; Craske et al., 2009; Wilamowska et al., 2010). The growing interest in TD treatments reflects both pragmatic clinical considerations and evidence indicating that similar cognitive and behavioural factors are shared across psychological disorders (Mansell, Harvey, Watkins, & Shafran, 2009), and respond to similar treatments. For example, there is considerable clinical evidence to indicate that conditions such as anxiety disorders (Butler, Fennell, & Hackmann, 2010), depression (Beck, 2011), insomnia (Perlis et al., 2010), irritable bowel syndrome (Hutton, 2005), and eating disorders (Fairburn et al., 2009) benefit from similar psychological treatment components.

It should be noted that while TD treatments may be used across a broad range of psychological disorders, this paper is concerned with TD for anxiety disorders and depression. There is now considerable evidence to indicate that, in addition to responding to similar psychological and pharmacological treatment components, anxiety disorders and depression share characteristics and risk factors. Specifically, a large body of evidence has identified that anxiety

disorders and depression are associated with similar genetic factors (Hettema, Neale, Myers, Prescott, & Kendler, 2006; Hettema, Prescott, Myers, Neale, & Kendler, 2005; Kendler, Prescott, Myers, & Neale, 2003), familial factors (Coelho, Cooper, & Murray, 2007; Goldberg, Krueger, Andrews, & Hobbs, 2009; Hettema, Neale, & Kendler, 2001) and temperamental characteristics including negative affect or neuroticism (Griffith et al., 2009; Krueger, 1999; Slade & Watson, 2006). In addition, conceptual reviews of the field have identified numerous possible mechanisms spanning diagnoses of anxiety, depression, and similar disorders, including negative affectivity, neuroticism, anxiety sensitivity, behaviour avoidance, thought suppression, self-focused attention, ruminative behaviours and changes in physiological reactivity (hyperactivity, hypoactivity) (Aldao & Nolen-Hoeksema, 2010; Mansell et al., 2009). These mechanisms represent important possible targets for TD treatments.

TD treatments offer considerable potential advantages to both patients and clinicians. Such treatments may reduce costs and inefficiencies associated with training mental health professionals to deliver numerous disorder-specific protocols, while also reducing the need for patients with comorbid symptoms to complete several different courses of treatment. Additional benefits include simplifying decisions about sequencing of treatments in cases of comorbid symptoms, easier dissemination, increased fidelity, and reduced waiting lists. Moreover, concurrently teaching patients to manage co-morbid disorders may reduce risks of relapse and may even potentiate treatment outcomes by directly addressing comorbid issues. For these reasons, TD treatments are an important target for clinical research.

Evidence for the potential of TD treatments has grown rapidly and includes data from a broad range of clinical trials. Amongst others, important contributions to the field have been made by the Boston group (Allen, Ehrenreich, & Barlow, 2005; Barlow et al., 2004; Farchione et al., in press; Wilamowska et al., 2010), who have published several open trials and an RCT of TD interventions, or *unified* treatment,

which are notable for their careful attention to conceptual and diagnostic issues as well as their descriptions of the clinical challenges associated with TD treatment. Reports by Erickson and colleagues (Erickson, Janeck, & Tallman, 2007; Erickson, Janeck, & Tallman, 2009) demonstrated how TD treatment can be implemented and administered in a clinical service in Canada, and provided valuable insights into their experiences and clinical outcomes. Norton, in the United States, has contributed both conceptually and pragmatically to the field via open trials, randomised controlled trials, and conceptual reviews (Norton, 2006, 2008, 2012).

A large body of evidence from the UK has demonstrated the effectiveness of two computer-delivered interventions at treating depression and anxiety disorders. These interventions, *Beating the Blues* (Proudfoot et al., 2003) and *Fearfighter* (Kenwright, Liness, & Marks, 2001), are in everyday use in the United Kingdom's National Health Service (NHS), and have been found to be clinically effective at reducing general symptoms of anxiety or depression (Kenwright, et al., 2001; Kenwright & Marks, 2004; Learmonth & Rai, 2008; Marks, Kenwright, McDonough, Whittaker, & Mataix-Cols, 2004; Proudfoot et al., 2003; Proudfoot et al., 2004).

Not all studies have supported the use of a TD approach. For example, Craske et al (2007) compared cognitive behaviour therapy (CBT) for panic disorder with CBT for panic disorder plus attention to comorbid symptoms, and reported an advantage for the disorder-specific approach. Such studies indicate that there are significant and outstanding questions about the relative benefits of TD and disorder-specific interventions, and that these are important targets for research. However, meta-analyses of face-to-face delivered TD treatments for the anxiety disorders (Norton & Philipp, 2008) and for anxiety combined with depression (McEvoy, Nathan, & Norton, 2009) indicate that, overall, these interventions result in outcomes of a similar magnitude to those obtained from disorder-specific treatments. Thus, emerging data indicates the TD approach has considerable potential.

Unmet need

Despite the existence of well-established disorder-specific interventions and the encouraging evidence for TD interventions, rates of treatment seeking amongst people with anxiety disorders and depression are typically low (Alonso et al., 2007; Christiana et al., 2000; Issakidis, Sanderson, Corry, Andrews, & Lapsley, 2004). The barriers to treatment seeking are well known and include the direct and indirect costs of treatment, low mental health literacy, and stigma (Titov, 2011). In addition, population dispersion and culture can result in inequity of service provision, that is, people may have difficulty accessing services due to cultural and language barriers and because of insufficient numbers of health professionals in their locale. Moreover, there is growing acknowledgement of the inability of traditional models of service delivery, which involve intensive individual and group-based interventions delivered face-to-face, to meet demand if all of those who met diagnostic criteria actually sought treatment. Consistent with this, there are increasing calls for integrated models of service provision that include harnessing the potential of technologies, such as the internet, in order to try to reduce the burden of mental disorders (Kazdin & Blase, 2011).

Internet-delivered psychological interventions

Computerised and internet-delivered psychological treatments (iPT) represent an emerging model of service delivery with the potential to improve access to evidence-based treatments for anxiety and depressive disorders. The term iPT will be used here to refer to internet or computer-delivered interventions which systematically present participants with structured materials that comprise the same information and skills typically taught in face-to-face psychotherapy (Titov, 2011). It should be noted that a broad range of terms have been used to describe activities conducted via the internet or computers for mental health purposes and these reflect the technological media employed. These terms include computerised cognitive behav-

avioural therapy (e.g., Cavanagh et al., 2006), or more recently, internet-delivered cognitive behavioural therapy (iCBT) (e.g., Hedman et al., 2011; Titov, Andrews, Davies, et al., 2010). While discussion of the different models of intervention is beyond the scope of this paper, interested readers are encouraged to consult Barak, Klein, and Proudfoot (2009), which provides an excellent review and description of the field.

It is useful to note that iPT are a recent form of a broader body of work concerned with strategies for improving access to evidence-based psychological interventions. This broader body of work includes evaluations of interventions for anxiety and depression delivered by bibliotherapy, or telephone and, more recently, via stand-alone computer software packages or the internet (Andersson et al., 2006; Craske et al., 2011; Marks & Cavanagh, 2009; Marks et al., 2003; Proudfoot et al., 2004; Roy-Byrne et al., 2010). The majority of published reports of trials of iPT have evaluated interventions based on cognitive behavioural therapy, interpersonal therapy, and problem-solving therapy. More recently, encouraging results have also been reported using structured psychodynamic models (Johansson et al., 2012). To date, no obvious differences have emerged in the clinical outcomes obtained from online treatments that are based on different psychotherapeutic models. This is consistent with comparisons of outcomes of psychotherapeutic treatments delivered in the face-to-face medium (Cuijpers, van Straten, Andersson, & van Oppen, 2008).

iPT can be administered with varying levels of guidance ranging from regular contact with a clinician to entirely self-guided and fully automated interventions. Several fully automated disorder-specific interventions are available and these are highly popular. For example, Moodgym (www.moodgym.anu.edu.au) and the Panic Centre (www.paniccenter.net), which provide free automated online iPT for symptoms of depression and panic, respectively; each have had more than 400,000 visitors or registered members (Christensen, 2010; Farvolden, Denisoff, Selby, Bagby, & Rudy, 2005). While such interventions are popular and those who complete the interventions appear to obtain good

clinical outcomes, entirely self-guided interventions are associated with lower effect sizes and higher dropout rates than clinician-guided iPT.

Until recently, the majority of reports of iPT have evaluated clinician-guided interventions targeting specific psychological disorders, that is, disorder-specific interventions. Participants in these trials have usually met diagnostic criteria as determined by diagnostic interviews or scored above clinical cut-offs. A substantial number of trials have reported the effectiveness of disorder-specific iPT at treating several common mental disorders. For example, more than 10 randomised controlled trials (RCTs) have reported the clinical benefits of iPT for clinical and subclinical depression (Andersson et al., 2005; Perini, Titov, & Andrews, 2009; Ruwaard et al., 2009; Titov, Andrews, Davies, et al., 2010), social phobia (Andersson et al., 2006; Berger, Hohl, & Caspar, 2009; Botella et al., 2010; Carlbring et al., 2007; Titov, Andrews, & Schwencke, 2008; Titov, Andrews, Schwencke, et al., 2008), and panic disorder (Carlbring et al., 2005; Klein et al., 2009; Wims, Titov, Andrews, & Choi, 2010). Encouraging evidence has also been found from a smaller but rapidly growing number of RCTs or open trials evaluating iPT for generalised anxiety disorder (Paxling et al., 2011; Robinson et al., 2010; Titov, Andrews, Robinson, et al., 2009), obsessive compulsive disorder (Andersson et al., 2011; Andersson et al., 2012; Wootton et al., 2011), and post-traumatic stress disorder (Klein et al., 2010; Spence et al., 2011).

Reflecting these outcomes, the results of meta-analyses of iPT indicate that such interventions consistently produce superior effect sizes over control conditions (Andersson & Cuijpers, 2009; Andrews, Cuijpers, Craske, McEvoy, & Titov, 2010; Cuijpers et al., 2009) and that the magnitude and long-term stability of clinical outcomes are comparable to those obtained from face-to-face interventions. Furthermore, and indicating that the medium is not as important as may have been assumed, RCTs directly comparing internet-delivered interventions with face-to-face-delivered interventions have failed to find significant differences between the two modes of intervention (Andrews, Davies, & Titov, 2011; Bergström et al., 2010;

Carlbring et al., 2005; Kiropoulos et al., 2008). Emerging data also indicates that the key demographic characteristics of participants seeking internet treatment are similar to those seeking face-to-face treatment and to those identified in a national epidemiological survey (Titov, Andrews, Kemp, & Robinson, 2010). This is consistent with recent reports of the effectiveness of online treatments with general outpatient populations, indicating that excellent clinical outcomes can be obtained from using iPT in standard clinical practice (Ruwaard, Lange, Schrieken, Dolan, & Emmelkamp, 2012).

In summary, TD and internet-delivered interventions each have the potential for improving access to mental health services. In the remainder of this paper, we describe the conceptual and pragmatic challenges we experienced when we integrated these approaches. We also describe the clinical outcomes obtained, lessons learned, and implications of this work.

DEVELOPMENT OF TRANSDIAGNOSTIC IPT: CONCEPTUAL AND PRAGMATIC CHALLENGES

The development of our TD iPT was guided by the available literature circa 2008, our experiences developing and delivering disorder-specific iPT, and the pragmatic objectives of delivering brief and effective clinical protocols that could be easily transferred to clinical settings. The absence of consensus on key TD mechanisms and intervention components meant that our decisions were influenced by pragmatism and the expectations that all interventions would be further modified and improved based on results of trials and feedback from participants.

Before discussing the conceptual and pragmatic challenges in the construction of our TD iPT, it will be useful to summarise the results of our trials of disorder-specific iPT. These trials preceded our development of TD iPT, and the results influenced our subsequent models and expectations of TD iPT. It should be noted that the initial targets of our disorder-specific protocols were generalised anxiety disorder (GAD), depression, social phobia and panic disorder

with or without agoraphobia. Thus, our subsequent TD iPT targeted these four disorders, rather than the full range of anxiety and affective disorders.

Results of our trials of disorder-specific iPT

Prior to developing TD iPT, we developed and evaluated disorder-specific iPT interventions to treat social phobia (Titov, Andrews, Choi, Schwencke, & Johnston, 2009; Titov, Andrews, Choi, Schwencke, & Mahoney, 2008; Titov, Andrews, & Schwencke, 2008; Titov, Andrews, Schwencke, et al., 2008; Titov, Andrews, Schwencke, et al., 2010; Titov, Andrews, Schwencke, et al., 2009), PD (Wims et al., 2010), GAD (Robinson et al., 2010; Titov, Andrews, Robinson, et al., 2009), and depression (Perini et al., 2009; Titov, Andrews, Davies, et al., 2010). These interventions were evaluated in 12 RCTs and 3 open trials with participants who met a principal DSM-IV diagnosis for the relevant disorder. We did not exclude participants with comorbid conditions and, consistent with others' experiences, we found that comorbidity was the rule rather than the exception, particularly amongst the anxiety disorders and depression.

Our model of iPT, which we subsequently modified for use in a TD iPT intervention, comprised therapeutic components of CBT and interpersonal therapy. A core assumption of this model is that some symptoms of anxiety and depression are normal, but may become severe, habitual and disabling when people lack knowledge or skills in techniques of emotional regulation. This model identifies a set of core psychological skills (see below) that serve at least two functions. First, they promote adaptive and helpful cognitions and behaviours. Second, they reduce the frequency of those cognitions and behaviours that maintain distress. A key assumption of this model of iPT is that strategies that facilitate adherence, engagement, and learning and practice of new skills will reduce symptoms of anxiety and depression and will facilitate improvements in emotional wellbeing.

Our disorder-specific interventions comprised five to eight lessons, administered over

a period of eight to ten weeks. These online lessons contained information about the core symptoms and about evidence-based strategies for managing those symptoms. In trials that included clinician-support or guidance, participants received brief contact with clinicians (10 to 20 minutes each week) via telephone or email. This level of support is consistent with a low-intensity model of psychological treatment (Bennett-Levy, Richards, & Farrand, 2010; Titov, 2010). Low-intensity treatments involve considerably less clinician support (i.e., < 3 hours) than usually provided in face-to-face interventions (i.e., > 5 hours). We opted for a low-intensity model of treatment over higher intensity models for several reasons including that we expected low-intensity interventions would be more easily adopted and implemented by health services. We expected that, when implemented, such interventions could be offered to those on waiting lists as well as to those who might not be severe enough to warrant treatment by a public mental health service.

The results of these trials were surprising and challenged several of our expectations. First, we expected that iPT would appeal primarily to younger adults; however, the mean age of participants was 43 years ($SD = 13$). Second, we expected that most participants would be naive to treatment; however, approximately 70% reported they had received previous treatment. Third, we were surprised by the number of applicants. Although our operating budget did not allow advertising, we were often inundated with large numbers of applicants. Fourth, we were surprised by our results, which consistently indicated that approximately 80% of participants completed the treatment protocols with a magnitude of clinical improvement at least as large as those we typically observed at our specialist tertiary face-to-face outpatient treatment facility for anxiety disorders (McEvoy, 2007). Specifically, using the same outcome measures across services, we consistently obtained mean effect sizes on primary outcome measures of Cohen's $d \geq 1.0$, which were consistent with results from other research teams evaluating disorder-specific iPT interventions (Andersson et al., 2006; Berger et al., 2011; Carlbring et al., 2007; Carlbring et al., 2005; Furmark et al.,

2009; Kiropoulos et al., 2008; Paxling et al., 2011; Richards, Klein, & Austin, 2006). Fifth, consistent with other reports, we noticed that effective treatment of the principal diagnosis often reduced symptoms in comorbid conditions (Johnston, Titov, Andrews, Dear, & Spence, accepted; Titov, Gibson, Andrews, & McEvoy, 2009). Finally, these outcomes were replicated when administered by either clinicians or coaches (supervised non-clinicians) (Johnston et al., 2011; Robinson et al., 2010; Titov, Andrews, Davies et al., 2010). Moreover, treatment gains were mostly sustained or even improved at follow-up, indicating the materials were robust and treatment effects were reliable.

Conceptual and pragmatic challenges

Although we had experience in developing disorder-specific iPT interventions, we identified several conceptual and pragmatic challenges in our construction of our TD iPT interventions. These included questions about the aims of treatment, the scope or size of the interventions, the targets for treatment, the treatment components and their sequencing, terminology and appropriate reading levels, and issues around measurement and reporting of outcomes. These issues are briefly discussed.

Aim of treatment

Given the large numbers of people with untreated anxiety and depression and the limited number of mental health professionals, we opted to continue with a model of administering online CBT and interpersonal therapy that was consistent with a low-intensity model of treatment. Drawing on our earlier trials of disorder-specific interventions, we hoped that our TD iPT would produce clinical outcomes at least comparable to those observed in our disorder-specific interventions. Our core criteria were that our interventions would be rated as highly acceptable by participants, that they would be completed by at least 75% of those who started them, and that large effect sizes on outcome measures (Cohen's $d \geq .8$) would be obtained.

Intervention size and scope

Our review of the literature on disorder-specific iPT indicated that adherence to online interventions often reduced considerably after six or seven online lessons. Our own experience was that, in order to appeal to participants with a broad range of education, symptom and motivation levels, each lesson should typically require no more than 20 minutes of reading; although considerably more time would be required each week for completion of homework assignments and other therapeutic activities.

Thus, our target was to develop iPT interventions with a maximum of eight core online lessons, each requiring no more than 20 minutes of reading. Adhering to these parameters also exposed an important tension between wanting to provide participants with a large range of therapeutic skills, but at the same time not overwhelming them with too much information. These issues had significant implications for our selection and sequencing of the core targets for treatment.

Treatment targets

A broad range of possible TD mechanism of pathology had been identified in reviews of the TD field (Barlow et al., 2004; Mansell, Harvey, Watkins, & Shafan, 2008; Mansell et al., 2009). However, with few exceptions, there appeared to be little published about the specific techniques and skills that were most effective in TD interventions. Reflecting the emerging nature of this field, the challenge of identifying TD targets for treatment was compounded by the absence of consensus about the key mechanisms underlying disorders of anxiety and depression and whether these were amenable to the components that comprised most psychological treatments.

We subsequently elected to target the three clusters of symptoms which, between them, appeared to capture the majority of the most frequently reported targets reported in the literature: (1) maladaptive cognitions (i.e., thoughts and beliefs); (2) maladaptive behaviours (i.e., avoidance, safety behaviours, and underactivity), and (3) physical symptoms (i.e.,

physiological hyper-arousal or hypo-arousal). Our previous experiences with developing disorder-specific protocols indicated that participants readily understood these three symptom clusters and understood the importance of mastering skills that targeted each symptom cluster.

Components and sequencing of treatment components

Our decisions about which specific treatment components to include in our TD treatment protocols were guided by three processes: reviews of existing TD treatments; the parameters determined by our model of brief and low-intensity treatment; and deconstruction of the content of our existing disorder-specific interventions for depression, GAD, social phobia, and panic disorder. Using these processes we identified eight core components (Table 1):

1. Psycho-education about the prevalence of symptoms, the clusters of symptoms, how symptoms interact with one another, and how they affect emotional wellbeing.
2. Strategies for increasing adaptive cognitions and reducing maladaptive thoughts and beliefs
3. Strategies for managing physical symptoms of anxiety and hyper-arousal.
4. Strategies for managing fatigue and hypo-arousal.
5. Strategies for overcoming underactivity, avoidance and safety behaviours.
6. Strategies for solving problems affecting emotional wellbeing.
7. Strategies for communicating effectively and assertively to manage interpersonal issues affecting emotional wellbeing.
8. Strategies to reduce risk of relapse and to promote further improvements.

All of these components were included in our subsequent trials of TD iPT. In the eight lesson version of our interventions, one of these treatment components was presented in each of the eight lessons. In the briefer interventions that comprised five and six lessons (Dear et al., 2011; Titov, Dear, Johnston et al., submitted)

Table 1. Content of the TD IPT interventions used in Studies 1 - 5, by lesson

Lesson	Study				
	Study 1	Study 2	Study 3	Study 4	Study 5
1	Education about the prevalence, symptoms and treatment of three types of anxiety disorders, including an explanation of the functional relationship between symptoms	Education about the prevalence, symptoms and treatment of anxiety including an explanation of the functional relationship between symptoms	Education about the prevalence, symptoms and treatment of depression and anxiety including an explanation of the functional relationship between symptoms	Education about the prevalence, symptoms and treatment of depression and anxiety including an explanation of the functional relationship between symptoms	Education about the prevalence and symptoms of anxiety and depression, their role in affecting achievement of life goals, and how cognitive, behavioural, and physical symptoms maintain poor emotional health
2	Instructions about controlling physical symptoms including de-arousal strategies and scheduling activities	Basic principles of cognitive therapy, including strategies for monitoring and challenging thoughts, and structured problem solving	Basic principles of cognitive therapy, including strategies for monitoring and challenging thoughts	Basic principles of cognitive therapy, including strategies for monitoring and challenging thoughts	Basic principles of cognitive therapy, including strategies for developing and maintaining realistic cognitions
3	Basic principles of cognitive therapy, including strategies for monitoring and challenging thoughts, and structured problem solving	Instructions about controlling physical symptoms including de-arousal strategies and scheduling activities	Instructions about controlling physical symptoms including de-arousal strategies and scheduling activities	Instructions about controlling physical symptoms including de-arousal strategies and scheduling activities	Instructions about controlling physical symptoms including de-arousal strategies and behavioural activation
4	Education and guidelines about practicing graded exposure	Education and guidelines about practicing graded exposure	Education and guidelines about behavioural activation	Education and guidelines about behavioural activation.	Education about avoidance and safety behaviours and guidelines for practicing graded exposure
5	Education and guidelines about communication and assertiveness skills	Education and guidelines about advanced cognitive skills including belief challenging	Education and guidelines about practicing graded exposure	Information about relapse prevention and constructing relapse prevention plans	Information about relapse prevention and constructing relapse prevention plans
6	Information about relapse prevention and constructing relapse prevention plans	Education and guidelines about assertive communication and healthy interpersonal boundaries	Education and guidelines for acting «as if» and troubleshooting common barriers to treatment	Education and guidelines about challenging dysfunctional beliefs, including positive, negative, and core beliefs	
7		Education and guidelines about assertive communication and healthy interpersonal boundaries	Strategies for overcoming common hurdles to treatment		
8		Information about relapse prevention and constructing relapse prevention plans	Information about relapse prevention and constructing relapse prevention plans		

iPT: Internet-delivered psychological treatments. TD: Transdiagnostic

the strategies for modifying maladaptive beliefs, solving problems, and communicating effectively and assertively were not included in the lessons, but were included as additional *resources* that participants could choose to download, as indicated in Table 2. This change was based on feedback from participants, who

reported that the most helpful content included the psycho-education and strategies for managing maladaptive thoughts, physical symptoms, maladaptive behaviours and lapses. By focusing on these core components in five or six lessons, we hoped to increase adherence and engagement.

Table 2. Additional content available in the TD IPT interventions

<i>Content</i>	<i>Description</i>	<i>Purpose</i>
Homework Summaries or Do It Yourself Guides	Homework summaries, subsequently called Do It Yourself (DIY) Guides, provided for each lesson in pdf format.	Summarise key messages in each lesson. Normalise difficulties during recovery. Provide tasks and forms that can be used to practice and consolidate skills.
Stories	2-3 paragraph case studies, based on experiences of previous participants, provided for each lesson in pdf format.	Describe life experiences of previous participants and how they apply skills described in the intervention. Describe how these people cope and master the challenges of treatment .
Automated email messages	Automated email messages triggered by actions or inactions of participants.	Four types of automated email messages are sent: 1. Completion emails are sent to reinforce progress when participant completes a lesson; 2. Notification emails are sent at the start of each week to inform the participant of new materials and recommended tasks for that week; 3. Reminder emails are sent if the participant has not read lesson by the recommended time; 4. Additional emails are sent at the start and end of the intervention to reinforce participation.
Announcements	Pop-up messages that appear when participants login and which welcome them back to the intervention.	Welcome people back to the intervention. Orient participants to core tasks for that session.
Resources	Series of pdf documents that are made available as the intervention progresses.	Resources address additional symptoms or issues not addressed in the intervention. Resources include materials about: Managing sleep difficulties; communication skills, assertive communication, structured problem solving, managing attention, changing beliefs, managing worry, etc.

Note: IPT: Internet-delivered psychological treatments. pdf: Portable document format. TD: Transdiagnostic.

Our experiences developing and delivering disorder-specific protocols indicated that the sequencing of treatment components had a considerable impact on engagement and adherence. For example, we discovered that expecting participants to engage in challenging and symptom-provoking activities, such as graded exposure or assertive communication

earlier in treatment was counter-productive. Instead, participants were considerably more motivated to attempt difficult tasks following success with easier tasks and once they had developed confidence with other core skills, including challenging unrealistic thoughts and managing physical symptoms of panic and stress.

Language

We chose to avoid diagnostic terminology in the content of the interventions. That is, with the exception of Lesson 1, the terms *major depression*, *GAD*, *social phobia*, or *panic disorder* were not used; rather, the terms *anxiety*, *stress*, *low mood*, *depression*, *worry*, *anxiety about panic*, or *anxiety about social situations* were used throughout the interventions and in communications between the clinician and participants. This decision was influenced by our desire to avoid stigma associated with psychiatric terminology, while also signalling that many of these symptoms are common to different disorders, and that similar psychological skills can be used to manage them. Consistent with this, and because of the expectation that participants would be expected to learn the materials and practice the skills independently, we took considerable steps to create materials that were simple to understand. For this reason, the written text was modified so that it was consistent with the reading level of a 10-year old.

Measures and reporting results

Despite considerable efforts, we were unable to find TD outcome measures that were brief, psychometrically sound, and widely accepted across English speaking countries. We consequently elected to use measures we had used in our trials of disorder-specific IPT, which were selected based on their use in the literature, and their brevity, which facilitated completion by participants. These measures included measures of treatment expectancy and satisfaction (Borkovec & Nau, 1972), a measure of neuroticism (Costa & McCrae, 1992), and several brief disorder-specific and TD outcome measures. We initially used the Depression and Anxiety Stress Scales-21 item (Lovibond & Lovibond, 1995) as a TD measure of symptoms of anxiety and depression and, following the example of the Improving Access to Psychological Therapies (IAPT) program in the UK, we used the Generalized Anxiety Disorder 7-Item (GAD-7) (Spitzer, Kroenke, Williams, & Löwe, 2006) and Patient Health Questionnaire 9-Item

(PHQ-9) (Kroenke, Spitzer, & Williams, 2001) as measures of anxiety symptoms and depression, respectively. We also used several brief disorder-specific measures including the Panic Disorder Severity Scale-Self Report version (PDSS-SR) (Houck, Spiegel, Shear, & Rucci, 2002), Penn State Worry Questionnaire (PSWQ) (Meyer, Miller, Metzger, & Borkovec, 1990), Social Phobia Screening Questionnaire (SPSQ) (Furmark et al., 1999) or Social Interaction Anxiety Scale and Social Phobia Scale - Short Form SIAS-6/SPS-6 (Peters, Sunderland, Andrews, Rapee, & Mattick, 2011), and the MINI Social Phobia Inventory (MINI-SPIN) (Connor, Kobak, Churchill, Katzelnick, & Davidson, 2001).

Challenges related to selecting measures extended to difficulties presenting the results of the TD trials in a form that was sufficiently brief for journal articles, while still presenting adequate amounts of data to allow readers to critically evaluate the results. This was difficult because we were trying to present a broad range of results that included both general and disorder-specific outcomes. This tension was also evident in feedback we obtained from journal reviewers, who had a wide range of preferred outcome measures and preferred analytic approaches.

Software platform

In the early stages of our work, no suitable commercial online software installations existed for administering IPT, which necessitated creating our own. The process of planning, developing, and testing the software required more time and resources than was required to develop the IPT interventions. Our experience, and the experience of our colleagues who provide similar services, is that considerable long-term attention should be given to the stability and security of the infrastructure required to provide IPT. Moreover, given the need to securely collect and store data, the software platforms cannot be expected to function independently; rather, they require continuous monitoring, maintenance, and ongoing development.

OUR TRIALS: DESIGN

To date, we have completed 4 RCTs and one open trial of TD iPT ($N = 572$), with several RCTs in progress ($N = 1,500$). As indicated in Table 3, the primary aim of these preliminary trials was to examine the efficacy of treating GAD, social phobia, panic disorder, and/or depression using a single iPT protocol. Our secondary aims were to determine the acceptability of such interventions to participants, and the effects of different types of therapeutic support and models of implementation on outcomes. The following section describes the general methodology used in these studies, and the main outcomes of the studies in chronological order. All studies were approved by relevant ethics committees, were consistent with CONSORT guidelines (Schultz, Altman, Moher et al., 2010), and were registered as clinical trials on a clinical trials registry (www.anzctr.org.au). Unless otherwise reported, the methods used in these studies were similar, and as described below.

Recruitment

Participants were recruited from our research websites, currently www.ecentreclinic.org, which were developed to conduct online research about treatments for psychological disorders. With the exception of Study 5, participants in all studies met DSM-IV diagnostic criteria for one of the four target disorders. The application process for Studies 1 to 4 involved two stages: (1) automated online screening, and; (2) then a diagnostic telephone interview. In order to examine the efficacy of entirely self-guided TD iPT, applicants for Study 5 completed only the automated online screening stage.

The automated screening was an important part of the recruitment process and helped determine whether participants met the inclusion criteria, which were: Resident of Australia; at least 18 years of age; had access to the Internet; not currently participating in CBT for the problem for which they were seeking treatment; not using illicit drugs or consuming more than three

standard drinks/day; not currently experiencing a psychotic mental illness, suicidal, or presenting with very severe symptoms of depression (defined as a total score > 23 or responding > 2 to Question 9 (suicidal ideation) on the PHQ-9; and, on stable dose of medication. Participants were not excluded for comorbid symptoms of anxiety or depression. Those who met these criteria completed a questionnaire enquiring about demographic details and treatment history. Applicants in Studies 1 to 4 then received a telephone call from one of the research team who administered the Mini International Neuropsychiatric Interview Version 5.0.0 (MINI) (Sheehan et al., 1998) to determine whether they met DSM-IV criteria for a principal diagnosis of GAD, social phobia, panic disorder or depression. Eligible applicants were then randomly allocated to a group in that trial.

Course content

Each iPT intervention comprised several core components including online lessons, lesson summaries, homework assignments for each lesson, regular automatic reminder and notification emails, and additional written resources (see Table 2). These additional resources included guidelines about assertiveness, health anxiety, and answers to frequently asked questions about the application of skills, and stories of how other people with anxiety and depression learn to manage symptoms. In the shortened interventions, the resources included materials on communication and assertiveness skills, modifying maladaptive beliefs, and structured problem solving. An online chat facility was also available that allowed secure email-type messages with a clinician.

Each online lesson was presented as a series of slides that combined text and images, and each lesson contained approximately 60 slides and 50 words per slide. Automated analyses of readability indicated the text was easy to read, and was consistent with the reading age of a 10 year old. Participants were instructed to read lessons in order, according to a recommended timetable, over eight or ten weeks. Participants were unable to read a lesson until they had read

Table 3. The authors' published research trials of TD iPT, to date [N=572]

Study	Design (n) /Aims	Conditions	Lessons and Duration	Clinician contact	Completion rates*	Pre-Post Within-Group effect sizes (Cohen's d)	Summary
Study 1: Titov et al. (2010)	RCT (n = 78). Examine the efficacy and acceptability of the 6 lesson <i>Anxiety Program</i> for people with a principle diagnosis of GAD, PD, and/or SP	Participants randomly allocated to: 1. Treatment Group (Clinician guided) 2. Waitlist Control Group	6 lessons over 8 weeks	51 mins	75%	1. GAD-7 = 0.81, DASS-21 = 0.77 2. GAD-7 = -0.01, DASS-21 = -0.05	Demonstrated preliminary feasibility of treating three anxiety disorders with an iPT intervention
Study 2: Johnston et al. (2012)	RCT (n = 131). Aim to replicate or extend the results of Study 1 and to explore relative benefits of Clinician vs. Coach-guided intervention using an 8 lesson version of the <i>Anxiety Program</i> for people with a principle diagnosis of GAD, PD, and/or SP	Participants randomly allocated to: 1. Treatment Group (Clinician-guided) 2. Treatment Group (Coach-guided) 3. Waitlist Control Group	8 lessons over 10 weeks	1.70 mins 2.69 mins	1.76% 2.74%	1. GAD-7 = 0.70, DASS-21 = 0.89 2. GAD-7 1.05, DASS-21 = 1.27 3. GAD-7 0.17, DASS-21 = 0.20	Replicated efficacy of treating three anxiety disorders using the <i>Anxiety Program</i> , and demonstrated Coach-guided support results in similar outcomes as Clinician-guided
Study 3: Titov et al. (2011)	RCT (n = 74). Examine the efficacy and acceptability of an 8 lesson version of the <i>Wellbeing Program</i> for people with a principal diagnosis of MDD, GAD, PD, and/or SP	Participants randomly allocated to: 1. Treatment Group (clinician guided) 2. Waitlist Control Group	8 lessons over 10 weeks	85 mins	81%	1. DASS-21 = 1.17 2. DASS-21 = 0.15	Demonstrated feasibility of treating depression and three anxiety disorders in one iPT intervention
Study 4: Dear et al (2011)	Open trial (n = 32). Examine the efficacy and acceptability of a 5 lesson version of the <i>Wellbeing Program</i>	Participants with a principle diagnosis of MDD, GAD, PD, and/or SP, treated in one group	5 lessons over 8 weeks	45 mins	81%	DASS-21 = 1.10	Demonstrated feasibility of treating depression and three anxiety disorders in a brief iPT intervention
Study 5: Titov et al. (2012)	RCT (n = 257). Examine the efficacy and acceptability of the automated and self-guided <i>Wellbeing Course</i> when administered with or without automated emails.	Participants randomly allocated to: 1. Self-Guided + Automated Emails 2. Self-Guided 3. Waitlist Control Group	5 lessons over 8 weeks	1.0 mins 2.0 mins	1.58% 2.36%	1. PHQ-9 = 0.99, GAD-7 = 1.19 2. PHQ-9 = 0.53, GAD-7 0.60 3. PHQ-9 = 0.04, GAD-7 0.16	Demonstrated preliminary feasibility of fully automated self-guided iPT intervention for MDD and three anxiety disorders

Note: Results employ an intention-to-treat model. Effect sizes are Cohen's d, using pooled standard deviation, and reported for within-group analyses. RCT: randomised controlled trial. Completion rates: Proportion in each group reading all core intervention content within duration of intervention. DEP: Major depressive disorder. GAD: Generalized anxiety disorder. SP: Social phobia. PD: Panic disorder with or without agoraphobia. DASS-21: Depression Anxiety Stress Scales -21 items. GAD-7: Generalised Anxiety Disorder 7-item scale. PHQ-9: Patient Health Questionnaire 9-Item Scale. iPT: Internet-delivered psychological intervention. TD: Transdiagnostic

all previous lessons. The lesson content combined both didactic and narrative styles and contained detailed case studies of people with anxiety and depression who learned to manage symptoms. These cases were used to describe the experiences frequently reported by people who are learning to apply psychological skills to managing symptoms, including descriptions of the difficulties commonly reported, and how those difficulties were overcome.

Procedure

The eight lesson interventions used in Studies 2 and 3 were administered over a ten week period, while the five and six lesson interventions used in Studies 1, 4, and 5 were administered over eight weeks. Outcome measures were administered online at pre-treatment, mid-treatment, post-treatment, and again at follow-up.

Participants received an email on the start date of the intervention inviting them to complete the pre-treatment questionnaires and begin the intervention. Participants were provided with a timetable that recommended when they should complete the intervention materials. They also received numerous automated emails throughout the duration of the intervention, which aimed to facilitate engagement and adherence. Participants were encouraged to login at least weekly, read or review a lesson, download and complete the homework assignment, download and read the relevant additional resources, practice the core skills, and send questions to their clinician. Participants were not able to proceed to later lessons until they had read the preceding lessons. Importantly, participants in Study 5, which evaluated a self-guided version of the iPT intervention, did not receive contact before or during the intervention.

Support

In the guided-interventions support was provided on at least a weekly basis, via telephone or a secure email system. This contact was brief and scripted, but individualised to better meet

the needs of the participant. Each script required approximately 5-10 minutes of contact, but clinicians could deviate if clinically indicated, although deviations from this script were reviewed in weekly supervision sessions to prevent *clinician drift*. Generally, clinicians answered participants' questions about the intervention, normalised the process of recovery, reinforced progress, and oriented participants to additional materials. Although clinicians contacted participants at pre-arranged times, participants could contact clinicians at any time and were encouraged to do so via the secure messaging system. While some individualisation of content and therapy was provided by virtue of the clinician's responses and guidance and the materials the participant chose to download, it should be noted that participants saw exactly the same treatment components, regardless of principal diagnosis.

Analyses

All analyses were conducted using an intention-to-treat model, whereby those who began the treatment, defined as starting the first lesson, were included in analyses. This criterion for inclusion was required as baseline data was collected immediately prior to accessing the first lesson. Missing data at post-treatment or follow-up was replaced with either the baseline or last available data point (last-observation-carried-forward). Hence, trial efficacy was based on conservative estimates of benefit.

OUR TRIALS: DESCRIPTIONS AND RESULTS

The primary aim and results from our trials is summarised below and in Table 3.

Study 1: Can we treat three anxiety disorders with one iPT intervention? (Titov, Andrews, Johnston, Robinson, & Spence, 2010).

This RCT examined the feasibility of treating people with a principal diagnosis of GAD,

panic disorder, or social phobia using a six lesson TD iPT intervention, the *Anxiety Program*. Seventy eight participants were randomly allocated to either a clinician-guided treatment group or to a waitlist control group, who began treatment after the treatment group finished. The topics of each lesson are listed in Table 1.

It was expected that, relative to controls, treatment group participants would show significant improvement on a general measure of anxiety and a measure of neuroticism, the GAD-7 and the NEO-FFI-N, respectively. It was also expected that treatment group participants with primary diagnoses of GAD, panic disorder, or social phobia would show significant improvement on relevant disorder specific measures (PSWQ; Social Phobia Screening Questionnaire, SPSQ; PDSS-SR), that gains would be sustained at 3-month follow-up and that participants would rate the procedure as acceptable.

The first version of the Anxiety program comprised six online lessons, which participants were asked to complete over eight weeks. The clinician spent a total mean time of 46 minutes ($SD = 16$) per person over the eight weeks. Relative to controls, treatment group participants reported significantly reduced symptoms of anxiety as measured by the GAD-7, SPSQ, PDSS-SR, but not on the PSWQ. Participants found the treatment program moderately acceptable, and gains were sustained at three month follow-up. Outcomes by primary diagnosis appeared lower than those obtained in disorder-specific programs. However, modifications to the Anxiety program, based on feedback from the treatment group, resulted in improved outcomes in the control group once they received treatment. This study provided encouraging evidence that we could treat at least three common anxiety disorders with materials combined in one intervention.

Study 2: Can we replicate or improve outcomes from Study 1, and do we need a clinician? (Johnston, Titov, Andrews, Spence, & Dear, 2011).

This RCT had two aims, first, to explore the benefits of an eight lesson version of the Anxi-

ety Program, and second, to explore whether guidance by a non-clinician or coach, supervised by a clinician, would result in similar outcomes as guidance by a clinician. This latter question has important implications for informing service providers about how such interventions could be implemented.

As in Study 1, all participants had a principal diagnosis of GAD, panic disorder, or social phobia. One hundred and thirty one participants were randomly allocated to one of three groups: a clinician-guided (CL) group; coach-guided (CO) group, or; waitlist control group. Based on feedback from participants, the Anxiety Program used in Study 1 was revised with the following changes: i) information about cognitive skills were presented in the second rather than third lesson; ii) two new lessons were added to address core beliefs, beliefs about anxiety, and assertive communication and interpersonal boundaries, and; iii) the duration of the program was increased from eight to ten weeks. In this study the primary outcome measures were the GAD-7 and DASS-21, and the disorder-specific measures were the PSWQ, SIAS-6/SPS-6, PDSS-SR. Changes in diagnostic status were also measured.

Seventy four percent of CO and 76% of CL group participants completed all eight lessons within the ten week time-frame. Both treatment groups obtained superior outcomes to the control group. Outcomes for the pooled treatment groups revealed significant reductions on the disorder-specific outcomes for each of the three principal diagnoses, and were associated with large effect sizes. CO group participants achieved similar outcomes to CL participants at post-treatment, and had significantly lower symptom severity scores on general anxiety, panic-disorder, depression and disability at follow-up. Significant changes were also observed in diagnostic status in the treatment groups, relative to controls. Importantly, less than 70 minutes ($SD = 31 - 32$) of clinician or coach time was required per participant during the program. These results indicated that TD iCBT for anxiety was effective, associated with significant change for specific disorders, and is equally efficacious with either coach or clinician support.

Study 3: Can we treat three anxiety disorders and depression in the same iPT intervention? (Titov, Dear, Schwencke, Andrews, Johnston, Craske, & McEvoy, 2011).

This RCT extended the previous trials by examining the feasibility of treating people with either a principal diagnosis of depression or one of the three anxiety disorders targeted in the earlier trials. A new eight lesson TD iPT intervention, the *Wellbeing Program*, was constructed. This differed from the previous interventions by including education and guidelines about behavioural activation. Seventy seven people were randomly allocated to either a clinician-guided treatment group or waitlist-control group. The DASS-21 was employed as the general outcome measure.

Eighty one percent of treatment group participants completed all eight lessons within the ten week program. Relative to controls, treatment group participants reported significantly reduced symptoms of anxiety and depression as measured by the DASS-21, PHQ-9, and GAD-7 scales, with corresponding between-groups effect sizes (Cohen's *d*) at post-treatment of .56, .58, and .52, respectively. The clinician spent a mean time of 85 (*SD* = 50) minutes per person over the program. Participants rated the procedure as highly acceptable, and gains were sustained at follow-up. These results provided preliminary support for the efficacy of TD iCBT in the treatment of three anxiety disorder and depression.

Study 4: Is a brief version of the Wellbeing Program effective? (Dear, Titov, Schwencke, Andrews, Johnston, Craske, & McEvoy, 2011).

This open trial examined the efficacy of a five lesson version of the *Wellbeing Program* with 32 of the participants who had been in the control group of Study 3. This brief version included the same core CBT skills as the original, but condensed the materials from eight to five online lessons and reduced the duration of treatment from 10 to 8 weeks. Thirty-two individuals with a principal diagnosis of depression,

GAD, panic disorder, or social phobia received access to five online educational lessons, homework assignments, weekly contact from a clinical psychologist and automated emails. Eighty-one percent of participants completed the five lessons within the 8 week program. Participants in the treatment group improved significantly on the DASS-21, PHQ-9, and GAD-7, relative to controls, with corresponding within-groups effect sizes (Cohen's *d*) for the treatment group at 3-month follow-up of 1.05, 0.73, and 0.95, respectively. Participants rated the procedure as highly acceptable with gains of a similar magnitude as those found for the original program, but less time was spent per participant by the clinician in the present trial (mean = 45 minutes, *SD* = 35) compared to the original program used in Study 3. Twenty-two of 32 participants (68%) no longer met diagnostic criteria for a disorder at follow up and the number of participants with co-morbid diagnoses decreased. These results provided additional support for the efficacy of TD iCBT in the treatment of anxiety and depressive disorders and indicated that a brief version may be of benefit.

Study 5: Can we improve outcomes of entirely self-guided iPT? (Titov, Dear, Johnston, Lorian, Zou, Wootton, Spence, McEvoy, Rapee, Submitted).

The primary aim of this RCT was to examine the efficacy of a new five lesson TD iPT intervention, the *Wellbeing Course*, when used in a completely automated and self-guided format with no clinical contact. The secondary aim was to determine whether automated emails improved adherence and clinical outcomes. Unfortunately, the original *Wellbeing Program* used in Studies 3 and 4 was not available when the researchers moved institutions and, consequently, a new intervention was developed. This intervention taught the same core psychological skills included in the previous iPT interventions, but introduced information about goal setting, and emphasised concepts of positive psychology and wellbeing.

Two hundred and fifty seven participants completed the automated screening process

without contact from the researchers and were randomly allocated to receive either self-guided access to the Wellbeing Course (SG Group), self-guided access to the Wellbeing Course plus automated reminder emails (SGE Group), or to a waitlist control group. Fifty eight percent of SGE Group and 36% of SG Group participants completed the Course in the eight week period. Both groups achieved significantly reduced scores on the GAD-7 and PHQ-9 relative to controls, with results sustained at follow-up. Mean pre to follow-up within-group effect sizes on the GAD-7 and PHQ-9 were large for the SGE Group (1.1) and moderate for the SG Group (0.7), indicating the automated emails were not only superior to the no-emails condition, but produced encouraging clinical outcomes.

Summary of trials

These five studies represent a systematic body of research exploring the efficacy of several TD iPT interventions targeting three anxiety disorders and depression. As indicated above, participants saw exactly the same treatment components, regardless of principal diagnosis. Engagement and adherence was consistently high, with at 74% of participants in the guided-treatment groups completing the interventions (Studies 1 - 4), and encouraging completion rates for the automated and self-guided version (Study 5). Statistically and clinically significant improvements were observed across the first four studies on general measures of anxiety and depression, and on symptoms of the principal diagnosis. Importantly, feedback from participants was positive, with 95% of participants of Study 5 reporting, at post-treatment, that they would recommend the intervention to a friend. These results indicate these interventions were engaging, clinically efficacious, and acceptable to participants.

LESSONS LEARNED

This section summarises the key lessons we learned during our attempts to develop TD iPT for people with anxiety disorders and depres-

sion. In hindsight, many of these appear self-evident. But, we include them here in the hope that others will learn from our experiences.

Simplifying treatment components

Our initial attempts at translating dense and complex treatment manuals into interventions suitable for remote administration has convinced us that materials should be brief, clear, relevant to peoples' problems, and skills should be immediately applicable. This meant that some materials typically used in face-to-face treatments needed considerable modifications before they could be used in online interventions. For example, typical thought challenging protocols, which involve numerous complex steps, were not suitable for low-intensity iPT where intensive guidance was not available. Moreover, dense instructions increased the likelihood that participants would not practice skills and would instead disengage from treatment.

The challenges of teaching therapeutic content and skills within a low-intensity treatment model accentuated the importance of fundamental principles of learning and skill acquisition. We typically deconstructed each treatment component or skill into three or four core steps and provided a large number of realistic examples demonstrating how others had applied that skill in different settings. A general rule that emerged was that, if we were unable to teach the steps of a psychological skill verbally in a brief telephone call, the technique was too complicated and required review. We also found it necessary to emphasise realistic expectations; in particular, emphasising that the skills take considerable time to learn and that they only become effective with practice. We also strongly encouraged participants to build competence and confidence in less challenging situations before moving to more challenging situations.

The low-intensity format of our interventions also meant that the total number of core treatment components was kept to a minimum. While our preference was to provide participants with multiple psychological skills to tackle each symptom, we discovered that this inadvertently resulted in participants failing to

develop sufficient competence with skills. Moreover, providing a broad range of choice appeared to signal to participants that, should one technique not be immediately or reliably effective, they should try something else. Consequently, each lesson was constructed to teach only one or two new skills and included information that emphasised realistic expectations about the participant's likely progress.

Prompts

Our experience has indicated that participants who fall behind during an intervention are more likely to withdraw or fail to complete an intervention, while regular prompts facilitate engagement. Consequently, each intervention comprises numerous prompts including recommended timetables, four different types of automated emails (see Table 2), regular telephone calls and pop-up messages. These collectively aim to facilitate adherence and guide participants through the intervention.

Software and IT

Another key learning has been that the software used to deliver IPT needs to be user friendly, reliable, secure, and relatively simple. We have previously developed complex interactive features based on the belief that such features would facilitate engagement and improve clinical outcomes. Unfortunately, we have consistently both under-estimated the complexity of adding new software functions and over-estimated the benefits of such features. Each additional feature changes participants' workflow and, should that feature not work, may distract participants from learning core skills, or worse, create confusion and disengagement. This became apparent in our early attempts to include video clips of clinicians introducing content and teaching skills, which we decided to include based on requests by participants. Unfortunately, due to an unforeseen software conflict, the video plug-in crashed the browsers of approximately 25% of users. This problem only emerged after a software provider released an

update for the video player, which then proved incompatible with several browsers. Subsequent feedback from participants revealed that despite the efforts and trials associated with creating and reliably presenting the videos, participants reported the videos made little difference to engagement or outcomes.

While such software conflicts are now less likely given improvements in software design, this example highlights several issues. First, the potential advantages of adding features to an existing intervention need to be carefully weighed against potential challenges. Second, requests for new features from participants may not actually translate into improved outcomes. Third, management of software installations requires the involvement of specialists, to ensure adequate planning, development, deployment and ongoing maintenance. Our experience is that these processes require a considerable investment in the time of both software developers and clinical staff, who are involved in testing the software and reporting problems. We have also found that, despite our experience designing online interventions and software delivery platforms, we continue to under-estimate the actual time required for developing and deploying new features. For this reason we do not encourage others to embark on developing their own software platforms until they have tested an existing platform and have identified the features and functionality required. We also recommend seeking professional advice from software specialists including specialists in IT security. This will assist in ensuring that systems meet minimum legal, professional, and ethical requirements for collection, management and storage of personal health information.

Participants

We have been unable to identify demographic, diagnostic or symptom signatures that predict clinical outcomes. However, participants who are difficult to contact early in treatment, fall behind early in treatment or who have not improved by the midway point of treatment appear less likely to benefit from low-intensity IPT

and may benefit from immediate referral to a higher intensity intervention. In these cases we believe pro-active engagement and therapeutic support is essential to avoid situations where participants and clinicians feel that they have failed in treatment.

Clinicians

A key lesson learned is that clinicians experienced in face-to-face treatments require specific orientation and supervision to adapt to a low-intensity model. This is particularly relevant to clinicians whose practice is characterised by non-directive talking therapies with limited structure and who are used to having considerable contact with participants. In our experience, reticence to change therapeutic orientation to a lower intensity model is the norm rather than the exception and reflects concerns about the efficacy of low-intensity interventions relative to higher intensity interventions. Strategies that we have found helpful in orienting clinicians to our iPT interventions include providing information about the clinical outcomes associated with these treatments, as well as providing new clinicians with the opportunity to observe and speak with other clinicians already operating within a low-intensity framework.

Strategies that we have found helpful in setting and maintaining high service standards include benchmarking expected outcomes and expected participant satisfaction levels, based on previous clinical trials and treatment groups. This provides clinicians with tangible standards to work towards, and also builds their confidence in the intervention.

Advantages of transdiagnostic iPT

In addition to those already discussed, we have observed several advantages of TD iPT, including that it reduces the numbers excluded from treatment, which is an advantage also noted by other clinical research teams (Erickson, Janeck, & Tallman, 2009). For example, 60% of applicants for our disorder-specific tri-

als met inclusion criteria, compared with approximately 90% of applicants in our trials of TD iPT. Importantly, being able to include a greater proportion of applicants reduces the number of disappointed people and the workloads associated with arranging referrals to other services.

An additional advantage of TD iPT is a somewhat unexpected, but welcome finding. We were initially concerned that participants might not engage in TD treatments because some of the content would not be directly pertinent to them. In contrast, we discovered that participants reported it helpful to learn about managing similar symptoms, and that this facilitates engagement and motivation. Moreover, as noted by others (Boisseau, Farchione, Fairholme, Ellard, & Barlow, 2010; Wilamowska et al., 2010), the TD content allows participants with co-morbid anxiety or depression to learn to manage symptoms relevant to multiple diagnoses simultaneously, rather than having to complete several disorder-specific protocols; a significant advantage for both the participants and clinicians.

OUTSTANDING QUESTIONS

Notwithstanding their potential to improve access to evidence-based treatments and the potential for simultaneously treating comorbid conditions, the outcomes of our research should be interpreted in the light of several limitations. These limitations reflect broader and outstanding questions in the field of TD interventions.

First, similar to many of the earlier studies in the field of TD interventions, an important limitation of Studies 1, 3, and 4 are the small sample sizes which, while sufficient to detect overall differences between groups, were insufficient to reliably detect differences based on principal diagnoses or to determine the effect of the interventions on comorbid diagnoses. This issue was addressed in Study 2 which, by combining data across treatment groups, provided encouraging evidence that these interventions can result in significant improvements on measures relevant to participants' principal diagnosis as well as in reductions in the number

of participants meeting diagnostic criteria for their principal and comorbid diagnoses following treatment. However, replications are required to test the reliability of these findings.

Second, few studies have compared the relative short and long-term benefits of disorder-specific and TD interventions for anxiety disorders and depression. Thus, there is currently little evidence to indicate which approach is superior or more acceptable to consumers. Such comparisons will also help identify characteristics of people more likely to benefit from each approach. Given the sample sizes required and the duration of follow-ups, these questions will require considerable resources, but are essential to answer before clinicians can confidently adopt TD approaches over existing disorder-specific protocols.

Third, our studies were limited to evaluating outcomes for participants with principal diagnoses of depression, GAD, social phobia, and panic disorder, and excluded participants with principal diagnoses of obsessive compulsive disorder (OCD) and post-traumatic stress disorder (PTSD). Thus, our findings are limited to those four target disorders. An instructive report of a group TD treatment for anxiety disorders suggested that people with principal diagnoses of OCD or PTSD may not benefit from such treatment, both due to complexity of their presentations and the likelihood that content about their symptoms may distract people with other anxiety disorders (Erickson, et al., 2009). Whether this caution applies to TD iPT remains an empirical question.

Fourth, the conceptual basis for defining what constitutes a TD treatment, issues around determining the most appropriate outcome measures and methods of reporting are issues that require further development, discussion, and debate. The literature has tended to indicate there is a dichotomy between disorder-specific and TD interventions, that is, they are somehow distinct. However, our experience is that many clinicians already provide both. Thus, an important direction for future research is to seek to optimally combine the strongest features of TD and disorder-specific materials. Research along these lines has already begun in the form of *tailored-individualised interventions*, which

combine and carefully sequence both TD and disorder-specific techniques. Encouraging findings have recently been reported using this approach (Andersson et al., 2011; Carlbring et al., 2011).

Finally, and of considerable importance, are questions about how disorder-specific and TD iPT may be integrated within existing mental health services. A recent report has described outcomes of 1500 adult patients treated via a Dutch online mental health clinic for symptoms of post-traumatic stress, burnout, panic disorder, or depression (Ruwaard et al., 2012). Large effect sizes were obtained from pre to post-treatment, with gains sustained at one year post-treatment, and high patient satisfaction was reported. These encouraging findings require replication in other jurisdictions, but provide one obvious potential avenue for implementation of TD iPT. Another important direction for future trials is to seek to combine existing mental health services with TD iPT, and carefully evaluate outcomes.

CONCLUSIONS

Interest in TD treatments is growing, reflecting both pragmatic clinical considerations and increasing evidence that anxiety disorders and depression share common characteristics and respond to similar treatment components. Internet-delivered TD interventions provide a means for improving access to evidence-based treatments. Emerging evidence indicates such interventions have considerable potential for improving access to effective treatments for at least four of the most common mental disorders.

Our experiences are that TD iPT are acceptable to participants and produce clinically significant outcomes. However, considerable outstanding questions remain about the relative benefits of disorder-specific vs. TD interventions, the disorders that can be treated, how trials and outcomes should be measured and reported, and how such interventions could be broadly disseminated. The field of TD iPT is evolving rapidly and we watch, with interest, how further conceptual and technological de-

velopments will influence the content and delivery of such interventions.

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