Evaluating the Impact of a Web-Based Acceptance & Commitment Therapy Intervention on Mental Health Skills in University Students

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Submitted in fulfilment of the requirements for the Professional Doctorate in Counselling Psychology (DPsych)
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January 2020

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Acknowledgements

With deepest gratitude:

To my family, friends and supervisors. Special thanks to Mike Levin for sharing the LifeToolbox program.

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ABSTRACT

Objective Transdiagnostic web-based Acceptance and Commitment Therapy (ACT) interventions have been shown to be effective in improving mental health outcomes in university students in the USA (Levin, Haeger, & Cruz, 2019), Australia (Viskovich & Pakenham, 2018), and Finland (Räsänen, Lappalainen, Muotka, Tolvanen, & Lappalainen, 2016). However, these interventions have not yet been evaluated in the UK, where university students are experiencing a mental health crisis (The Insight Network, 2019). This study evaluated a transdiagnostic web-based ACT self-help intervention called LifeToolbox designed specifically for university students.

Method A total of 112 undergraduate (22%) and postgraduate (78%) students attending university in the UK were randomised to the immediate treatment (ACT) or waiting-list control (WLC) condition with online self-report assessments at baseline and two further timepoints. A waitlist crossover design was used such that participants in the WLC condition transferred to the active arm following the second assessment. Primary outcomes assessed: academic distress, alcohol use, generalised anxiety, depression, eating concerns, hostility, self-compassion, social anxiety and overall distress. Processes assessed: cognitive defusion, mindful awareness, psychological inflexibility, valued living, and self-compassion.

Results Overall results were mixed. However, relative to the waiting-list control group, participants receiving ACT significantly improved on mindful awareness, $F(1, 55.70) = 19.14$, $p < .001$, self-compassion, $F(1, 56.47) = 6.63$, $p = .01$, and social anxiety, $F(1, 59.86) = 6.30$, $p = .02$, in the intention-to-treat sample. Within-subjects analyses showed significant improvements on the combined mental health variables between the start and end of the course, $F(14, 26) = 4.20$, $p = .001$, Pillai's V = .69, $\eta_p^2 = .69$, on half of the primary outcomes (generalised anxiety, hostility, social anxiety, and overall distress) and on all ACT processes in the completer sample. All ACT processes mediated changes on one or more primary outcomes, with cognitive fusion being the most frequent mediator. Participants rated the program as 'excellent' on a standardised measure.

Conclusions These preliminary findings suggest that web-based ACT self-help programs merit more attention as a cost-effective and easily disseminated treatment platform for the promotion of mental health skills in university students.

PREFACE

On Becoming a Psychologist

"The curious paradox is that when I accept myself just as I am, then I can change"
(Rogers, 2004[1961])

Introduction

This doctoral portfolio is comprised of three components: an empirical research project, a publishable journal article and a client case study. Each of these elements reflects knowledge and skills I have developed throughout my training while on the Professional Doctorate in Counselling Psychology, and my concomitant development as a reflective-scientist-practitioner. The latter hybrid term reflects the subtle dynamics of the compound role of the counselling psychologist, where the contemplative, methodical and applied aspects aim to exist in symbiosis. The three sections of this portfolio are informed and linked above all by my own personal and professional ethos. I could not imagine submitting a portfolio which did not acknowledge the central tenets of each of the strands of counselling psychology which have most strongly influenced me. With this in mind, the research is quantitative and focuses on Acceptance and Commitment Therapy (ACT), a third-wave contextual cognitive-behavioural approach, while the case study is written from a systemic perspective. Meanwhile, this preface is tethered at either end by quotations which are ostensibly humanistic and existential. Ultimately, it is my hope that this portfolio captures the curiosity, the playful paradox and the delicate dance between acceptance and change, student and expert, and the pluralism inherent in the triumvirate role of the counselling psychologist.

Section A: Empirical Research

The empirical research investigated the effectiveness of a web-based ACT program for developing mental health skills in university students in the UK. A series of research instruments pertaining to psychological symptoms were administered via online survey software at baseline and two further time points. A crossover waitlist design was employed

such that those in the waiting-list control group transferred to the active arm in the hope that all participants might benefit from the program, while maintaining the benefits of a control condition. As it was an effectiveness study, the analysis was quantitative and included between-groups and within-subjects analysis. Mediation analysis was also conducted in order to examine the underlying process of change. Finally, quantitative participant feedback was analysed in order to consider the acceptability of the program to university students.

The final sample consisted of 112 university students. However, attrition was not modest, as is typical of web-based intervention studies, which the reader will learn in the course of this portfolio. In spite of typically low retention rates, it is argued that web-based interventions may serve a small but significant group of university students who might not otherwise access psychological support, as well as improve accessibility for the entire student cohort, therefore reducing pressure on university services at a time when mental health issues are increasing at an alarming rate in the UK (Institute for Public Policy Research [IPPR], 2017; The Insight Network, 2019).

It was decided to focus on an ACT intervention, given its coalescence with my personal approach and the preliminary success with web-based interventions for university students in the USA (Levin, Haeger, & Cruz, 2019; Levin, Haeger, Pierce, & Cruz, 2017; Levin, Haeger, Pierce, & Twohig, 2017; Levin, Pistorello, Seeley, & Hayes, 2014), Australia (Viskovich & Pakenham, 2018), and Finland (Lappalainen et al., 2014; Lappalainen, Langrial, Oinas-Kukkonen, Tolvanen, & Lappalainen, 2015). This research will be explored in the literature review in Chapter 1, since it heavily informs the current study.

Given my professional history in IT and data analysis in particular, this research offered an opportunity to integrate my two professional identities, while enhancing my research skills and contributing to technological developments in counselling psychology. In no way is this thesis suggesting online interventions as a total replacement for individualised or face-to-face therapy. Rather, it is hoped that this study might encourage other researchers to investigate the effectiveness of web-based interventions using low-cost and flexible software, where resources are limited, so that online support might be made available as a stop-gap and supplement to existing British social care. The findings, strengths, limitations and implications of the research are discussed in the context of relevant literature in Chapter 4.

Section B: Publishable Journal Article

The journal article mainly focuses on the primary hypothesis, namely the comparison of the ACT and waiting-list control (WLC) groups on various measures of psychological symptoms and psychological flexibility. Although the significant results were not as extensive as hoped, it is important to publish such results to avoid publication bias. Given that the overall results were still promising, researchers might use the recommendations to design future studies in order to improve results and retention rates. The article encourages counselling psychologists to consider web-based interventions as adjuncts to therapy and for use in university counselling services where waiting lists tend to be lengthy. While the *Journal of Contextual Behavioral Science* is an ardent publisher of ACT studies, it was noted that similar studies had been published therein previously. The intention is therefore to submit the article to the *Journal of Counseling Psychology* in order to explicitly promote web-based interventions within the field of counselling psychology and in response to the journal's particular emphasis on the evaluation of interventions with under-represented populations. Moreover, it is a regularly published American Psychological Association (APA) journal with a high impact factor of 3.85 (APA, 2018).

Section C: Client Case Study

On placement in my final year of doctoral training, I committed to the systemic approach, and a consequential stance of curiosity (Cecchin, 1987). I had the privilege of working with a single mother of two who presented with low self-esteem, low mood and anxiety in an NHS parental well-being service. I chose to focus on this client because I felt our work lent itself naturally to the systemic model, organically traversing intergenerational patterns and focusing on family-centred goals. This model readily responds to one of the core principles of counselling psychologists, which is "recognising social contexts" (British Psychological Society [BPS], 2005). In the included excerpt, I explore the dilemma between 'falling in love' with a comfortable therapeutic script and taking subtle risks in the therapy room, in the context of the therapeutic relationship. This piece of work was fundamental in helping me to appreciate the systemic model in the facilitation of change. While I was drawn to the optimistic and playful nature of systemic, it was challenging to conduct it in a 'pure' way having previously completed placements grounded in the person-centred and cognitive-behavioural approaches.

Epistemological Stance

Questions might be raised concerning my epistemological stance since I employ a quantitative analysis and suggest a post-positivist approach in the research section, yet assume a social-constructionist standpoint in the case study. Ultimately, following much reflection, I have come to regard myself as a pragmatist, a contextual perspective to which ACT also credits its philosophical underpinnings (Hayes, 2004; Hayes, Strosahl, & Wilson, 1999). While researching this, it was gratifying to learn that pragmatism is also a philosophical foundation of general psychology. Indeed, one of the fathers of psychology, William James, is also considered to be a father of pragmatism (Robinson, 2014). In fact, James argued that the two are intrinsically linked (James, 1977[1909]), as is perhaps most evident nowadays in the emphasis on the justification of the implications and applications of psychological research (Robinson, 2014). Pragmatism naturally involves multiple epistemologies, since it prioritises function and usefulness above all. A philosophically pragmatic perspective of knowledge is therefore "intrinsically pluralist" (Robinson, 2014, p. 8).

One could argue that primary therapeutic schools of thought encourage pluralistic thinking. For example, the systemic (Hedges, 2005) and humanistic (Kasket, 2012) approaches warn of the danger of falling in love with certain ideas, hypotheses or perspectives, and the very nature of 'waves' of cognitive behavioural therapy (Hayes, 2004) implies a multi-perspective stance. Indeed, this flexibility contributed to my initial attraction to counselling psychology, a field which benefits from the capacity to hold multiple epistemological perspectives simultaneously (Milton, 2010). This progressive perspective calls to mind Rogers' concept of a mature person defined as one who can hold multiple opposing ideas in mind simultaneously (Rogers, 2004[1961]). Perhaps, then, it is not only our prerogative but our duty as counselling psychologists to consider multiple epistemological perspectives in tandem. Indeed, the BPS has suggested that "being a counselling psychologist researcher means being open to exploring all the paradoxes, divergences and different perspectives" and demonstrating a "curiosity about the multitude of research approaches available" (Kasket, 2012, p. 66). With this in mind, I urge clinicians to consider functional, existential and contextual factors, even in the development of brief online and/or manualised programs. As reflective-scientist-practitioners it is our privilege to claim philosophical sanctuary in pragmatism and pluralism.

Bringing It All Together

As mentioned in the introduction, the three sections of the portfolio are predominantly linked by my own personal ethos. The research represents the scientist aspect of my identity. It also emphasises the role of acceptance in therapy, which could also be considered a core tenet of the person-centred approach, for example through the concepts of unconditional positive regard (Rogers, 2004[1961]), and the systemic approach, where positive connotation encourages us to accept that every member of a system is doing the best they can (Hedges, 2005). It seemed odd that I might focus on a single therapeutic approach throughout my portfolio when I have no intention of reflecting this in my career. It seemed more authentic to attempt to reflect the nuance and paradoxes of my personal approach. Perhaps the downside of this is not excelling in any single model, but here I refer to the oft-cited research throughout our training program that the relationship is more important to therapeutic outcomes than the model (Lambert & Barley, 2001).

My approach has been greatly affected by the systemic placement I undertook during my final year of training and on which the case study (Section C) is based. As a result, I rarely view any situation without seeing the systemic blueprints overlaid and the limited layers of intersectionality, of which I had the privilege to have been made aware during this time. The three components of my portfolio are no exception. How could I possibly study university students and consider this not be a systemic piece of work? My hybrid approach also reflects my lifelong love of learning. I am under no illusion that the submission of this thesis equates to the end of this learning or my development as a counselling psychologist. Indeed, it is my curiosity that maintains my passion for the dynamic field of counselling psychology. Ultimately, then, I leave the professional doctorate program relishing the title of *pluralistic* counselling psychologist, since it does not impose such a choice.

Summary

The aim of this research is to further the field of counselling psychology by addressing the gaps in the literature regarding web-based ACT interventions for university students in the UK, given the urgent need to provide support to this population. This was informed by similar studies in the USA, Australia and Finland, and underpinned by the psychological flexibility model of change. In conjunction with the client case study, it is hoped that this will reflect an amount of progress as a reflective-scientist-practitioner appropriate to a newly qualified counselling psychologist. I invite the reader to this liminal space, on the cusp of qualification.

Here, I am reminded again of the first book on our ‘Essential Reading List’ in our inaugural year of training: *On Becoming a Person* by the eminent psychologist Carl Rogers. It is with humble appreciation that I now recognise that it is not just the client that is becoming. How limiting, then, that the Cambridge dictionary defines the verb ‘to become’ as “to *start* to be” (Become, n.d.).

> When I am thus able to be in process, it is clear that there can be no closed system of beliefs, no unchanging set of principles which I hold. Life is guided by a changing understanding of and interpretation of my experience. It is always in process of becoming. (Rogers, 2004[1961], p. 27)

References (Preface)

American Psychological Association (2018). *Journal Impact Factors.* Retrieved from https://www.apa.org/pubs/journals/resources/impact-factors

Become. (n.d.) *Cambridge dictionary*. Retrieved from https://dictionary.cambridge.org/dictionary/english/become

British Psychological Society (2005). *Division of Counselling Psychology Professional Practice Guidelines* [PDF file]. Retrieved from https://www.bps.org.uk/member-microsites/division-counselling-psychology/resources

Cecchin, G. (1987). Hypothesizing, circularity and neutrality revisited: An invitation to curiosity. *Family Process, 26*(4), 405–413.

Hayes, S. C. (2004). Acceptance and commitment therapy, relational frame theory, and the third wave of behavioral and cognitive therapies. *Behavior Therapy, 35*, 639–665.

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and Commitment Therapy: An experiential approach to behavior change.* New York: The Guilford Press.

Hedges, F. (2005). *An introduction to systemic therapy with individuals. A socio-constructionist approach*. New York, NY: Palgrave.

The Insight Network (2019). *University student mental health survey 2018.* London: The Insight Network. Retrieved January 02, 2020, from https://uploads-ssl.webflow.com/561110743bc7e45e78292140/5c7d4b5d314d163fecdc3706_Mental%20Health%20Report%202018.pdf

Institute for Public Policy Research (2017). *Not by degrees: Improving student mental health in the UK's universities.* Retrieved from https://www.ippr.org/publications/not-by-degrees

James, W. (1977). *The meaning of truth: A sequel to "Pragmatism".* Oxford, England: Longmans, Green. (Original work published 1909).

Kasket, E. (2012). The counselling psychologist researcher. *Counselling Psychology Review, 27*(2), 64–73.

Lambert, M. J., & Barley, D. E. (2001). Research summary on the therapeutic relationship and psychotherapy outcome. *Psychotherapy: Theory, Research, Practice, Training, 38*(4), 357–361.

Lappalainen, P., Granlund, A., Siltanen, S., Ahonen, S., Vitikainen, M., Tolvanen, A., & Lappalainen, R. (2014). ACT Internet-based vs. face-to-face? A randomized controlled trial of two ways to deliver Acceptance and Commitment Therapy for depressive symptoms: An 18-month follow-up. *Behaviour Research and Therapy, 61*, 43–54. https://doi.org/10.1016/j.brat.2014.07.006

Lappalainen, P., Langrial, S., Oinas-Kukkonen, H., Tolvanen, A., & Lappalainen, R. (2015). Web-based acceptance and commitment therapy for depressive symptoms with minimal support: A randomized controlled trial. *Behavior Modification, 39*(6), 805–834. https://doi.org/10.1177/0145445515598142

Levin, M. E., Haeger, J., & Cruz, R. A. (2019). Tailoring acceptance and commitment therapy skill coaching in the moment through smartphones: Results from a randomized controlled trial. *Mindful Awareness, 10*, 689–699. https://doi.org/10.1007/s12671-018-1004-2

Levin, M. E., Haeger, J., Pierce, B., & Cruz, R. (2017). Evaluating an adjunctive mobile app to enhance psychological flexibility in acceptance and commitment therapy. *Behavior Modification, 41*, 846–867.

Levin, M. E., Haeger, J., Pierce, B., & Twohig, M. P. (2017). Web-based acceptance and commitment therapy for mental health problems in college students: A randomized controlled trial. *Behavior Modification, 41,* 141–162.

Levin, M. E., Pistorello, J., Seeley, J. R., & Hayes, S. C. (2014). Feasibility of a prototype web-based acceptance and commitment therapy prevention program for college students. *Journal of American College Health*, *62*(1), 20–30. https://doi.org/10.1080/07448481.2013.843533

Milton, M. (2010). *Therapy and beyond: Counselling psychology contributions to therapeutic and social issues.* West Sussex: Wiley-Blackwell.

Robinson, O. (2014). Re-examining the epistemological foundations of quantitative psychology: Pluralism, not positivism. *QMiP Bulletin*, *17*, 5–9.

Rogers, C. R. (2004). *On becoming a person: A therapist's view of psychotherapy*. London: Constable and Company. (Original work published 1961).

Viskovich, S., & Pakenham, K. I. (2018). Pilot evaluation of a web-based acceptance and commitment therapy program to promote mental health skills in university students. *Journal of Clinical Psychology*, *74*(12), 2047–2069.

SECTION A: EMPIRICAL RESEARCH

Chapter 1: Introduction

1.1 Overview

The aim of this study is to evaluate the effectiveness of a web-based Acceptance and Commitment Therapy (ACT) program in the promotion of mental health skills in students enrolled at universities in the UK. ACT (Hayes, Strosahl, & Wilson, 2012) is one of the most widely practised and researched third-wave cognitive behavioural approaches to psychotherapy. It combines acceptance, mindfulness, values-based and behavioural techniques. Due to its transdiagnostic nature, ACT may be particularly promising in the promotion of general mental health skills in university students, covering a broad range of clinical issues through a single point of access.

A primary objective of counselling psychology is to reduce distress and promote well-being across the lifespan (British Psychological Society [BPS], 2019). In the UK, it is understood that 50% of mental health problems are established by age 14, and 75% by age 24 (Kessler et al., 2005). In 2017, the Institute for Public Policy Research (IPPR) revealed that 63% of university students in the UK were experiencing high levels of stress that interfered with their day-to-day lives, that students were at higher risk of mental distress than their non-academic counterparts, and that poor mental health has a profound influence on academic performance, retention and engagement, and is even linked to death by suicide in the student population. More recently, The Insight Network (2019) administered the largest mental health survey ever conducted among UK university students, with 38,000 students taking part. Results revealed that thoughts of self-harm were almost twice as high as those published by the IPPR just two years previously and that 90% of students were now struggling with anxiety. Moreover, the stigma around mental health persisted, with more than three-quarters of distressed students disclosing that they conceal psychological symptoms from their friends.

University students in the UK are not the only ones facing these issues. Almost half of American university students have a diagnosable psychological disorder in a given year (Blanco et al., 2008) and up to 84% of Australian students experience elevated distress (Stallman, 2010). One reason for concern is that early adulthood is a critical developmental period; unresolved psychological distress can affect psychosocial functioning well into adult life (Rickwood, Deane, Wilson, & Ciarrochi, 2005). Moreover, treatment-seeking is low: fewer than one in five distressed students seek help due to barriers such as time and stigma (Blanco

et al., 2008; Eskin et al., 2016; Levin, Stocke, Pierce, & Levin, 2018). Additionally, it is reported that if all distressed university students *were* to access help, university services would not be capable of meeting the increased demand (Stallman & Kavanagh, 2016). In the USA, university counselling services already appear to be facing this dilemma, in terms of demand and presentation complexity (Gallagher, 2014); supply is not growing at the same rate, with only one counsellor per 1,459 students (Association for University and College Counseling Center Directors [AUCCCD], 2014). A final reason to focus on the promotion of mental health skills among university students is to develop their expertise, since they are likely to play a significant role in determining the future of our societies (Eskin et al., 2016).

One possible solution to the university student mental health crisis, that might also reduce barriers to help-seeking, is transdiagnostic web-based mental health interventions. This study will investigate the effectiveness of a web-based mental health program called LifeToolbox. LifeToolbox has been developed and generously provided by a team in the USA that has had successful results with several iterations of web-based ACT programs with university students over the last few years (e.g., Levin, Haeger, & Cruz, 2019; Levin, Haeger, Pierce, & Cruz, 2017; Levin, Haeger, Pierce, & Twohig, 2017; Levin, Pistorello, Seeley, & Hayes, 2014). Web-based ACT programs have also been successfully applied with university students in Australia (Viskovich & Pakenham, 2018) and Finland (Lappalainen et al., 2014; Lappalainen, Langrial, Oinas-Kukkonen, Tolvanen, & Lappalainen, 2015). Yet, at the time of writing, no published research has investigated transdiagnostic web-based ACT programs for UK-based university students. In line with previous research, the impact of LifeToolbox on primary outcome and process measures will be examined. It is hoped that doing so will further illuminate therapeutic mechanisms of change and effective intervention strategies, thus contributing to counselling psychology literature and helping to inform how we practise in the therapy room. It is imperative for psychologists to feel informed and comfortable in working with the student population, given the increasing numbers requiring support, and to develop the skills not only to prevent clinical symptoms but also to facilitate a healthy transition towards a thriving adulthood.

The study will use a quantitative methodology to evaluate the LifeToolbox program. The program will be described in depth in Chapter 2 along with further details of the intervention. Prior to that, the current chapter will outline the relevant literature, highlighting the theoretical underpinnings of ACT, and reviewing pertinent web-based and ACT interventions. While

limitations in the current literature will be highlighted, a systematic review is beyond the scope of this study; the aim is rather to contextualise and rationalise the current research. Unsurprisingly, only quantitative studies have been deemed suitable for inclusion, given the grand-scale evaluative nature of the research aims – seeking feasible and effective solutions to the university student crisis.

1.2 Acceptance & Commitment Therapy (ACT)

1.2.1 Philosophical Underpinnings of ACT

ACT is commonly referred to as a third-wave cognitive-behavioural therapy (Hayes et al., 2012). The concept of 'waves' refers to the dominant discourses and methods that have informed evidence-based cognitive-behavioural practice at different points in time (Hayes, 2004). The first wave saw the introduction of specific and rigorous empirical evidence-based psychotherapy in the form of pure behaviour therapy in the 1950s (Öst, 2008), where psychoanalysis and humanism were rejected in favour of simple stimulus-response contingencies. Pure behaviourism persisted for a decade or so before the "cognitive revolution" (Hayes, 2004, p. 651) occurred and with it, the second wave. During this phase, the importance of language and cognition was recognised and traditional Cognitive-Behavioural Therapy (CBT) emerged and flourished. However, some aspects of traditional CBT have recently been called into question (Halliburton & Cooper, 2015), for example, whether it is even necessary to target the content of thoughts in therapy at all (Hayes, 2004). Less mechanistic theories of behaviour began to develop. Enter the third wave.

In 2004, Hayes made a case for the existence of a third wave of cognitive-behavioural therapies which had been in development since the 1980s. Rather than focusing on first-order change, such as problem behaviours, thoughts and emotions, this generation concentrated on how a person *responds* to their thoughts and feelings; it is, therefore, second-order or contextual change (Hayes, 2004). Third-wave therapies synthesise and advance earlier waves, bolstering traditional empiricism with contextualism. Along with ACT, other prominent third-wave therapies include but are not limited to Dialectical Behavioural Therapy (DBT; Linehan, 1993), Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2012), and Compassion Focused Therapy (CFT; Gilbert, 2004). However, ACT was the target of much of the early criticism of the third wave (Ruiz, 2012), such as the questioning of its commitment to empiricism. An abundance of randomised control trials (RCTs), systematic reviews and

meta-analyses (e.g., A-Tjak et al., 2015; Ruiz, 2012) have since appeared in response. A selection will be reviewed in detail throughout the remainder of this chapter.

ACT is founded on the pragmatic philosophy of functional contextualism, which encourages the consideration of the function of any behaviour – overt or covert – in a given context (Hayes, Strosahl, & Wilson, 1999). From an ACT perspective, context includes environmental and biopsychosocial factors (Harris, 2019). Functional contextualism rejects the idea of an objective truth since all interactions with the world are limited by contextual factors (Hayes, 2004). Therefore, in ACT, clients are encouraged to let go of the quest for truth in their thoughts and focus instead on the functionality or helpfulness of thoughts and behaviours in the achievement of valued living (Harris, 2019). Similarly, in philosophy, pragmatism considers cognition and language as purely practical and predictive tools, rather than reflections of reality (James, 1977[1909]). Philosophical pragmatists view language, cognitions and attached meanings in respect of their practical application and are in favour of precipitating action in order to test the feasibility of ideas (Gutek, 2014). This emphasis on functionality is reflected in the ACT model.

Meanwhile, the *theoretical* foundation of ACT lies in Relational Frame Theory (RFT; Hayes, Luoma, Bond, Masuda, & Lillis, 2006), a behavioural theory solidly supported by over 100 studies (Ruiz, 2012). The core idea of RFT is that language and cognition are developed through learned 'relational frames'. This includes the uniquely human ability to arbitrarily derive relations between stimuli. For example, understanding that if A is smaller than B, and B is smaller than C, then A is also smaller than C. Crucially, we also have the ability to derive relations based on arbitrary social cues. For example, a young child can understand that a 50 pence piece is physically bigger than a one pound coin, but an older child will learn that a 50 pence piece is 'smaller than' a one pound coin in terms of social and economic value.

Our relational learning abilities and linguistic representations, as well as creating wonderful opportunities for communication and development, have the capacity to vastly increase the number of perceived harmful stimuli, and therefore distress, that we experience. This might explain how people develop phobias of situations they have never directly faced. This is a fundamental feature of RFT – that previously neutral stimuli (e.g., attending a lecture) can be transformed into aversive stimuli. Another way of saying this is that how we relate to an experience can modify the function or meaning of the experience. Relational frames permit

pain to happen in virtually any situation, since harmful stimuli can occur at any time in linguistic form, regardless of the presence or absence of actual external threats. This renders irrelevant potential situational solutions. Moreover, stimuli linked to aversive functions or meanings, in combination with a typical tendency to avoid uncomfortable internal experiences, can engender rigid and extensive avoidance patterns.

RFT integrates two separate aspects of behavioural analysis: rule-following and equivalence relations (Ruiz, 2012). One aim of ACT is to reduce unhelpful rule-governed behaviour and increase flexible responding. According to RFT, there are three types of rule-governed behaviour (Hayes, Barnes-Holmes, & Roche, 2001): (1) pliance or socially reinforced behaviour (e.g., following a social rule); (2) tracking or environmentally reinforced behaviour (e.g., using an umbrella in a rainstorm); (3) augmenting or reinforced behaviour (e.g., receiving a compliment from a tutor on the assignment you have already completed). ACT aims to increase flexible responding to the environment (i.e., tracking) and decrease rigid and unhelpful socially reinforced behaviour.

Values are central to ACT and can be conceptualised as motivational augmental rules (Plumb, Stewart, Dahl, & Lundgren, 2009). For example, the value of 'Being Healthy' could be reinforced by healthy eating and augmented further through positive physiological and social consequences. Associating healthy eating with the value of 'Being Healthy' can further augment the behaviour and increase the likelihood of eating healthily again in future. A hierarchy of actions, goals and values exists, where the reinforcing functions of an individual's actions are extended to their goals and bolstered by concordance with their values (Plumb et al., 2009).

1.2.2 Psychological Flexibility

Originally, the central target of the ACT model was 'acceptance', that is, the willingness to experience internal events in their full form, frequency and strength in the pursuit of goals and values (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). However, it was recognised that this did not capture the ACT model in its entirety. For example, early interpretations appeared to concentrate on difficult thoughts and feelings. Internal events which are 'neutral' or 'positive' might also reduce responsiveness to values-related contingencies by influencing behaviour, either consciously or unconsciously. As a result, the current model of ACT also emphasises mindful awareness and action. Nowadays, the central tenet of the ACT model and

its proposed mechanism of change is psychological flexibility (Bond et al., 2011). This is the ability to fully and non-defensively engage in values-based action in the present moment regardless of unwanted internal experiences (Hayes et al., 2006; Hayes et al., 2012). It is achieved through the cultivation of six interrelated core ACT processes, recognised collectively as the ACT Hexaflex (Figure 1):

1. Acceptance – The active, non-defensive willingness to experience internal and external events as they occur, in their organic unaltered state. It is the opposite of experiential avoidance, a pathological process which involves the avoidance of inner experiences that are perceived as aversive even when doing so results in psychological harm (Hayes, 2004). In ACT, acceptance is considered to be a behaviour rather than an attitude or feeling.
2. Cognitive De-fusion – The non-attached, neutral observation of inner cognitions and a precursor to acceptance and values-based decision-making (Ruiz, 2012). The opposite is (cognitive) fusion, which is when we experience cognitive events as literal and authoritative, thus forgoing contact with the present moment and often resulting in experiential avoidance when defusion skills are not available. For example, someone experiencing anxiety might interpret trembling as negative rather than simply as a neutral physiological occurrence. Defusion is used to shift from a literal to a non-literal relationship with thoughts (e.g., "I'm not good enough" becomes "I'm having the thought that 'I'm not good enough'") and develop an alternative context where meaningful action is more realisable (Hayes, 2004). Unhelpful thoughts can be defused from historic associations by manipulating them using techniques such as prolonged repetition, singing, backwards-writing, and mimicry in humorous voices until associations dissolve. Acceptance and defusion are also necessary prerequisites for the ACT practitioner, alleviating a sense of hierarchy in the therapeutic relationship (Hayes, 2004).
3. Self-as-Context – The awareness of one's self as a vehicle or context for psychological experiences, rather than equivalent to the events themselves. The observing self experiences internal events but is not defined by them (Hayes, 2004); while internal events change, the observing self remains fairly consistent. From an RFT perspective, self-understanding involves deictic perspective-taking. As this skill develops, so too does a sense of common humanity and therefore self-compassion.
4. Present Moment Awareness – Also known as Contact with the Present Moment, this is the ability to be responsive and attentive to environmental and internal events as they

transpire without judgement and according to what is useful. Present moment awareness diminishes the control of perceived threats and increases the opportunity for mindful valued action. The first four ACT processes are all considered to be under the remit of mindfulness (Harris, 2019).

5. Valued Living – This is the ability to live purposefully according to self-selected directions. For example, a university student might value 'Learning' or 'Independence' highly. Alternatives to valued living include being led by specific attainable goals (e.g., a first-class university degree) or even symptoms (e.g., exam anxiety). Values clarification is often a starting point in ACT work as it provides the context for acceptance, defusion and meaningful action (Hayes, 2004). It is a continuous collaborative process between the client and the therapist. The facilitation of acceptance and valued action is reminiscent of traditional exposure-based therapies due to the inherent element of 'emotional exposure' and the exploration of avoidance behaviours.
6. Committed Action – The ability to behave flexibly and consistently in accordance with one's identified values. Traditional behavioural interventions are incorporated during this process, such as goal-setting, behavioural activation and the confrontation of obstacles. Committed action is tantamount to the operationalisation of values. The commitment element refers to a continuous pursuit of valued living rather than an unrealistic commitment to success (Hayes et al., 1999). Challenging actions can be reinforced through meaningful connection with values. For example, an individual experiencing discomfort while exercising could focus on their value of 'Fitness' or 'Self-Care'. Although acceptance appears first in the title of ACT, equal weight is placed on the 'commitment to change' aspect. It therefore has an acceptance and change dialectic in common with DBT (Linehan, 1993).

It is these six skills that render possible the substitution of experiential avoidance with meaningful action and purposeful living. Although all six components are traditionally incorporated into ACT interventions, researchers are also investigating the components individually and in various combinations in order to further illuminate the process of change and maximise the efficiency of interventions (Levin, Hildebrandt, Lillis, & Hayes, 2012). Since many of the elements are shared by other therapeutic approaches, it can be challenging to quantify the 'pure' effect of ACT. It is important to note that all of these processes can be viewed on a spectrum and that neither end of these spectrums is inherently good nor bad, but – true to functional contextualism – context dependent. For example, fusion involving

daydreaming about the future can be helpful on the beach but less so in the midst of a driving test. A self-evaluation of being aggressive might be useful in some sporting competitions, but less helpful when looking after children. Focusing on internal events can be useful when describing symptoms to your doctor, but less so if you are trying to concentrate on a lecture. Likewise, experiential avoidance can be natural and helpful, for example, taking a single dose of painkillers to ease a headache. In ACT it is all about functionality, so these processes should only be targeted when they are resulting in rigid and unhelpful behaviours.

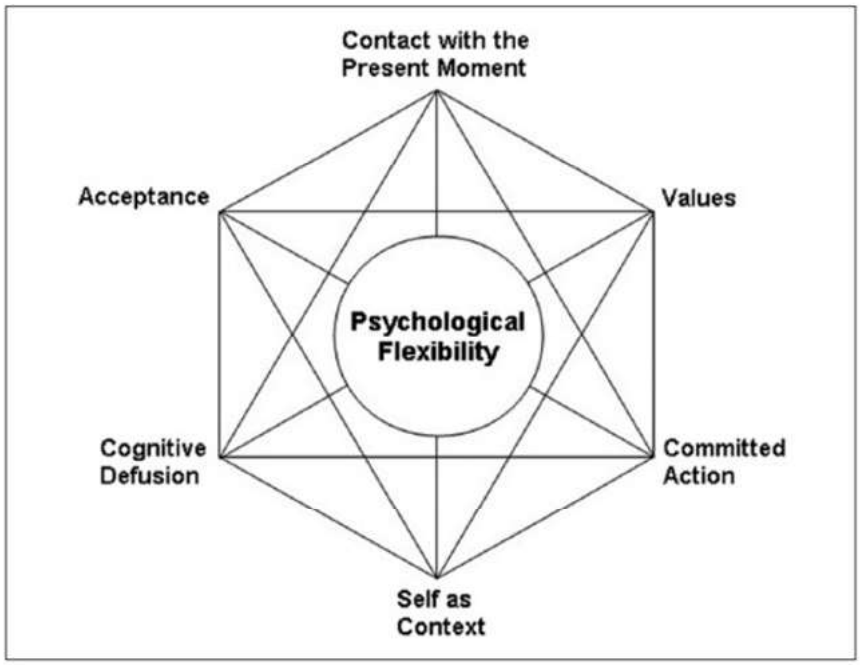


Figure 1.1 The ACT 'Hexaflex' model. This figure illustrates the interconnected components of psychological flexibility. *Copyright Steven C. Hayes. Used by permission.*

So, then, ACT posits a psychological flexibility model of well-being. When this ability is compromised, in a state known as psychological inflexibility, psychopathology is thought to occur (Hayes et al., 2006). Psychological inflexibility involves fusion with particular thoughts and reduced contact with the present moment and results in experiential avoidance and forfeiture of contact with meaningful values and effective action. By decreasing psychological inflexibility, ACT aims to treat a vast array of psychological issues. Accordingly, the development of psychological flexibility has been linked to improved outcomes on a range of mental and physical health conditions (Ruiz, 2012).

For example, while the role of psychological flexibility in anxiety and depression should be considered on a case-by-case basis, there is evidence to support a strong correlation between psychological inflexibility and these symptoms (Twohig & Levin, 2017). There are multiple studies which therefore address both in a single intervention. A client with anxiety or depression typically wants to eliminate their symptoms in order to live a more purposeful life. ACT does not suggest denying that end goal but rather suggests a different route of attainment. ACT aims to assist individuals to function more effectively and meaningfully in spite of any symptoms they are experiencing. Paradoxically, then, although ACT is effective in symptom reduction, it does not explicitly aim to reduce these symptoms, rather it seeks to increase acceptance of all experiences, including – but not limited to – symptoms, in the greater pursuit of valued living (Hayes et al., 1999). In other words, specific symptom reduction is a by-product of treatment rather than a primary objective.

1.2.3 Empirical Evidence

Since ACT targets the underlying process of psychological flexibility, the effectiveness of ACT interventions on mental health issues is "unusually broad" (Hayes, 2004, p. 657). Meta-analyses have shown the efficacy of ACT in the promotion of psychological flexibility and mental health skills (Ruiz, 2012) across the lifespan and in the treatment of multiple psychological difficulties such as stress, anxiety, depression, psychosis, addictive disorders, chronic pain and tinnitus (A-Tjak et al., 2015; Öst, 2008). An early meta-analysis and systematic review of third-wave behavioural therapies (Öst, 2008) examined 13 ACT RCTs (n = 677) with various target disorders in clinical and non-clinical adult samples and reported a moderate mean effect size (Hedges' g = 0.68). However, the author noted that the methodology used was significantly less stringent in comparison with similar trials examining CBT, such as the inclusion of waiting-list only control or treatment-as-usual conditions with limited descriptions.

Given that there were still questions around the effectiveness of ACT over existing treatment, researchers conducted a systematic review and meta-analysis of studies comparing ACT with CBT (k = 16, where k is the number of studies included; n = 954) for various clinical targets (Ruiz, 2012). ACT significantly outperformed CBT on primary outcomes (g = 0.40). At post-treatment, it resulted in favourable outcomes for depression (g = 0.27) and quality of life (g = 0.25), though showed similar results for anxiety. ACT also demonstrated a larger effect on its purported mechanism of change (g = 0.38), while no differences were found on the purported

CBT mechanisms (g = 0.05). ACT's specified process of change is a major strength in a field known for its specificity and emphasis on empirical evidence. Of note, in the aforementioned review, the majority of studies included were conducted by advocates of ACT. Moreover, the studies did not focus on specific psychological issues; clearer differences between ACT and CBT might emerge when compared for specific disorders. However, most of the studies compared ACT and CBT from a symptom reduction point of view, which may have advantaged CBT and therefore lends even more credibility to the superior ACT results.

More recently, a meta-analysis on ACT with clinical adult populations was published which included an additional 22 RCTs not encompassed in previous meta-analyses (k = 39; n = 1,821; A-Tjak et al., 2015). The results indicated that ACT surpassed control conditions on primary (g = 0.57) and secondary (g = 0.30) outcome measures as well as process measures (g = 0.56) at post-treatment and follow-up assessments, in both completer and intention-to-treat analyses. The authors concluded that ACT is more effective than waiting-list (g = 0.82), treatment-as-usual (g = 0.64) and placebo (g = 0.51) conditions and that it may be as effective as recognised psychological interventions (i.e., CBT) for anxiety, depression, addictive and somatic disorders. Note that the effect size on primary outcomes in comparison with control conditions was lower (g = 0.57) than in Öst's original 2008 meta-analysis (g = 0.68). The authors suggested that the methodological quality of ACT studies had advanced in the interim, and yet the efficacy of ACT appeared not to have improved. Also of note, those RCTs that were rated more highly for quality were linked to smaller effect sizes. The authors emphasised that this was typical of psychotherapeutic meta-analyses, but that caution should clearly be taken in generalising the findings from less stringent studies.

While the preceding ACT meta-analyses did not focus on specific clinical targets, others have opted to focus on specific disorders. For example, findings from a meta-analysis of ACT RCTs for anxiety and depression in adults (Hacker, Stone, & Macbeth, 2016) agreed with previous research (A-Tjak et al., 2015) that while ACT is effective in the treatment of anxiety (k = 28; n = 1,628; Cohen's d = 0.95) and depression (k = 439; n = 1,987; d = 0.92) in comparison with control conditions, it is no more effective than conventional treatment (i.e., CBT). However, results might have been distorted by considerable between-study variance in the sample – a common limitation in ACT reviews, given its broad-ranging application. Regardless, since symptom reduction is not the primary aim of ACT (Hayes et al., 2012), perhaps reviews should ensure that psychological flexibility is examined alongside outcome measures. Indeed, a more

recent systematic review of ACT for depression and anxiety did include mediation analyses (Twohig & Levin, 2017). Pooled results from 36 RCTs found that ACT was more effective than waiting-list control (WLC) conditions and treatment-as-usual, though no pooled effect sizes were provided since a meta-analysis was not conducted. In line with Hacker et al. (2016) and A-Tjak et al. (2015), the authors noted that the effects were similar to CBT. However, they also added that outcomes appeared to be mediated through rises in psychological flexibility.

While it remains unclear whether ACT is more effective than traditional treatment (i.e., CBT), results do tend to suggest that it is at the very least equivalent to it and is therefore still worth considering. After all, ACT is a younger model and further refinements to its application may provide it with the advantage.

1.2.4 ACT & Self-Compassion

One way to advance ACT theory and application is in the further consideration of its processes of change. Along with psychological flexibility, it is thought that self-compassion might be a key mediator through which ACT engenders psychological change (Yadavaia, Hayes, & Vilardaga, 2014). RCTs have supported the idea that ACT significantly improves self-compassion in undergraduate students (Yadavaia et al., 2014), perhaps due to the encouragement of non-judgemental awareness of thoughts, increased self-empathy via perspective-taking, and self-acceptance. While it appeared that ACT could improve self-compassion levels, some authors wondered if this was more or less relevant with particular groups of people.

Specifically, researchers in the USA (Ong, Barney, Barrett et al., 2019) investigated psychological flexibility and self-compassion as mediators and moderators of ACT outcomes in participants with clinical perfectionism (n = 53). Participants were randomised to either a 10-session ACT condition or a 14-week WLC condition. Results showed that psychological flexibility mediated the relationship between condition and quality of life and that self-compassion mediated the relationship between condition and concern over mistakes, though not other aspects of clinical perfectionism such as high personal standards. Those with average baseline self-compassion improved most favourably as a result of ACT, which seems logical since there is likely a ceiling effect for those with higher levels. Meanwhile, perhaps the dosage was not strong enough for those with lower self-compassion at baseline. While this study was

unusual and welcome in the ACT literature in that multiple processes of change were examined, it is possible that further mechanisms of change are still being overlooked.

1.2.5 ACT & Stigma

It has been suggested that it is difficult to reverse cultural stereotypes once they are learned (Krafft, Ferrell, Levin, & Twohig, 2018). When it comes to stigma, then, it may be more logical to alter relationships to internal stigma-related experiences than to focus on changing the content or frequency of said experiences. Thus targeting psychological flexibility might also be a suitable intervention in the reduction of stigma and self-stigma, which is particularly relevant given that stigma has been highlighted as a barrier to treatment-seeking in university students (Apolinário-Hagen, Harrer, Kählke, Salewski, & Ebert 2018; Blanco et al., 2008; Eskin et al., 2016; The Insight Network, 2019; Levin, Stocke, Pierce, & Levin, 2018; Viskovich & Pakenham, 2018). In fact, psychological inflexibility has been shown to predict generalised prejudice above conventional predictors (Levin et al., 2016). ACT interventions may even buffer the effects of stigma, racism and discrimination in those on the receiving end (Brown-Iannuzzi, Adair, Payne, Richman, & Fredrickson, 2014). The ACT model of stigma-reduction is even congruent with current social psychology literature which advises that efforts to control prejudiced thoughts may actually backfire (Krafft et al., 2018).

In the first systematic review and meta-analysis (k = 16) investigating the link between psychological inflexibility and stigma as well as ACT interventions for stigma (Krafft et al., 2018), results indicated a positive, medium-to-large relationship between psychological inflexibility and stigma. ACT interventions showed consistent decreases in stigma and improved outcomes in comparison with active control groups. Indeed, the results supported this novel approach to reducing stigma in the long term even with low-intensity treatments. However, the authors did not develop nor detail a systematic review protocol, thus limiting further replication and evaluation of their methods.

ACT is clearly a promising new treatment for a variety of psychological symptoms, but how effective is it when delivered via web-based interventions? Let us now consider the literature on online interventions, before focusing on ACT-specific web-based interventions.

1.3 Web-Based Interventions

1.3.1 Overview

One potential solution to the university student mental health crisis is web-based interventions. Web-based mental health programs can be convenient, cost-effective, private, flexible, easily disseminated, scalable, amenable to students and reduce both the stigma associated with help-seeking and the pressure on university counselling services (Viskovich & Pakenham, 2018). Such interventions can provide treatment to students who are restricted by geography, disability, finances or psychological barriers, those on the waiting list and those seeking further support following face-to-face treatment, all while maintaining a high level of treatment fidelity. Although heed must be paid to the concomitant potential for the exacerbation of social isolation, further advantages of web-based interventions include the ability for clients to return to material rather than relying on memory, the potential for economical and well-controlled RCTs, and the ease of updating interventions as new evidence is reported. It is unsurprising, then, that the Royal College of Psychiatrists (2011) called for increased availability of evidence-based web-based interventions for university students.

Web-based interventions could be particularly appropriate for a population known for their developing independence and high usage of technology (Viskovich & Pakenham, 2018). Perhaps this growing independence is one of the reasons for the low treatment-seeking rates in university students (Blanco et al., 2008; Eskin et al., 2016; Levin, Stocke, Pierce, & Levin, 2018). Indeed, a study of over 13,000 undergraduates reported a preference for handling mental health issues autonomously (Eisenberg, Speer, & Hunt, 2012). This is important since clients' preferences for psychological treatment are linked to improvements in clinical outcomes (Williams et al., 2016). Research associates web-based interventions with empowerment, self-management, agency and self-efficacy (Lappalainen et al., 2014; Lappalainen et al., 2015). However, there is some uncertainty over the suitability of web-based interventions for certain groups of students. For example, mature and international students sometimes require additional direction and students with disabilities benefit from the application of web accessibility guidelines (Stallman & Kavanagh, 2016).

Another important limitation of self-guided web-based interventions is that effect sizes are typically low in comparison with face-to-face treatment or guided self-help (Farrand & Woodford, 2013). However, web-based interventions with some therapist or administrator

contact show similar results to in-person treatment with medium to large effect sizes for CBT (Cuijpers, Donker, van Straten, Li, & Andersson, 2010) and ACT (Lappalainen et al., 2014). Another note of caution with web-based interventions concerns late-night use, which can negatively affect circadian rhythms, a major risk factor for mental health issues in itself (Burns, Davenport, Durkin, Luscombe, & Hickie, 2010). However, it is also possible that late-night support might be critical to young people in crisis.

1.3.2 Web-Based Interventions for University Students

Farrer et al. (2013) conducted a systematic review of randomised studies (k = 27; 26 RCTs and one randomised trial) examining technology-based interventions specifically for university students, and mainly targeting depression, anxiety and stress. Close to half (47%) of the interventions across the studies resulted in a minimum of one significant positive outcome in comparison with a control group at post-treatment. Effect sizes were calculated for 18 of the interventions where data was adequate, with a medium median effect size (g = 0.54) for interventions aimed at both depression and anxiety (k = 8), and a large effect size (g = 0.84) for interventions focused on anxiety only (k = 10). Interestingly, neither the length nor frequency of interventions was associated with positive outcomes. Some limitations were noted in the reviewed studies, such as lack of randomisation, insufficient descriptions of randomisation where it did occur, lack of identification of a primary outcome (i.e., the main clinical outcome targeted in the study, such as anxiety or depression) and lack of intention-to-treat analysis. Furthermore, the combination of interventions reviewed included a mix of those developed specifically for university students – for example, targeting exam anxiety – and more generic interventions.

More recently, Harrer et al. (2019) conducted a systematic review and meta-analysis (k = 48 RCTs) on the effectiveness of web-based interventions for university students' mental health. This study was part of the WHO World Mental Health International College Student initiative (WMH-ICS, 2018), a global investigation into the mental health of university students. The authors reported small effect sizes for depression (g = 0.18), stress (g = 0.20) and anxiety (g = 0.27). However, effects on anxiety were no longer significant once results were adjusted for publication bias. Moderate effect sizes were reported for symptoms of eating disorders (g = 0.52) and socio-professional functioning (g = 0.41). Non-significant effects were found on well-being (g = 0.15). Of interest, effects were higher for interventions of moderate length (1–2 months) and CBT interventions, 29% of which were third-wave treatments. Finally, unlike

previous research, the authors reported that clinical guidance (i.e., the level of therapist contact) did not moderate intervention effectiveness. However, guidance did vary substantially among the studies included, which may have concealed the effects. Alternatively, it could be that guidance is not as vital to the success of web-based interventions with university students, who, as mentioned previously, demonstrate a preference for handling mental health issues autonomously (Eisenberg et al., 2012).

1.3.3 Attitudes to Web-Based Interventions

Two online surveys investigating public attitudes to web-based interventions were published in 2018 to ratify the usability of web-based interventions for mental health support. According to the first (Levin, Stocke, Pierce, & Levin, 2018), undergraduate students (n = 389) in the Mountain West region of the United States were most inclined towards informal support (e.g., friends) and least inclined towards web-based self-help. However, a small subgroup (1%) reported a predilection for web-based self-help above any other format. This, in addition to the substantial number of participants who reported using web-based interventions in the past (23%), led the authors to conclude that these interventions could still be a powerful public health resource. Also of note is the minority of participants who reported using web-based self-help resources and not professional face-to-face support services. This lends weight to the premise that there exists a subgroup of students who are willing to use web-based but not face-to-face resources. This is important because, while the results were mixed overall, it means that web-based services could provide support to individuals who would not seek treatment in traditional ways. Perhaps web-based interventions might even act as a gateway for such groups to reach out for further support.

In the second survey (Apolinário-Hagen et al., 2018), while participants (n = 646; 53.4% university students) did not consider web-based interventions as an adequate replacement for in-person treatment, the majority perceived web-based interventions to be helpful (65.9%) and were willing to use them (81.0%). Interestingly, participants indicated a preference for guided web-based interventions (39.0%) above video-psychotherapy (22.8%), although unguided web-based interventions (19.2%) were less popular. A significant minority (19.8%) were disinclined to use web-based interventions for mental health support in any format. A preference for web-based help was positively associated with an avoidant attachment style and stress, supporting the hypothesis that web-based interventions might reach those for whom psychological or temporal barriers prevent conventional treatment-seeking. Of note, 53.1% of

respondents were not aware of the existence of web-based interventions, highlighting the need for increased public awareness. Interestingly, sociodemographics were not found to be predictors of attitudes to web-based interventions. While the sample may have been biased due to its web-based nature, conversely this may be the population most likely to engage with web-based interventions.

The two attitude surveys were conducted by separate teams of researchers in the USA and Germany, respectively, and yet the same help-seeking barriers were identified: concerns around data privacy, stigma, and intervention credibility. There were also concerns that smartphone applications (apps) might come to replace face-to-face therapy. Respondents were more inclined towards apps as an *adjunct* to in-person therapy. Stigma as a barrier is particularly interesting given that, as set out above, web-based interventions are typically associated with lower perceived stigma. Specifically, students were concerned that others might see them using self-help smartphone apps (Levin, Stocke, Pierce, & Levin, 2018). One of the advantages of web-based interventions is the facilitation of simple dissemination; however, this also heightens the risk of public exposure to non-evidence-based, ineffective and even harmful apps. One way to mitigate against this is for psychologists to provide technology-based intervention recommendations to counsellors, students and the general public. The credibility concerns raised by students are worth considering in light of the current technological and therapeutic landscapes. For example, the authors (Levin, Stocke, Pierce, & Levin, 2018) remind us that the majority of mental health apps, and indeed many mental health practitioners, do not use evidence-based methods and that treatment dosage is often too low to effect change.

It is clear that web-based interventions are not the first choice of mental health support for many university students, but we must contemplate this within the context of our under-resourced mental health services. There are also limitations with online mental health surveys such as the use of ambiguous key terms (e.g., ‘self-help’; ‘mental health problems’) in questionnaires, which may have been misunderstood. Moreover, whether they are *perfectly* acceptable or not, they do appear to be effective (Farrer et al., 2013; Harrer et al., 2019), but how effective are web-based ACT programs in particular?

1.4 ACT Self-Help Interventions

1.4.1 ACT Self-Help Programs

Recently, a systematic review and meta-analysis investigated the efficacy of self-help ACT interventions targeting depression, anxiety and/or psychological flexibility in adults (n = 2,580; 15.5% students) in 13 peer-reviewed RCTs (French, Golijani-Moghaddam, & Schröder, 2017). Results supported the efficacy of ACT for depression (g = 0.34), anxiety (g = 0.35) and psychological flexibility (g = 0.42). Greater effect sizes were associated with brief clinical guidance, unlike in a previous systematic review and meta-analysis (Harrer et al., 2019). The intervention format (e.g., self-help book) did not appear to moderate results. In line with previous studies (French et al., 2017; Ong, Barney, Barrett et al., 2019; Twohig & Levin, 2017), support for the hypothesis that psychological flexibility mediates outcomes was also reported, with psychological flexibility associated with decreases in depression (*rho* = -0.70) and anxiety (*rho* = -0.90).

1.4.2 ACT Bibliotherapy

Bibliotherapy is a natural precursor to web-based interventions. A commonly cited study in the literature, included in multiple systemic reviews and meta-analyses (French et al., 2017; Hacker et al., 2016; Twohig & Levin, 2017), examined the effectiveness of a guided ACT self-help program for depression (Fledderus, Bohlmeijer, Pieterse, & Schreurs, 2012). Adults with mild to moderate depression were enlisted from the general population and randomised to the self-help program with extensive email support (n = 125), the self-help program with minimal email support (n = 125) or a waiting-list control group (n = 126). The intervention consisted of the self-help book *Living to the Full* (Bohlmeijer & Hulsbergen, 2008) which participants received via post. The book consists of nine modules, based on the six core processes of ACT. Participants were advised to complete one module each week for 9 weeks. Once a week, both experimental groups received an email from a counsellor (one of five ACT-trained psychology postgraduate students supervised by a clinical psychologist), on the topic of the module associated with that week. Participants were expected to reply within 48 hours, at which point the counsellor responded with a feedback email. Those in the minimal support group received an email asking about progress only and received encouraging feedback from the counsellor. Meanwhile, the extensive email support group were also asked about how they were experiencing the modules and what they might have discovered as a result; they also had

permission to ask questions about the program. Counsellors replied to feedback on experiences and questions on the program, as well as providing advice regarding program completion.

Both experimental groups showed significant decreases in depression, anxiety, fatigue, experiential avoidance and enhancements in well-being and mindfulness in comparison with the waiting-list control group (d = 0.51–1.00) at both post-treatment and 3-month follow-up. However, results may have been affected by uncontrolled variables, such as spontaneous remission. The study benefited from the inclusion of two levels of the intervention, which allowed for the evaluation of optimum treatment intensity. Surprisingly, the authors reported no significant difference on outcome measures between minimal and extensive email support. This was in line with previous research which suggested that self-help programs with minimal counsellor contact are as effective as face-to-face therapy (Cuijpers et al., 2010) and supports the idea of self-help interventions as both therapeutically and economically effective, necessitating minimal clinical guidance. While ACT bibliotherapy is clearly associated with positive outcomes, reliance on a physical book is not always convenient or discreet. Moreover, monitoring user activity and disseminating clinical updates can be a challenge. Meanwhile, web-based interventions are still associated with positive outcomes, while offering a solution to these practical challenges.

1.4.3 ACT Web-Based Interventions

The first systematic review and meta-analysis of third-wave web-based RCTs (k = 21; n = 3,176) focused on treatment effects on depression, anxiety and quality of life (O'Connor, Munnelly, Whelan, & McHugh, 2018). Third-wave interventions outperformed inactive control conditions on depression (g = 0.52), anxiety (g = 0.32) and quality of life (g = 0.46), at post-treatment with small to medium effect sizes, and active control groups on depression (g = 0.29) and anxiety (g = 0.31), with small effect sizes. Results suggested that more stringent studies yield smaller effect sizes, similar to previous meta-analyses (A-Tjak et al., 2015; Öst, 2008). Also in line with earlier meta-analyses (A-Tjak et al., 2015; Hacker et al., 2016), the authors noted that there were no statistically significant differences compared to existing interventions. Although it is unfortunate that the authors did not provide sub-analyses of the various third-wave therapies, for the purposes of this review it is noteworthy and advantageous that almost half of the studies (k = 9) focused on ACT. However, the authors examined post-treatment data only, so no conclusions can be reached on the longer-term benefits of third-wave web-based interventions. They concluded that third-wave web-based interventions have the

potential to improve access to mental health services and stepped care approaches in adult populations.

Email reminders

It seems clear that web-based interventions accompanied by some clinical guidance are more successful than purely self-guided interventions, but how much guidance is necessary? Web-based ACT interventions have been shown to be equally or more effective than in-person treatment in depression in Finnish adults (Lappalainen et al., 2014) when participants (n = 38) receive face-to-face support at the beginning and end of the intervention only. Using the latest version of the same intervention, the authors wondered whether results could be replicated by replacing face-to-face contact with limited phone and email support and automated email reminders (Lappalainen et al., 2015; n = 39; 5.1% students). This time, the intervention consisted of 7 weeks of home assignments, with online feedback provided by postgraduate psychology students. Participants in the ACT group received telephone contact at the start of the intervention and also if they did not complete the weekly assignment following three automated reminders (n = 1). In comparison with a WLC condition group, the ACT group reported significantly favourable results on depression (g = 0.83), psychological flexibility (g = 0.67) and mindfulness (g = 0.53) at post-intervention and effects were maintained at 12-month follow-up. Participants also reported that they would recommend the program to others experiencing similar symptoms (M = 8.94 out of 10). This supports the hypothesis that low-intensity interventions with limited support, supported by novice therapists without formal ACT qualifications, can be effective. Although the effectiveness of automated email reminders in the study was unclear, a systematic review of periodic prompts in health interventions reported that they can be effective in behavioural interventions (Fry & Neff, 2009), perhaps because they imitate guided treatment.

1.4.4 ACT Smartphone Applications

ACT Daily

ACT interventions delivered via smartphone apps have the advantage of providing high-frequency real-time treatment. One study examined the efficacy of a basic app to enhance psychological skills learned in face-to-face ACT (Levin, Haeger, Pierce, & Cruz, 2017). Over a 2-week period, 14 adults with depression and/or anxiety disorder were provided with access to the 'ACT Daily' app. The app consisted of check-in screens and 28 short skill sessions

covering all ACT components except for committed action and self-as-context skills, which were omitted due to challenges with assessing and tailoring these skills, in addition to their less prolific evidence base (Godbee & Kangas, in press; Levin et al., 2012). Skill suggestions were based on whatever source of psychological inflexibility appeared to be most elevated at check-in. Post-intervention check-ins mirrored pre-intervention skills session check-ins and were therefore helpful in the exploration of which ACT components are helpful to whom under which conditions.

Depression (d = 0.84), anxiety (d = 0.45) and psychological flexibility (d = 1.13) improved significantly over the 2 weeks. Participants also reported high levels of satisfaction with the app, with 'excellent' (Bangor, Kortum, & Miller, 2008) ratings on the System Usability Scale (SUS; Brooke, 1996; M = 89.08, SD = 7.69). Interestingly, results indicated that the usefulness of skills varied according to which aspect of psychological inflexibility was highest at a given moment. For example, acceptance skills appeared to be most helpful in the reduction of experiential avoidance. Remarkably, the authors noted difficulties in recruiting participants: only 14 clients took part in the final study, even though 22 existing ACT therapists advertised the study to clients over a 14-month period. Moreover, the authors noted that although nationwide recruitment took place, all but a single participant were local university students. Clearly, then, even with an app that is reported to be both effective and highly satisfactory, barriers to engagement still persist, consistent with the web-based intervention attitude surveys discussed earlier (Apolinário-Hagen et al., 2018; Levin, Stocke, Pierce, & Levin, 2018). Notably, some participants in this study spontaneously used the app with their therapists. Perhaps further app adherence might be achieved by actively engaging therapists with the app, for example, allowing the therapist to monitor clients' progress on a dashboard. With promising pilot studies, more nuanced algorithms could be developed in future apps taking into account variables such as previous app usage, contextual variables and perhaps even physiological variables, such as heart rate.

More recently, a subset of the same team of researchers (Levin, Haeger, & Cruz, 2019) conducted an RCT in the hope of further optimising the ACT Daily App (n = 69). Participants were randomised into one of three conditions for 4 weeks, as follows: (1) check-ins followed by tailored skill sessions; (2) check-ins followed by random skill sessions; (3) check-ins only. It was predicted that the tailored skills group would improve the most, followed by the random skills group. Indeed, the tailored group improved significantly on distress and positive mental

health compared to the other two conditions. Surprisingly, no differences were discovered between the random and check-ins only group, and the latter actually improved more on psychological flexibility. This supports the idea that some degree of real-time tailoring is warranted, consistent with ACT's focus on the present moment and contextual factors (Hayes et al., 2012). Satisfaction levels were in line with the first evaluation of ACT Daily (M = 89.08) and were similarly high in the tailored (M = 83.13) and random (M = 87.88) app conditions. The check-ins only group used the app most frequently, and the tailored group used it the least. This is notable considering that the tailored app group improved the most. It could be because tailored skill sessions resulted in more efficient improvements.

The ACT Daily App was developed and hosted on Qualtrics online survey software, which had been used successfully in previous web-based intervention studies (e.g., Levin, Haeger, Pierce, & Twohig, 2017). Although Qualtrics is primarily a survey platform, it provides a cost-effective and simple-to-use environment for quickly developing and disseminating interactive interventions with multiple conditions featuring multimedia and tailored elements and with a relatively sophisticated user interface. However, Qualtrics was not designed for the development of such interventions and it is not possible to advertise Qualtrics-developed apps on popular app stores, somewhat reducing the potential for quick and easy recruitment and dissemination. Regardless, the ACT Daily App studies provide further support for the successful use of Qualtrics in interventional research.

The Matrix App

More recently, another team of researchers, including the principle researcher from the ACT Daily App studies (Krafft, Potts, Schoendorff, & Levin, 2019), conducted a pilot RCT examining multiple versions of another ACT smartphone app, this time focused on using a new ACT tool for the enhancement of well-being. The ACT Matrix (Polk & Schoendorff, 2014) is a visual tool which aims to enhance psychological flexibility by teaching clients to discriminate between sensory and mental experiences, as well as behaviours which move away or towards valued living. The basic matrix diagram consists of four quadrants: sensory-toward (valued actions), sensory-away (experiential avoidance), mental-toward (values) and mental-away (inner obstacles).

Two samples were recruited: undergraduate students (n = 63) and help-seeking adults (n = 35). Participants were allocated to one of three conditions: (1) simple matrix app – participants were

simply asked to identify away and toward moves five times a day; (2) complex matrix app – in addition to identifying away and toward moves, a daily check-in asked participants to rate inner obstacles and their ability to act according to their values across various life domains; it also contained an optional goal-setting feature and a series of ACT activities; (3) WLC. In the undergraduate sample, no differences were found between the conditions. Meanwhile, in the adult help-seeking sample, well-being and valued living increased in both of the active conditions, and even more so for the complex app group.

It seems that ACT self-help programs are effective when delivered in a variety of ways, and particularly when they are accompanied by some clinical guidance and/or email reminders. Since the effectiveness of ACT and web-based interventions has been empirically established, let us now turn to the literature on ACT with university students.

1.5 ACT & University Students

Over 100 RCTs have now been published which show how ACT can be used to improve mental health issues associated with university students (Hooper & Larsson, 2015), such as generalised anxiety, depression, eating concerns and public speaking anxiety (A-Tjak et al., 2015; Öst, 2008). ACT therefore seems a natural fit for university settings where support services cater to an array of clinical issues (AUCCCD, 2014; Gallagher, 2014). Additionally, a significant number of university students are adolescents. Halliburton and Cooper (2015) argue that ACT can specifically help adolescents through:

- Mindfulness training – reduces stress and anxiety; improves self-care, self-control and sleep.
- Values clarification – improves motivation to pursue hobbies and decision-making around career and risky behaviour.
- Acceptance and flexible perspective-taking skills – provide the tools for negotiating internal and external conflict and independence.
- Defusion and self-as-context techniques – help young people to differentiate between the real self and those aspects which are products of socialisation.

1.5.1 Academic Success & Socioeconomic Status

Applying the psychological flexibility model to the world of academia, student struggles could be explained by the unwillingness to experience uncomfortable inner events related to

university life, engendering rigid thinking and behaviour, and disconnection from academic values. A feasibility study in the USA (Sandoz, Kellum, & Wilson, 2017) demonstrated how a 9-week ACT group intervention positively affected grades (d = 0.92) for undergraduate students from low-income families who were at risk of dropping out (n = 14). Moreover, post-treatment graduation rates were impressively high (57.1%) in contrast with a comparison group who did not have access to the program (35.1%). This could have a profound impact on the future of students from low-income families, given, for example, that annual income increases according to educational level. However, it was unclear in the study how alternative academic support interacted with the ACT intervention. Additionally, although the intervention lasted 8 weeks, only the initial half-day workshop was mandatory, the eight 2-hour follow-up booster sessions being optional.

1.5.2 ACT as a Positive Psychological Intervention

Another study (Howell & Passmore, 2019) focusing on the positive effects of ACT on university students, made the argument for ACT as a positive psychological intervention since positive psychology aims to boost well-being and ACT has also been shown to do so. Other similarities between ACT and positive psychology include a focus on goals and mindfulness, as well as their successful application across clinical, educational, social and/organisational contexts (Ciarrochi, Kashdan, & Harris, 2013). Yet ACT and positive psychology literatures have "hardly referenced each other" (Ciarrochi et al., 2013, p. 2). Howell and Passmore conducted a systematic review and preliminary meta-analysis (k = 5; n = 585) which investigated the effect of ACT on well-being in samples of North American, Finnish and Chinese university students in comparison with control groups. The authors reported a small but significant overall effect size on well-being (d = 0.29), leading them to conclude that ACT should be incorporated into well-being literature. Yet none of the studies that they reviewed cited principal positive psychology literature. In fact, the founder of ACT has gone as far as to suggest that ACT and positive psychology are "… mutually supportive fellow travelers" (Hayes, 2013, p. 317). Meanwhile, a leading voice in positive psychology literature has started to refer to *contextual* positive psychology (Ciarrochi, Atkins, Hayes, Sahdra, & Parker, 2016). It seems, then, at least when it comes to university students, that ACT could be considered well within the remit of well-being, and therefore positive psychology, literature.

1.5.3 Counselling Psychology Trainees

The relevance of ACT to counselling psychology extends not only to client outcomes but also to self-care among trainees and practitioners. A pilot study (Moyer, Murrell, Connally, & Steinberg, 2016) in the USA investigated the use of a semester-long ACT course as support for clinical and counselling psychology doctoral students (n = 10). While students were not explicitly instructed to apply the ACT techniques personally, personal growth was still expected. Although not consistent across all students, improvements in ACT knowledge were reported, along with modest benefits vis-à-vis personal growth, as well as reduced stress and increased self-compassion levels for some students. In fact, the only two students who appeared not to improve on emotional regulation also appeared to struggle on the ACT knowledge quiz element. Elsewhere in the literature, experiential ACT workshops have engendered improvements in psychological flexibility, self-care and clinical practice among cross-discipline trainee and qualified psychologists (Luoma & Vilardaga, 2013; Wardley, Flaxman, Willig, & Gillanders, 2016). Finally, a 4-week ACT workshop for postgraduate clinical psychology students resulted in improvements in psychological flexibility, life satisfaction, counselling self-efficacy and therapeutic alliance (Pakenham & Stafford-Brown, 2013), with students rating the intervention as both professionally and personally useful.

So ACT has been shown to be effective with university students, but what about when it is delivered online? Next, we will consider the principle studies which have examined ACT web-based interventions for university students. These have taken place in Finland, the USA and Australia.

1.6 ACT Web-Based Interventions & University Students

1.6.1 Finland

One of the earliest studies was an RCT that investigated the effects of a 7-week web-based ACT program on well-being in Finnish university students (Räsänen, Lappalainen, Muotka, Tolvanen, & Lappalainen, 2016; n = 68). Participants were randomised to a WLC group or an ACT group which received two face-to-face sessions succeeded by seven online sessions, as well as personalised weekly written feedback via student coaches. The ACT group reported significantly higher improvements in well-being (d = 0.46), life satisfaction (d = 0.65), self-esteem (d = 0.63), and mindfulness (d = 0.49), but not in psychological flexibility (d = 0.11). They also reported greater reductions than the WLC group on two depression measures (ds =

0.55 and 0.69), but results for anxiety were less impressive (d = 0.20), and results for stress were mixed across two measures (ds = 0.54 and 0.18). Improvements continued at 12-month follow-up. Notably, coaches spent an average of 45 minutes a week per client in spite of being instructed to spend a maximum of 20 minutes on each participant. Presumably, this might decrease over time, and yet it is noteworthy that at 45 minutes, the effort is almost equivalent to the typical clinical hour.

1.6.2 USA

A group of authors in the USA have been developing web-based interventions for university students for years, varying the number of modules, ACT components, reminders, material and guidance level in the quest for the optimal intervention. Two of their early studies reported improvements in motivation, depression, anxiety, stress, psychological flexibility, mindfulness, and academic values in students following brief online ACT interventions in comparison with a WLC group (Levin et al., 2014) and a no control condition (Levin, Pistorello, Hayes, Seeley, & Levin, 2015), as well as high satisfaction ratings. However, their subsequent study (Levin, Hayes, Pistorello, & Seeley, 2016) compared the latest iteration of their program to a generic website promoting psychological skills and found that the treatment group (n = 114) did not vary from the website-only group (n = 120) on primary outcomes or ACT components at post-treatment and follow-ups. Perhaps this is because the website control condition was more helpful than a simple WLC condition, or it could be that the intervention was not effective for all university students.

Finally, in 2017, a team lead by the same principal author (Levin, Haeger, Pierce, & Twohig, 2017) conducted the RCT on which the research in this thesis draws heavily. The researchers examined the effect of a 4-week web-based ACT program on psychological problems in US university students (n = 79). In contrast with their earlier work, the 6-module program included all six ACT components. Participants experiencing distress were recruited via the Sona research platform and class announcements, and randomised to the ACT or WLC condition. Psychology course-credits were offered as a participatory incentive. The authors proposed that this was the first study to examine a complete ACT web-based self-help intervention for a variety of psychological issues affecting university students. Like the ACT Daily smartphone app (Levin, Haeger, & Cruz, 2019), this program was developed and hosted on Qualtrics.

The ACT group reported significantly improved general anxiety (d = 0.47), social anxiety (d = 0.78), depression (d = 0.50), academic concerns (d = 0.62), positive mental health (d = 0.58), overall distress (d = 0.66), acceptance (d = 0.53) and values-obstruction (d = 0.65) in comparison with the WLC group. However, no significant differences were observed in eating concerns, alcohol use, hostility, the remaining investigated components of psychological flexibility (mindful awareness, values-progress, fusion), or psychological flexibility itself. The lack of improvements in psychological flexibility might be explained by the use of the Acceptance and Action Questionnaire–II (AAQ-II; Bond et al., 2011) as the measurement tool. Researchers believe that the AAQ-II may be less sensitive to psychological flexibility changes with university students (Levin et al., 2014). In line with previous studies (French et al., 2017; Ong, Barney, Barrett et al., 2019; Twohig & Levin, 2017), results provided support for psychological flexibility as a mediator of change. However, unlike most previous studies, the authors also examined the mediation effects of separate components of psychological flexibility and were able to conclude that changes in specific psychological flexibility components (acceptance and values-obstruction) mediated outcome changes (well-being and distress).

The program appeared to be acceptable to students, with the majority of participants completing a minimum of 50% of the program. Satisfaction ratings were slightly lower than previous studies (e.g., Levin et al., 2015; Levin, Haeger, Pierce, & Cruz, 2017) but the program was still rated as adequate on the System Usability Scale (M = 71.13) and individual satisfaction items. However, given the pilot nature of the study, naturally, there were some limitations. For example, although the Counseling Center Assessment of Psychological Symptoms (CCAPS-34; Center for Collegiate Mental Health [CCMH], 2012) is helpful in assessing transdiagnostic interventions, it is not possible to reliably conclude whether an intervention is effective in the treatment of specific clinical disorders when the CCAPS-34 alone is used to measure symptoms. Moreover, this measure does not address all areas of concern related to university students, such as relationships and career decisions.

1.6.3 Australia

More recently still, researchers in Australia (Viskovich & Pakenham, 2018) examined the effects of an online ACT program on mental health in university students. The program, You Only Live Once (YOLO), included all six ACT components, and was comprised of four modules over a 4-week period. Unlike previous research, the study did not include incentives

(e.g., Levin et al., 2014) nor face-to-face support (e.g., Levin, Haeger, Pierce, & Cruz, 2017), and students were recruited from multiple disciplines and degree levels within the university, which potentially increased generalisability. A total of 130 participants were recruited and randomised into one of three groups in order to ascertain the superior intervention delivery method; the study included no control condition. Group 1 were advised to complete one module per week over the 4 weeks but had the option to complete the modules as and when they wanted. Group 2 were given no instructions on how or when to complete the modules over the 4 weeks. Group 3 had the strictest structure applied; without first completing a module they could not proceed to the subsequent module, and even when the former was completed, a 3-day gap was imposed. All groups received reminder emails or SMS messages every three to seven days throughout the program.

Interestingly, all of the groups improved on all primary outcomes except alcohol use (depression, $d = 0.36$; anxiety, $d = 0.32$; stress, $d = 0.48$; well-being, $d = 0.25$; self-compassion, $d = 0.58$; and life satisfaction, $d = 0.45$) and also improved on ACT processes (acceptance, $d = 0.37$; cognitive fusion, $d = 0.40$; education values, $d = 0.25$; engaged living, $d = 0.40$; and mindfulness, $d = 0.68$), with no differences reported between the three groups. The lack of differences between the groups was disappointing, since it did not shed much light on the optimal delivery method, but the authors reported that, based on qualitative data, the most rigid delivery method (Group 3) was the least liked. Moreover, participants in Group 2, who received no instructions, reported higher rates of not starting the program (30%) in comparison with Groups 1 (23%) and 3 (23%). It is not surprising, then, that a balance between flexibility and structure appears to be the most promising in terms of user satisfaction and engagement. Also of note, 89% of participants rated the reminder emails as helpful. Furthermore, while only 62.3% of participants visited the program on more than one occasion, this is considerably higher than the accepted repeat user rate among students of 25% (Stallman & Kavanagh, 2016). Additionally, students who did revisit the program rated it as well above average.

Similar to Levin, Haeger, Pierce and Twohig (2017), distinct ACT components were examined as mediators of change. The authors found that *all* of the ACT processes mediated improvements on at least one primary outcome, with acceptance, valued living, and cognitive fusion being the most common mediators. Of note, reported baseline distress levels (48.5–58.5%) were similar to those found in comprehensive studies of psychological distress in university students (Eskin et al., 2016; Stallman, 2010) but noticeably higher than in the US

web-based ACT studies (Levin et al., 2014; Levin et al., 2016). Reasons for this are not clear but may include that the study took place in a different country, and across all degree levels and disciplines, rather than focusing primarily on psychology undergraduate students (e.g., Levin, Stocke, Pierce, & Levin, 2018). While this is a solid study which also informs this research dissertation, it is not without flaws. For example, the randomisation of participants into three groups was conducted manually. However, comparisons between the three groups at baseline were examined to control for unequal groups.

While there is clearly support for web-based ACT interventions with university students in the form of RCTs, systematic reviews and meta-analyses, many of the studies included in this chapter are afflicted by some common limitations. These will be reviewed in the next section.

1.7 Common Limitations

The homogeneity of participants was noted in most of the studies (e.g., Levin, Haeger, & Cruz, 2019; Räsänen et al., 2016), which meant results could not be generalised to all university students. For example, a meta-analysis of web-based ACT interventions (Kelson, Rollin, Ridout, & Campbell, 2019) noted that the average proportion of participants identifying as female was 72.6% (range = 43.4–100%). Web-based ACT interventions for university students report similarly high figures (e.g., 66%, Levin, Haeger, Pierce, & Twohig, 2017; 85.3%, Räsänen et al., 2016; 75.4%, Viskovich & Pakenham, 2018). Although the literature spans multiple Western countries, such as Australia, Finland, and Germany, the majority of studies were conducted in the USA. None of the studies reviewed took place in the UK, and few UK-based studies were found for inclusion even in systematic reviews and meta-analyses, although Farrer et al. (2013) found one study examining a web-based CBT intervention for test anxiety in university students at Kings College London (n = 86; Orbach, Lindsay, & Grey, 2007); the results suggested that the intervention was indeed effective in comparison with a control group, with a post-intervention attrition rate of approximately 32.6%.

In the majority of studies participants self-selected, and also tended to be ethnically homogeneous, with a significant majority of participants identifying as White (e.g., 96.8%, Krafft et al., 2019; 94.2%, Levin, Haeger, & Cruz, 2019; 91.5%, Levin, Stocke, Pierce, & Levin, 2018), and a significant over-representation of psychology students (e.g., Levin, Stocke, Pierce, & Levin, 2018). Psychology students report higher levels of distress, treatment-seeking inclination (Lipson, Zhou, Wagner, Beck, & Eisenberg, 2016), intellectuality and

psychological mindedness (Yadavaia et al., 2014) in comparison with the general population. Having said that, the accessibility of ACT has been evidenced in its successful application with people with learning disabilities (Brown & Hooper, 2009) and brain injuries (Sylvester, 2011). The study examining ACT for clinical perfectionism (Ong, Barney, Barrett et al., 2019) was the only one to report on religion. Interestingly, 79.2% of participants identified as members of the Church of Latter-Day Saints; given that there exists a link between religiosity and scrupulosity, the authors suggested that scrupulosity may have impacted clinical perfectionism scores and behaviours (e.g., being more faith-driven). Given that many of the studies reported on above took place at the same university from which these participants were recruited, there may be other ways in which an over-representation of this particular group may have influenced the generalisability of the results.

Promising results should also be interpreted against the backdrop of bias. For example, there is a high risk of performance and detection bias with inactive control conditions and self-report measures, respectively, both of which tend to be linked to greater reported effect sizes (O'Connor et al., 2018). Notably, non-English language, unpublished and non-peer reviewed journals were excluded from the systematic reviews and meta-analyses (Farrer et al., 2013; Howell & Passmore, 2019; Krafft et al., 2018; O'Connor et al., 2018), suggesting that publication bias may also be a risk in the interpretation of any results. In contrast, where randomisation was automated (Levin, Haeger, & Cruz, 2019; Öst, 2008), there was adequate allocation concealment (i.e., the sequence of assigning participants to groups was hidden) and a low risk of selection bias. However, the Australian web-based intervention study involved manual random allocation (Viskovich & Pakenham, 2018) and in many other studies, the randomisation procedure was not clear. Furthermore, any usage data automatically recorded by online programs were not clearly captured (e.g., Viskovich & Pakenham, 2018).

Across the studies, sample sizes tended to be small (e.g., $n = 69$, Levin, Haeger, & Cruz, 2019; $n = 79$, Levin, Haeger, Pierce, & Twohig, 2017), which heightens the risk of Type II errors and suggests that they may not have the required power to detect differences between conditions. Cohen's *d* was sometimes reported for effect size (e.g., Hacker et al., 2016), but this suffers from a slight upward bias when based on small samples (Lipsey & Wilson, 2001). This was mitigated in those studies which transformed it into Hedge's *g* (e.g., Lappalainen et al., 2015). Some studies analysed completer data only, which can also exaggerate effect sizes (e.g., O'Connor et al., 2018). Surprisingly few studies incorporated power analyses and confirmed

whether intention-to-treat analysis was employed. Statistical power is also lessened due to the passive control conditions used in many of the studies (Howell & Passmore, 2019; Levin, Haeger, Pierce, & Cruz, 2017; Levin, Haeger, Pierce, & Twohig, 2017; Ong, Barney, Barrett et al., 2019; Räsänen et al., 2016; Viskovich & Pakenham, 2018), which does not control for the generic factors which accompany any treatment such as expectancy effects.

The studies reviewed did not typically include or exclude based on mental health criteria, in line with ACT's transdiagnostic approach. However, this meant that results could not be confidently extrapolated to particular mental health issues. Paradoxically, then, it is the transdiagnostic nature of ACT that prevents conclusions from being made, since many RCTs, meta-analyses and systematic reviews do not tend to focus on specific clinical populations (e.g., French et al., 2017). While non-clinical samples are convenient and sensible, with a broad-ranging approach, they may also mask the efficacy of interventions. Furthermore, when studies did target specific conditions, the diagnosis was typically still limited to self-report data, although a few studies did incorporate assessor interviews (e.g., Lappalainen et al., 2015). Moreover, concomitant treatment was rarely reported on and never controlled for in the studies reviewed above.

Some of the studies investigating less commonly studied areas used unvalidated measures (e.g., Levin, Stocke, Pierce, & Levin, 2018) and concerningly, as mentioned previously, the best available psychological flexibility tool (AAQ-II) may lack discriminant validity and exhibit reduced sensitivity with the university student population (Ong, Lee, Levin, & Twohig, 2019). Additionally, the operationalisation of ACT varied across studies. For example, ACT interventions ranged from 15 minutes (Farrer et al., 2013) to 16 weeks (Öst, 2008) and did not always include all six of the ACT components (e.g., Levin, Haeger, Pierce, & Cruz, 2017). Similarly, there was variability in the number of participants in ACT intervention studies ranging from 10 (Moyer et al., 2016) to 234 (Levin et al., 2016), which potentially also undermined statistical power in comparative calculations. Moreover, detailed ACT protocols were rarely published, potentially limiting replication. However, a tenet of the ACT community is the sharing of resources (Levin, Smith, & Smith, 2019), and this thesis is a good example of the realisation of that ethos since LifeToolbox was provided by a prominent ACT researcher freely, enthusiastically and expeditiously.

We know that web-based interventions with limited guidance show similar results to face-to-face treatment (Cuijpers et al., 2010; Lappalainen et al., 2014) and that students report a preference for guided web-based interventions even over video psychotherapy (Apolinário-Hagen et al., 2018). Again though, the operationalisation of 'guidance' varies considerably throughout the literature. When guided help was provided, coaches were typically psychology students with limited training (e.g., Räsänen et al., 2016), and the effect of the coach on the outcome was never reported, although in some instances adherence was monitored (e.g., Lappalainen et al., 2015).

Many of these limitations are not unexpected in a nascent model of psychotherapy, nor with feasibility and pilot studies. While some of them will be addressed in the current thesis, for example through the use of a psychological measure designed specifically for university students (AAQ-US; Levin, Krafft, Pistorello, & Seeley, 2018) rather than relying on the AAQ-II alone, some will persist, such as the homogeneity of participants and lack of active control condition, for want of additional resources. It is hoped that if feasibility is evidenced, further funded research might address the outstanding issues.

Qualitative Literature

The literature search did not explicitly exclude qualitative studies but rather focused on keywords such as 'university', 'web-based', 'acceptance and commitment therapy' and their synonyms in various combinations. Notably, when it came to university students this did not yield any qualitative results. Perhaps this reflects a limited emphasis on certain aspects of the phenomenology of the individual in ACT, such as early life experiences. Moreover, a perusal of the Association for Contextual Behavioral Science (ACBS) website reveals over 50 meta-analyses of ACT and more than 300 RCTs (ACBS, 2020). Meanwhile, it lists only 10 qualitative studies, although it does emphasise that qualitative transcript analyses lead to the development of early ACT measures and protocols.

A note on attrition

Although it is clear that attrition is a problem in web-based interventions, it can actually be quite challenging to interpret attrition rates across the existing literature since terms such as 'dropout', 'attrition', 'adherence' and 'completion' are rarely defined. For example, 'completion' might be explained as completing some or all of the baseline measures, modules, exercises, post-treatment, follow-up etc. We do know that approximately one-quarter of

students access web-based interventions on only one occasion (Stallman & Kavanagh, 2016). This might be because students do not find these programs useful, or it could be due to forgetfulness or perhaps because single sessions are satisfactory in themselves. Indeed, single-session programs have been shown to promote academic success in an undergraduate population (Chase et al., 2013).

Systematic reviews and meta-analyses of web-based interventions report attrition rates between 17% and 98% (Melville, Casey, & Kavanagh, 2010) for adults and between 1.9% and 50.3% for web-based interventions targeting university students (Harrer et al., 2019). Attrition rates for ACT interventions are also mixed, from general ACT interventions (23%, O'Connor et al., 2018; 0–37%, Öst, 2008) to self-help ACT interventions for adults (3–46.4%, French et al., 2017), and web-based ACT interventions aimed at adults (19.19%, Kelson et al., 2019). When it comes to web-based ACT intervention studies for university students, unsurprisingly, attrition rates vary according to the level of guidance and monetary incentive involved, ranging from 8% when both are present (Levin et al., 2014), to 21.2% when the monetary incentive is removed (Lappalainen et al., 2015; Räsänen et al., 2016), and varying from 21.5% (Levin, Haeger, Pierce, & Twohig, 2017) to 60.8% (Viskovich & Pakenham, 2018) with self-guided interventions with no monetary compensation.

While guided interventions are associated with increased engagement rates and effect sizes (Richards & Richardson, 2012), this clearly affects budgetary and staffing requirements. Although non-guided web-based interventions are not as successful, they can provide an economical alternative or additional source of support for some students, especially since even limited email guidance can be unexpectedly time-consuming (Räsänen et al., 2016). Attrition rates must also be considered in comparison with face-to-face adherence rates for university students, which have been reported at around 50% (Lucas, 2012).

1.8 Rationale for the Study

Although ACT was shown to outperform CBT in an early meta-analysis (Ruiz, 2012), the efficacy of ACT in comparison with other interventions remains unclear (A-Tjak et al., 2015; Hacker et al., 2016; O'Connor et al., 2018). This raises questions for stakeholders concerning optimal interventions for specific mental health issues. However, an effective universal approach towards mental health which acts on a broad range of outcomes may be ideal in a service that caters to a range of mental health issues and severities, such as a university

counselling service. Transdiagnostic interventions have the advantage of replacing multiple problem-specific interventions, thus potentially saving development time and cost, while targeting comorbidities in the individual.

That ACT relies on a very specific theory of change also gives it advantages over CBT. Meta-analyses and systematic reviews have put forth evidence that outcomes are mediated through psychological flexibility (French et al., 2017; Twohig & Levin, 2017), and more recent RCTs have indicated that some of the separate components of psychological flexibility act as mediators in themselves (Levin, Haeger, Pierce, & Twohig, 2017; Viskovich & Pakenham, 2018), so it may be that not all components are necessary to effect change. Although there is strong evidence for psychological flexibility as a mediator of outcomes, this does not mean that it is the sole mediator. We have seen for example how self-compassion also appears to mediate outcomes (Ong, Barney, Barrett et al., 2019). Of course, there is significant overlap between self-compassion and elements of psychological flexibility, such as acceptance and flexible perspective-taking. There is likely more nuance yet to be discovered, which is why it is so helpful to study the components of psychological flexibility separately.

Participants have typically rated ACT web-based interventions as above average (Levin et al., 2016; Levin, Haeger, Pierce, & Twohig, 2017; Viskovich & Pakenham, 2018) to high (Levin et al., 2014; Levin et al., 2015; Räsänen et al., 2016) on a standard usability measure (SUS) and non-standardised questions. However, there are exceptions, such as a more recent iteration which was rated as only adequately satisfying on non-standardised questions (Levin, Haeger, Pierce, & Twohig, 2017). Some studies incentivised participants with university course credits (e.g., Levin, Haeger, Pierce, & Twohig, 2017) and monetary compensation (e.g., Levin et al., 2014), meaning that reported engagement, satisfaction and impact on process and outcome measures might be more modest than with an actual treatment-seeking sample. Engagement is clearly an issue with web-based interventions, but few studies discuss how to best engage students going forward.

Previous web-based ACT interventions have been successful with university populations (e.g., Levin et al., 2014; Levin et al., 2015; Levin, Haeger, Pierce, & Twohig, 2017; Räsänen et al., 2016; Viskovich & Pakenham, 2018). Typical limitations in the literature include small sample sizes, homogeneous samples, a lack of active control condition, over-reliance on self-report measures, limited information on the integrity of ACT protocols and a lack of symptom

targeting. However, this must be considered in the context of easily developed broad-ranging applications that, although not preferable to all students (Apolinário-Hagen et al., 2018; Levin, Stocke, Pierce, & Levin, 2018), may serve a subsection of students who might not otherwise access mental health support. However, this promising approach has yet to be tested in the UK, where the need for a solution is no less urgent (The Insight Network, 2019; IPPR, 2017). Furthermore, most of the interventions mentioned in the above review were tested by the intervention developers; this may be the first time a web-based ACT intervention for university students has been tested by an independent researcher. That is not to say that it will be conducted without bias; potential sources of bias will be discussed in the Reflexivity section of Chapter 2 (Section 2.1.2).

By learning how to treat this population en masse, we might also elucidate pathways for the treatment of individual university students. Furthermore, the evidence-based approach of ACT, with rigorous scientific roots in behaviour analysis, Relational Frame Theory and CBT, is in line with the scientist-practitioner facet of counselling psychology. Web-based ACT studies are published by authors in multiple countries across journals from social, clinical and counselling psychology, contextual behaviour, psychiatry, psychotherapy, and college health literature. Thus by contributing to the research, the relevance of counselling psychology is maintained across multiple disciplines. It is notable that no qualitative research has been discussed in this chapter; the author fully supports the development of qualitative research in future studies of ACT with university students but suggests that the urgency of the mental health crisis demands large-scale solutions, which can sooner be answered by larger sample sizes and robust statistical analyses, hallmarks of quantitative studies.

As described in Section 1.6, studies evaluating the effectiveness of transdiagnostic online ACT interventions with university students have been conducted in Finland (Räsänen et al., 2016), Australia (Viskovich & Pakenham, 2018) and the USA (Levin, Haeger, Pierce, & Twohig, 2017), with each country evaluating a different ACT intervention. In order to source a web-based intervention for the purposes of this research, it was decided to reach out to the American team in the first instance. This was partly due to language restrictions around the Finnish program. Moreover, the US team had highlighted the use of Qualtrics as a delivery method, a tool that was freely available to the researcher as a student at City, University of London. The US team offered to provide the content for either of two transdiagnostic programs – ACT Daily (Levin, Haeger, & Cruz, 2019) and LifeToolbox (Levin, Haeger, Pierce, & Twohig, 2017).

Sections 1.4.4 and 1.6 describe promising studies featuring earlier iterations of these tools, respectively. Although setting up LifeToolbox required additional effort (e.g., building a LifeToolbox home page using website building software), it was still selected given its more sophisticated and aesthetically appealing user interface.

In conclusion, the current study is a response to the call in the literature and the media to generate solutions to promote psychological skills in university students. This study will build on previous literature in terms of evaluating the feasibility of a potentially scalable web-based ACT program for university students in the UK. The study is an RCT, in that subjects will be randomly allocated to one of two conditions, receive different treatment and be compared on measure responses. However, it will not meet the gold standard of evaluation since there will be no blinding of participants or researcher and input will be provided from self-report. The use of standardised measures that have been validated with university students, robust statistical analyses, and a follow-up assessment to offer credibility to any post-intervention effects, will go some way to maintaining methodological quality. Given that it is a pilot RCT, feasibility must be considered as well as statistical significance (Thabane et al., 2010). Results might be used to inform larger-scale studies in the research community, or at the very least, prevent the duplication of efforts. The intervention selected for evaluation is LifeToolbox, which is described in detail in Section 2.3

1.8.1 Research Summary & Aim

It is clear that we are facing a mental health crisis among university students in the UK and we do not currently have the resources to cope with it. Given the urgent need for brief, easily-accessible, flexible and cost-effective interventions to help university students maintain their mental health, the aim of this study is to evaluate the feasibility, including acceptability and preliminary efficacy, of a self-guided web-based ACT program with university students in the UK using a crossover intervention design. This was conceptualised into four primary hypotheses.

1.8.2 Hypotheses

Hypothesis 1: Participants in the immediate intervention group will show significantly improved mental health outcomes relative to those in the waiting-list control group following the intervention.

Hypothesis 2: The whole sample will show significantly improved mental health outcomes relative to baseline following the intervention.

Hypothesis 3: Changes in psychological flexibility and self-compassion will mediate decreases in psychological symptoms.

Hypothesis 4: LifeToolbox will be acceptable and usable as a self-guided application for university students.

The following three Chapters (2–4) will present the (2) Quantitative Method, (3) Results, (4) Discussion and final conclusions on lessons learned, limitations, implications for clinical practice, and possible pathways for further research.

Chapter 2: Methodology

2.1 Positioning the Researcher

2.1.1 Theoretical Position

Quantitative methods were dictated by the research aims of evaluating the feasibility and effectiveness of LifeToolbox. They also sit comfortably within the CBT paradigm, allowing for benchmarking against alternative interventions, facilitating the construction of predictive models and permitting the generalisation of results (Barker, Pistrang & Elliott, 2002). Yardley and Marks (2004) compare quantitative research to a map which provides precise information about a place, without ever conveying ambience. The usefulness of further qualitative studies is therefore also recognised and even encouraged in order to further validate and explore any quantitative results and provide this missing 'ambience'.

From an epistemological perspective, quantitative research can be viewed as positivist, since it relies on acquiring knowledge from data and facts. A positivist ontology assumes that there exists a single objective measurable reality, agnostic to the researcher (Robinson, 2014). Although this perspective could be deemed somewhat deterministic and reductionist, the aim of this study was never to establish a single truth, but rather a modest attempt to "test, falsify and thereby improve our imperfect models of reality" (Yardley & Marks, 2004, p. 4). Moreover, a positivist position permits the constructs under investigation to be defined in a way that provides a degree of uniformity – a concept that is becoming increasingly important when our policies and treatment guidelines rely on evidence-based trials and are heavily data-driven. For the purposes of this thesis, post-positivism was preferred over pure positivism due to its additional acknowledgement of scientific and human limitations, which seems more congruent with the dynamic and self-aware field of counselling psychology.

Unlike traditional positivism, post-positivism purports that researchers cannot be wholly separated from their research: assumptions and preconceptions about a topic may unwittingly affect research decisions and interpretations (Ponterotto, 2005). As leading social sciences statistician Andy Field (2016) writes, "good science should … promote objectivity" but "you can never fully get away from some subjectivity" (p. 21). While we can measure psychological inflexibility and symptoms, they can also be explained as subjective experiences, belying quantification. One way of addressing this here is through the employment of relatively neutral

third parties, such as data collection software and existing psychological measures, which enhance the dualism between the researcher and participants. While such measures cannot capture the complexity of subjective mental health experiences, they can provide some insight and direction in understanding the experience of university students when triangulated with studies from alternative research paradigms. Self-report measures are based on the assumption that people are truthful and consistent, and that responses can accurately reflect experience. Here, these were controlled for somewhat by the repeated measures aspect of the design, assuming that interpretation and truthfulness remained relatively consistent for each participant across time points.

2.1.2 Reflexivity

Many quantitative researchers avoid explicit forms of reflexivity, often due to financial and time constraints (Ryan & Golden, 2006). While tools such as psychological measures, Qualtrics and statistical software confer "an air of scientific objectivity" (Mauthner & Doucet, 2003, p. 415), it is important to recognise that the researcher's protected characteristics, personal experiences and values can still influence the research approach, the interpretation of results and any ethical judgements. Ultimately, benign introspection will serve as a tool for enhancing the current research and speculating on further research topics. For example, in this thesis topics for reflection might include: how did the participant information sheets, in providing details of both the researcher's gender and education level, affect participation in this study? What about the absence of the researcher? Were participants frustrated that they could not explain their responses? Did they feel that their experiences were reduced to scores on a scale? Could some participants have interpreted the online self-guided nature of the research as shaming or devaluing? Such reflexive discussions can lead to further opportunities for research.

Considering that I myself am a university student it would be difficult for me to have an entirely neutral view on the topic. Indeed, it is precisely because of my intimacy with and interest in this topic that I elected to research it. While this undermines a position of neutrality, perhaps this is mitigated somewhat by a sensitivity to nuance in the design and interpretation of results. As an advocate of ACT and having invested considerable resources into this project, naturally I hoped that LifeToolbox would decrease levels of student distress, but I was also open to the idea that it would not. Regardless of the results, it was important for research to continue into novel interventions for this population and, at the very least, this study could help to rule out the usefulness of certain interventions.

Finally, although I am independent of the development of the LifeToolbox program, I have been in email contact with the provider of the program and have elicited advice on the thesis, including the discussion of procedures and data analysis, with the understanding that he would be named as a secondary author on any resulting journal articles. Knowing one of the lead proponents of web-based ACT interventions for university students, even in a limited capacity, lends an additional layer of bias of which to remain vigilant.

2.2 Design

A randomised waitlist crossover intervention design was used. Participants were randomised to either the immediate intervention (ACT) condition or a waiting-list control (WLC) condition. The ACT group were given access to LifeToolbox following the completion of baseline measures, where 12 short ACT modules could be completed in a tunnelled sequence (i.e., sessions were designed to be completed in consecutive order, from 1 to 12). Four weeks after enrolment, WLC participants were transferred to the active intervention arm and given the same access. The ACT group was assessed at baseline, 4 weeks (post-intervention) and at 8 weeks (follow-up). Four-week follow-up was considered reasonable to assess for deterioration of gains and matches the intervention period incorporated in early web-based ACT studies for university students (e.g., Levin et al., 2014; Levin et al., 2015). WLC participants were also assessed at baseline, 4 weeks (pre-intervention) and 8 weeks (post-intervention). The main outcome and process measures were psychological symptoms and psychological inflexibility, respectively.

2.3 LifeToolbox Program Specification

The ACT program used in this study has been adapted from the work of ACT experts based on existing, empirically validated ACT and self-help protocols. This program is the latest iteration of the transdiagnostic 'LifeToolbox' program, which has been found to perform well relative to a waiting-list in a distressed university student sample, the results of which are currently being written up. The authors found that university students who completed the previous iteration of the LifeToolbox program improved on overall distress, general anxiety, social anxiety, depression, academic concerns, and positive mental health, relative to a waiting-list in an RCT (n = 79; Levin, Haeger, Pierce, & Twohig, 2017), as described in Chapter 1 (Section 1.6.2). The lead author of said study provided the content of the individual LifeToolbox modules which was received via 12 .QSF files and uploaded directly to Qualtrics, a secure web-based survey development program. Qualtrics uses Transport Layer Security encryption

(aka HTTPS) for all transmitted data. Qualtrics rights are held within City, University of London.

LifeToolbox takes a transdiagnostic approach in which sessions teach core ACT skills found to be helpful for a range of disorders rather than focusing on more disorder-specific issues. The aim of the program is to provide participants with a rudimentary theoretical and experiential understanding of ACT. Each module introduces a new concept or skill and requires approximately 15 minutes to complete. The module structure is as follows: an overview of the session, introduction to the new concept or skill, a series of exercises, session summary and a brief homework exercise. Homework exercises were automatically generated at the end of each module and personalised to incorporate individual responses from earlier in the session. In each of the modules, example scenarios are provided to elucidate how ACT skills could apply to specific challenges associated with attending university. Exercises range from didactic text-based content and reading about common ACT metaphors (e.g., Passengers on the Bus; Dropping the Rope), to interactive exercises (e.g., writing and sorting exercises; multiple-choice questions; automatic feedback on responses) and multimedia content (e.g., audio mindfulness exercises; animations of metaphors) with text-based alternatives. See Figure 2.1 for sample exercises. For further sample screenshots see Appendices F and H.

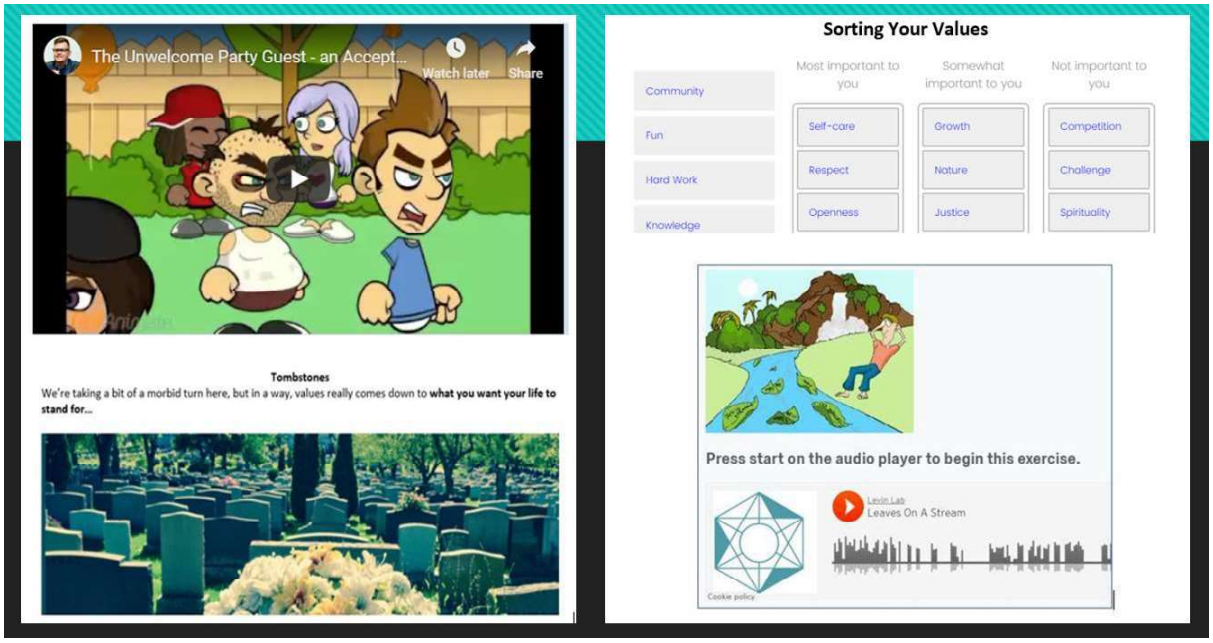


Figure 2.1 Screenshots from LifeToolbox illustrating a selection of video (the Unwelcome Party Guest), reflective (Tombstones), interactive (Sorting Your Values) and audio (Leaves on a Stream) exercises.

In the current study, although participants were encouraged to complete the series of 12 short modules in a tunnelled sequence, all of the modules were available to participants throughout the intervention period. The program included three modules focusing on each of following four ACT components: Acceptance (Modules 1-3), Cognitive Defusion (Modules 4-6), Valued Living (Modules 7-9) and Committed Action (Modules 10-12). Explicitly focused content on the core ACT processes of present moment awareness and self-as-context were omitted, due to challenges with operationalising, assessing and tailoring these skills, in addition to their less prolific evidence base (Godbee & Kangas, in press; Levin et al., 2012). However, there is an argument that these skills are subsumed in the remaining target content given the overlapping nature of ACT skills and concepts. For example, mindfulness exercises can teach acceptance, cognitive defusion, present moment awareness and self-as-context skills. Table 2.1 contains an overview of the program content.

Table 2.1

LifeToolbox Skills List

Core ACT Process	Module	Primary Content
Acceptance	1. Away Moves	• Difficult Emotions; Identifying Away Moves (experiential avoidance); Feeding a Tiger metaphor
	2. Letting Go	• Away Moves: Pain vs. Suffering; Dropping the Rope metaphor; Unwanted Party Guest *(video)*; Letting Go of Away Moves
	3. Carrying Emotions with You	• Unwanted internal experiences. Passengers on the Bus metaphor; Compassion; Catching Your Breath exercise; 'But' vs. 'And'
Defusion	4. Noticing Hooks	• Getting hooked on thoughts (cognitive fusion); Your Mind is a GPS metaphor; Identifying & Labelling Thoughts
	5. Stepping Back	• Rose Coloured Lenses metaphor; Leaves on a Stream *(audio-guided & text-based)*; Labelling Thoughts *(audio-guided & text-based)*
	6. Getting Flexible	• Your Mind as a Bully metaphor; Playing with thoughts (defusion)
Valued Living	7. Your Values	• What are Values; Rating Life Domains; Shoulds vs. Values; Identifying & Sorting Your Values (*interactive exercise)*
	8. How You Want to Act	• Connecting Actions & Values; Tombstone Reflection
	9. Finding Values	• Finding Values as Lifelong Journey; Rating Life Domains: Desired vs. Actual values *(interactive exercises)*; Noticing Shoulds
Committed Action	10. Setting Goals	• Common challenges with goal-setting; SMART goals (Harris, 2009)
	11. Making Commitments	• Meaning & Qualities of Commitment; Gardening metaphor; How to Commit Wholeheartedly
	12. Returning to Commitments	• Drifting from Commitments; Warning Signs; Recommitting

The 12 modules are accessed via a homepage (Figure 2.2), developed and hosted on Weebly, a free online website builder and hosting platform, on the recommendation of the provider of the LifeToolbox program. By clicking on any of the modules on the Weebly homepage, participants were taken to the module content which was hosted on Qualtrics. The Weebly 'About' screen contained a copy of the participant information sheet (Appendix C) and the

'Contact' screen contained the email addresses of the principal researcher and research supervisor.

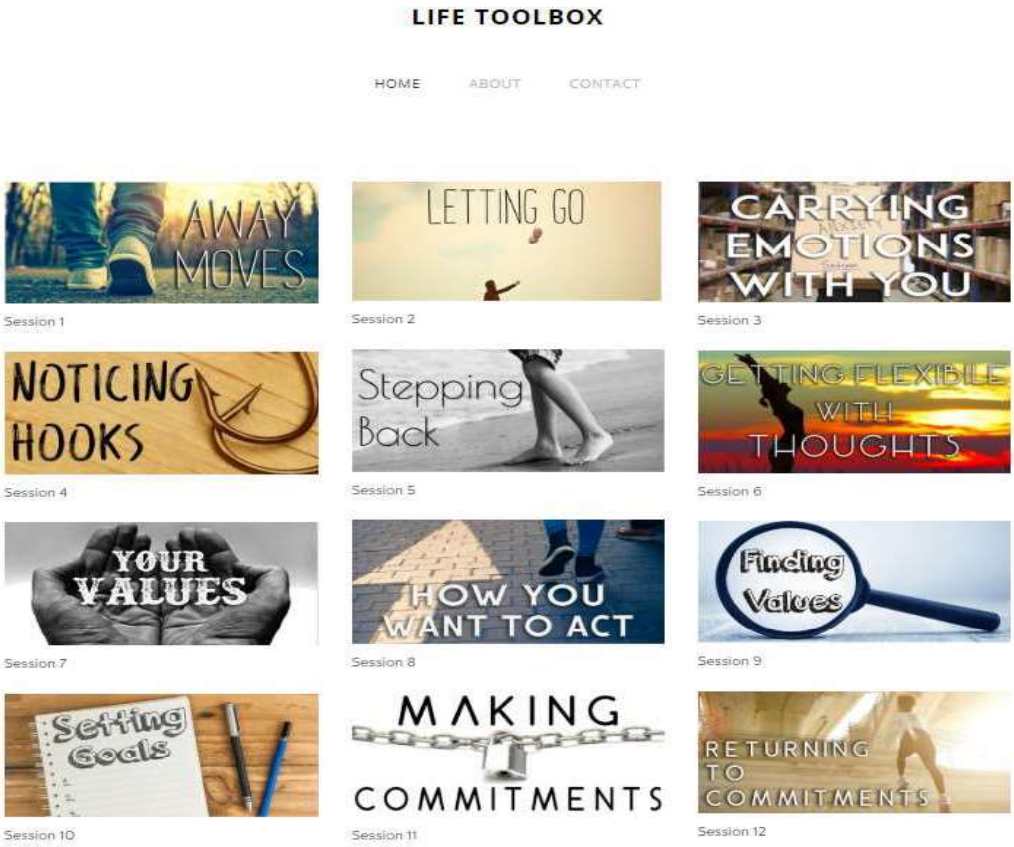


Figure 2.2 LifeToolbox homepage hosted on Weebly linking to the 12 individual ACT modules.

2.4 Research Instruments

Participants were asked to complete a battery of psychological measures (see Appendices I-R). After an extensive review of the literature pertaining to web-based ACT interventions and university students, the following measures were selected in order to best capture the information required. Although the number of measures is not modest, it is typical of the literature on the evaluation of web-based ACT interventions with university students (e.g., Levin, Haeger, Pierce, & Twohig, 2017; Viskovich & Pakenham, 2018). Furthermore, the measures can ultimately be summarised as the dependent variables of psychological inflexibility, self-compassion and psychological symptoms. Finally, participants only completed the majority of measures at three time points, and some measures only once (e.g., demographics; System Usability Scale).

Demographics

2.4.1 Demographic Questionnaire

At baseline, the following demographic information was captured using a bespoke questionnaire: gender, ethnicity, age, disability, employment and relationship status, university name and year, faculty, and experience of personal counselling. Please see Table 2.2 for demographic details.

Process Measures

2.4.2 Acceptance & Action Questionnaire–II (AAQ-II)

The 7-item single factor AAQ-II (Bond et al., 2011) served as the primary process measure. This is the most frequently used measure of psychological inflexibility, the key process targeted in ACT. Items are rated on a 7-point scale ranging from 1 (*never true*) to 7 (*always true*). Sample items include "I'm afraid of my feelings." The scale is scored by adding together the seven items, with a total score range of 7-49. There are no subscales or reverse-scored items. Higher scores reflect greater levels of psychological inflexibility. The AAQ-II is an updated version of the AAQ (Hayes et al., 2004), the original self-report measure of psychological inflexibility which contained nine items and was less psychometrically rigorous (e.g., lower internal consistency; Bond et al., 2011). The AAQ-II has been found to have adequate reliability and validity in previous studies with university students (Bond et al., 2011; Levin, Haeger, Pierce, & Twohig, 2017). In this study, internal consistency for the AAQ-II was excellent (Cronbach's α =.92).

2.4.3 Acceptance & Action Questionnaire for University Students (AAQ-US)

Since the AAQ-II may not be sensitive to changes in university-specific functioning (Levin et al., 2014), the 12-item single factor AAQ-US (Levin, Krafft, Pistorello, & Seeley, 2018) served as the co-primary process measure of psychological inflexibility. The AAQ-US is a relatively new scale that has been shown to be a stronger predictor of academic outcomes than the AAQ-II. However, the AAQ-II is more strongly related to mental health outcomes, even within the university population. With this in mind, the authors of AAQ-US have recommended that both be included in future studies to continue the investigation of their usefulness in the measurement of psychological inflexibility with this population. The AAQ-US has been found to have adequate reliability and validity as a measure of psychological inflexibility among

university students (Levin, Haeger, Pierce, & Twohig, 2017). As with the AAQ-II, items are rated on a 7-point scale ranging from 1 (*never true*) to 7 (*always true*). Items are then added together for a total score between 12 and 84. There are no subscales or reverse-scored items. Higher scores indicate higher psychological inflexibility. Sample items include "My thoughts and feelings get in the way of studying". The internal consistency of the AAQ-US was excellent within this study (α = .93).

2.4.4 Cognitive Fusion Questionnaire (CFQ)

The CFQ (Gillanders et al., 2014) is a 7-item measure of cognitive fusion, an essential sub-process of psychological inflexibility. Items are rated on a 7-point scale ranging from 1 (*never true*) to 7 (*always true*). Items are added together to calculate a total CFQ score (range = 7-49), with higher scores indicating higher levels of cognitive fusion. There are no subscales or reverse-scored items. Sample items include "I over-analyse situations to the point where it's unhelpful to me." The CFQ is a relatively new measure but has demonstrated adequate reliability and validity with various populations, including university students (Gillanders et al., 2014; Levin, Haeger, Pierce, & Twohig, 2017). In this study, internal consistency for the CFQ was excellent (α = .95).

2.4.5 Mindful Attention Awareness Scale (MAAS)

The 15-item Mindful Attention Awareness Scale (Brown & Ryan, 2003) is a widely used, reliable, and valid instrument for measuring mindful awareness (Newsome, Waldo, & Gruszka, 2012), another crucial sub-process associated with psychological inflexibility. Responses are recorded on a 6-point scale from 1 (*almost always*) to 6 (*almost never*). Sample items include "I could be experiencing some emotion and not be conscious of it until some time later." A mean score is calculated with higher scores indicating higher levels of mindful awareness. There are no subscales or reverse-scored items. MAAS has been found to have adequate reliability with university students (Viskovich & Pakenham, 2018). The internal consistency of the MAAS was excellent within this study (α = .88).

2.4.6 Valuing Questionnaire (VQ)

The VQ (Smout, Davies, Burns, & Christie, 2014) is a 10-item measure of the degree to which one lives in alignment with personal values, without stipulating particular life domains (e.g., relationships; education). Valued living is another key sub-process of psychological flexibility. The VQ includes two subscales assessing behavioural progress towards valued living (VQ-

Progress; e.g., “I was proud about how I lived my life”) and interference with valued living (VQ-Obstruction; e.g., “It seemed like I was just ‘going through the motions’, rather than focusing on what was important to me.”). Responders are asked to reflect on the past week and rate each item on a 7-point scale ranging from 0 (*not at all true*) to 6 (*completely true*). Each subscale ranges from 0 to 30 with higher scores on VQ-Progress indicating more progress towards valued living and higher scores on VQ-Obstruction indicating more interference with valued living. No reverse-scoring is required. The VQ is a relatively new measure, but initial validation results indicate adequate reliability and validity (Smout et al., 2014), including with university students (Levin, Haeger, Pierce, & Twohig, 2017) and in a recent systematic review of values measures (Reilly et al., 2019). The review showed that ACT resulted in positive VQ change in 60% of the studies, mixed outcomes in 20%, and no advancement in the remaining 20%. However, caution must be taken when applying the VQ to non-Western cultures. For example, poor internal consistency was reported with a Sierra Leone population (Stewart et al., 2016), due to confusion over terminology. VQ-Obstruction has been shown to improve and mediate mental health outcomes with university students through a web-based ACT program (Levin, Haeger, Pierce, & Twohig, 2017). The VQ displayed good internal consistency within the current study: VQ-Obstruction α = .83 and VQ-Progress α = .79.

2.4.7 Self-Compassion Scale – Short Form (SCS-SF)

Self-compassion involves patience, kindness and understanding. The original Self-Compassion Scale demonstrated good test-retest reliability (α = .93; Neff, 2003). The 12-item SCS-SF is a reliable and valid condensed version of its predecessor (Raes, Pommier, Neff, & Van Gucht, 2011). SCS-SF has been found to have adequate reliability with university students (Viskovich & Pakenham, 2018). Responders score how they typically act toward themselves in challenging times on a 5-point scale ranging from 1 (*almost never*) to 5 (*almost always*). SCS-SF consists of six subscales, including three ‘positive’ items (self-kindness, common humanity, mindfulness) and three ‘negative’ items (self-judgement, isolation, over-identification) which are reverse-scored. A mean score is calculated with higher scores indicating higher levels of self-compassion. A score of 1-2.5 indicates low self-compassion, 2.5-3.5 indicates moderate self-compassion, and 3.5-5.0 indicates high self-compassion. Sample ‘positive’ items include “I try to see my failings as part of the human condition,” while ‘negative’ items include “I’m disapproving and judgmental about my own flaws and inadequacies.” The internal consistency of the SCS-SF was excellent within this study (α = .89).

Outcome Measures

2.4.8 Counseling Center Assessment of Psychological Symptoms (CCAPS-34)

The 34-item version of the CCAPS (CCMH, 2012) served as the primary outcome measure for this study. The CCAPS-34 was developed and validated specifically to assess a broad range of mental health problems among university students with subscales for academic distress, alcohol use, depression, eating concerns, generalised anxiety, hostility, social anxiety, and an overall total score for distress. Items are rated on a 5-point scale ranging from 0 (*not at all like me*) to 4 (*extremely like me*), and reverse-scored where indicated in the CCAPS User Manual (CCMH, 2018). A mean score between 0 and 4 is calculated for each subscale, with lower scores indicating lower levels of distress. The CCAPS-34 has been found to have good reliability and validity in past studies with distressed university students (CCMH, 2012). The CCAPS had adequate internal consistency in the current sample: academic distress, $\alpha = .79$; alcohol use, $\alpha = .79$; depression, $\alpha = .89$; eating concerns, $\alpha = .90$; generalised anxiety, $\alpha = .79$; hostility, $\alpha = .84$; social anxiety, $\alpha = .83$; and distress total score, $\alpha = .93$. Although the CCAPS-34 contains more items than any other measure included, it takes only 2-3 minutes to complete and was specifically designed for repeated-measure use (CCMH, 2018). The CCAPS is highly regarded in the UK, and was introduced as a standard evaluation tool at the counselling service in Cambridge University in 2016 (University of Cambridge, n.d.).

Program Evaluation Measures

2.4.9 System Usability Scale (SUS)

The 10-item System Usability Scale (Brooke, 1996) is a highly robust and versatile instrument designed to assess technology-based program usability and acceptability. Sample items include "I think that I would need the support of a technical person to be able to use this system." Each item is rated on a 5-point scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Even-numbered items are scored by subtracting the scale position from 5. Oddly-numbered items are scored by subtracting 1 from the scale position. The resulting total is multiplied by 2.5 in order to obtain the overall SUS score which can range from 0 to 100. Higher scores indicate higher system usability. Research across 206 studies indicates that the SUS items load onto a single factor, have a high level of internal consistency ($\alpha = .91$) and can distinguish between more and less usable programs (Bangor et al., 2008), including web-based ACT programs among university

students (Levin et al., 2014; Levin, Haeger, Pierce, & Twohig, 2017). The SUS displayed adequate internal consistency within the current study (α = .69).

2.4.10 Participant Satisfaction Questions

Five rating scale and multiple-choice questions were included in the post-intervention survey to assess participant satisfaction and feasibility based on items used in previous studies (Levin et al., 2014; Levin, Haeger, Pierce, & Twohig, 2017). Participants were asked two multiple-choice questions on their opinion of the recommended duration of the program (i.e., 4 weeks) and the typical length of the individual modules (approximately 15 minutes). A rating scaling question was included to assess features such as whether participants found the program to be helpful and relevant. A second rating scale question asked participants to rate elements of the program such as assignments and explanation of key concepts. Finally, participants were asked whether they would use the program again in future and how likely they would be to recommend it to others.

2.4.11 Program Usage Measures

Along with the participant satisfaction questions (see item 10 above), students were asked how many of the 12 modules they had completed. If they indicated that they had not completed all of the modules, they were presented with a multiple-choice question where they could select one or more reasons why (e.g., not enough time; trouble accessing the program; the program was too long and/or boring). Qualtrics metadata (e.g., number of users per module) and attrition metrics were also considered as measures of participant engagement.

2.5 Pilot Phase

A brief pilot phase was conducted over two evenings in December 2018 with a single individual in order to generate feedback on the duration of the questionnaires and modules, to detect any design or data collection issues and identify technical issues, such as the failure of automated email instructions or login details. Written feedback was obtained; the program appeared to be satisfactory and no major issues were noted. The modules lasted an average of 15 minutes and the baseline, Time 2 and Time 3 questionnaires lasted 35, 15 and 5 minutes, respectively. Feedback on format, length and content was received. The pilot participant provided written consent (via email) for their feedback to be detailed anonymously in the study write-up. An example of feedback received included an error appearing when they attempted to write free-text in response to a question in the Demographics section: “Any other employment status,

please describe." This was due to a restriction on text input length and was rectified before going live. Further feedback was received by a participant via email at the start of April 2019, who noted that item 10 on the SCS-SF was missing some text. This was immediately remedied, and no further technical feedback was received.

2.5.1 Initial Concerns

Notable concerns following the pilot phase included the impression that the program might be overly geared towards an American audience. For example, feedback from the pilot mentioned that one scenario described a student driving to a university class, which may be less common in the UK. Although the feedback was positive overall, there were also concerns regarding recruitment, particularly since the data collection period extended over the Easter and summer holidays, and the end-of-year assessment period. Finally, as noted in Chapter 1, in self-guided web-based intervention studies, attrition rates tend to be quite high (e.g., Levin, Haeger, Pierce, & Twohig, 2017; Viskovich & Pakenham, 2018); this was a particular risk given that the design of the study incorporated not two but three time points.

2.6 Participants

2.6.1 Sample Size

Following a comprehensive review of the literature, it was noted that, while justification of sample size is important, a formal power analysis is not always necessary in pilot and feasibility studies (Billingham, Whitehead, & Julious, 2013). Elsewhere, between 12 per group (Julious, 2005) and a minimum of 30 participants (Browne, 1995) have been suggested. In pilot studies, feasibility is as important, if not more important (Thabane et al., 2010), than statistical significance. Nevertheless, relevant literature was consulted to provide some indication of the desired sample size and inclusion criteria. The most relevant literature has reported on between 79 (Levin, Haeger, Pierce, & Twohig, 2017) and 130 (Viskovich & Pakenham, 2018) participants for similar studies, which quote mainly small and some medium-large effect sizes between $d = 0.25$ and $d = 0.78$ for changes in outcome and process scores.

While it was thought that power might not be achieved for Hypothesis 1 (see Section 1.8.2), given that being a mixed analysis it would require a larger sample size (repeated measures and between groups), it was hoped that power would be achieved for the second hypothesis (repeated measures only). A power analysis using G*Power 3.1.9.2 indicated that for a repeated

measures multivariate analysis of variance (MANOVA) with two time points, a medium effect size of $f = 0.25$ (Faul, Erdfelder, Buchner, & Lang, 2013), a confidence interval of 0.05 and 80% power, a sample size of 34 participants was considered adequate (Appendix G), i.e., 17 per group. Assuming an attrition rate of 22% based on a study on the effectiveness of LifeToolbox among university students in the USA (Levin, Haeger, Pierce, & Twohig, 2017), it was hoped to recruit a minimum of 44 participants.

2.6.2 Participant Eligibility

The study was designed to be as inclusive as possible. In order to qualify for this study, participants needed to self-report to be at least 18 years of age, enrolled at a UK university, in possession of a university email account and interested in testing a web-based self-help program. Clients under the age of 18 were excluded from the study in line with previous studies and in order to eliminate issues of consent. No other exclusion criteria were applied; there was no cut-off for psychological symptom scores and there were no exclusion criteria regarding concurrent treatment.

2.6.3 Participant Characteristics

Participant characteristics are summarised in Table 2.2. The sample consisted of 112 university students with an average age of 31.4 years ($SD = 8.7$, range = 18–62). The sample was 84% female and 15% male, with one participant identifying as non-binary. It was homogeneous in ethnicity with most of the sample identifying as White (87%), followed by Asian/Asian British (8%), Black/Black British (3%) and one participant identifying as each of the following: Multiple ethnic groups; Arab; and Any other ethnic group. In both the ACT and WLC groups, the majority of participants reported being late in their university career, at postgraduate level (78%). A similar proportion of participants identified as students of Social Sciences (80%), commensurate with the number of counselling and clinical postgraduate programmes targeted during the recruitment phase. A substantial minority of participants reported attending counselling (22%) at baseline. Of note, 7% of the participants reported never having attended counselling and having no intention to attend in the future. In terms of group differences, the ACT group had a higher proportion of men than the WLC group; that is, 22% against 9% in the control group.

Table 2.2

Demographic Details

Category	Subcategory	ACT		WLC		Total	
		M	**(*SD*)**	***M***	**(*SD*)**	***M***	**(*SD*)**
Age	(in years)	31.65	(8.10)	31.16	(9.32)	31.4	(8.70)
		n	**(%)**	***n***	**(%)**	***n***	**(%)**
Gender	Female	43	(78.2)	51	(89.5)	94	(83.9)
	Male	12	(21.8)	5	(8.8)	17	(15.2)
	Other	0	(0.0)	1	(1.8)	1	(0.9)
Ethnicity	White – British	42	(76.4)	39	(68.4)	81	(72.3)
	White – Irish	1	(1.8)	1	(1.8)	2	(1.8)
	White – Any other background	4	(7.3)	10	(17.5)	14	(12.5)
	Asian/Asian British – Chinese	2	(3.6)	1	(1.8)	3	(2.7)
	Asian/Asian British – Indian	1	(1.8)	2	(3.5)	3	(2.7)
	Asian/Asian British – Pakistani	0	(0.0)	2	(3.5)	2	(1.8)
	Asian/Asian British – Malay	0	(0.0)	1	(1.8)	1	(0.9)
	Black/Black British – African	2	(3.6)	0	(0)	2	(1.8)
	Black/Black British – Caribbean	1	(1.8)	0	(0)	1	(0.9)
	Multiple ethnic groups	0	(0.0)	1	(1.8)	1	(0.9)
	Arab	1	(1.8)	0	(0)	1	(0.9)
	Any other ethnic group	1	(1.8)	0	(0)	1	(0.9)
University Year	Undergraduate – Year 1	4	(7.3)	6	(10.5)	10	(8.9)
	Undergraduate – Year 2	1	(1.8)	4	(7)	5	(4.5)
	Undergraduate – Year 3	1	(1.8)	5	(8.8)	6	(5.4)
	Undergraduate – Year 4	3	(5.5)	1	(1.8)	4	(3.6)
	Postgraduate – Taught	32	(58.2)	30	(52.6)	62	(55.4)
	Postgraduate – Research	14	(25.5)	5	(8.8)	19	(17)
	Postgraduate – Taught & Research	0	(0.0)	6	(10.5)	6	(5.4)
Relationship Status	Single	17	(30.9)	11	(19.3)	28	(25)
	In a Relationship	25	(45.5)	36	(63.2)	61	(54.5)
	Married/Registered	11	(20)	9	(15.8)	20	(17.9)
	Divorced/Separated	1	(1.8)	1	(1.8)	2	(1.8)
	Other	1	(1.8)	0	(0)	1	(0.9)
Disability	Yes	10	(18.2)	12	(21.1)	22	(19.6)
	No	45	(81.8)	45	(78.9)	90	(80.4)
Employment Status	Not employed	9	(16.4)	12	(21.1)	21	(18.8)
	Part-time	18	(32.7)	13	(22.8)	31	(27.7)
	Full-time	24	(43.6)	27	(47.4)	51	(45.5)
	Other	4	(7.3)	5	(8.8)	9	(8)

Table 2.2 (*contd.*)

Counselling Experience	Attending counselling at present	12	(21.8)	13	(22.8)	25	(22.3)
	Attended counselling in the past only	21	(38.2)	27	(47.4)	48	(42.9)
	Never attended counselling						
	– No intention to attend	3	(5.5)	5	(8.8)	8	(7.1)
	– Open to attending	19	(34.5)	12	(21.1)	31	(27.7)
Faculty	Arts	1	(1.8)	0	(0.0)	1	(0.8)
	Business	1	(1.8)	1	(1.7)	2	(1.7)
	Education	1	(1.8)	0	(0.0)	1	(0.8)
	Engineering	2	(3.6)	0	(0.0)	2	(1.7)
	Health & Human Sciences	1	(1.8)	2	(3.5)	3	(2.6)
	Law	0	(0.0)	2	(3.5)	2	(1.7)
	Medicine	4	(7.2)	2	(3.5)	6	(5.3)
	Science	4	(7.2)	2	(3.5)	6	(5.3)
	Social Sciences	41	(74.5)	48	(84.2)	89	(79.5)

Based on empirically derived cut-off scores (CCMH, 2012), 81% of the sample reported clinically elevated scores on one or more CCAPS-34 subscales at baseline, indicating a higher probability of clinical problems in those areas. More specifically, although the sample was unscreened, 31% were in the clinical range for depression, 31% generalised anxiety, 38% social anxiety, 26% academic distress, 56% eating concerns, 25% hostility, 34% alcohol concerns and 21% overall distress. The average number of elevated subscales was 2.6 out of 8.

2.7 Procedure

Data were collected over an 8-month period, from January to September 2019. The aim was for all participants to complete the measures described above at Time 1 (baseline), Time 2 (4 weeks) and Time 3 (8 weeks). Please refer to Figure 2.3 for a diagrammatic representation of the data collection process and further details on the three time points.

2.7.1 Recruitment

Participants were recruited through self-selection between January and June 2019. In the first instance, participants were recruited from City, University of London via flyers (Appendix B). Universities across the UK were subsequently contacted via email: a list of UK universities was obtained from Wikipedia, and where an email address was clearly available on the university website, well-being services and various Heads of Schools or lecturers who explicitly indicated an interest in CBT or ACT on the university website were contacted with a generic marketing email, with a copy of the study flyer and information sheet (Appendices B

and C) attached. Some marketing email recipients forwarded the email to their students while others physically advertised the flyer in university well-being services. There was also an opportunity to recruit students from UK-wide universities through the Division of Counselling Psychology (DCoP) newsletter, *CBT Today* magazine and the Student Mental Health Research Network (SMaRteN), a national research network that focuses on mental health in higher education. Links to the research were also advertised on psychology and well-being student society webpages on Facebook and Twitter. Potential participants could show interest by emailing the researcher; they would then receive a survey link with instructions. Alternatively, students could obtain the online research address directly from the recruitment adverts. Recruitment materials advertised that participants would be entered into a draw to win one of four £20 Amazon vouchers.

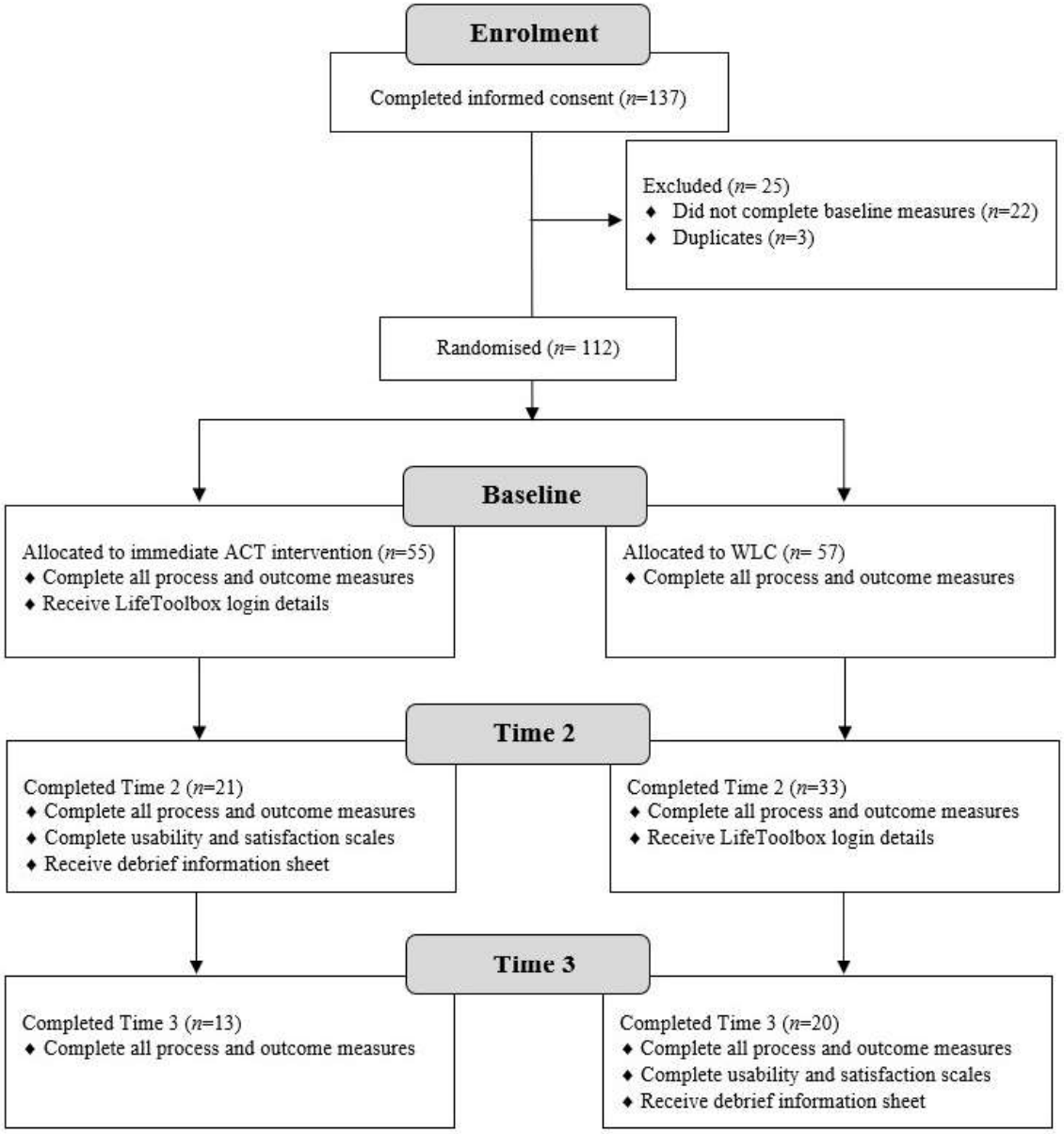


Figure 2.3 CONSORT flow diagram of participant numbers and procedures at each stage of the study. This illustrates the pathway for the ACT and WLC groups.

2.7.2 Time 1 (Baseline)

Students who expressed an interest in the study were guided to the downloadable participant information sheet (Appendix C) and consent form (Appendix D). These documents were hosted on Qualtrics along with all subsequent surveys. Enrolment in the study was not possible without completing the consent form.

Where informed consent was provided, participants automatically proceeded to the baseline demographics, outcome and process measures. Qualtrics automatically randomised

participants into either the ACT or WLC condition in order to satisfy the random sampling criteria for the analysis (i.e., MANOVA; see Section 2.9). When 100% of baseline measures were completed, participants had the opportunity to complete the LifeToolbox program online with immediate effect (ACT condition) or following a 4-week waiting period (WLC condition). The LifeToolbox URL and login details were provided in an email automated by Qualtrics. Five-digit Study IDs were randomly assigned by Qualtrics and a standard password was provided for all participants.

2.7.3 Time 2

Twenty-eight days after the completion of baseline measures, all participants were automatically prompted by email to retake the outcome and process measures. Those in the ACT group were asked to complete the program evaluation measures; they also received the debrief information sheet (Appendix E) as a reminder of available support and further clarification of research aims. Meanwhile, as soon as Time 2 measures were complete, participants in the WLC group were given access to the LifeToolbox program.

2.7.4 Time 3

Twenty-eight days after completion of Time 2 measures, all participants were prompted via email to complete copies of the outcome and process measures for the last time. Those in the WLC group were now asked to complete the program evaluation measures; they also received the debrief information sheet.

2.7.5 Email Reminders

Original Setup

Initially, the automated email schedule was limited to LifeToolbox login details along with Time 2 and Time 3 invitations. The final email schedule is laid out in Table 2.3 and explained in detail below. To view the contents of automated emails, please see Appendix H.

Table 2.3

Final LifeToolbox Email Schedule

		Emails sent to ACT group	Emails sent to WLC group
Baseline	**0 days**	LifeToolbox login details	
	7 days	Spotlight on Cognitive Defusion Modules	
	14 days	Spotlight on Valued Living Modules	
	21 days	Spotlight on Committed Action Modules	
Time 2	**28 days**	Time 2 Reminder (+ prompts*)	Time 2 Reminder (+ prompts*); Login details
	7 days		Spotlight on Cognitive Defusion Modules
	14 days		Spotlight on Valued Living Modules
	21 days		Spotlight on Committed Action Modules
Time 3	**28 days**	Time 3 Reminder (+ prompts*)	Time 3 Reminder (+ prompts*)

Note. *Participants were automatically prompted up to four times at Time 2 and Time 3 and subsequently sent an opt-out email. They were free to unsubscribe at any point.

Program Reminder Emails

When engagement with the program appeared to be low in the first couple of months, it was decided to send manual reminder emails with a 'spotlight' on a selection of modules (Appendix H). These were ultimately built into the automation process so that participants received these reminders on days 7, 14 and 21 of the 4-week intervention period.

Time 2 & Time 3 Prompt Emails

It was also noticed that participants were not completing Time 2 and Time 3 measures on the first request, so it was decided to send additional emails as prompts. Again, these were initially sent manually, but ultimately became semi-automated; while they could be scheduled to be sent automatically, it was still necessary to gather the contact list manually, unlike with the other automated emails. Participants could 'unsubscribe' from these reminders by following a link in the email. They were sent an 'opt-out' email regardless of whether they ignored multiple reminders or not. By the latter half of the data collection period, compiling these lists of participants was the only manual element of running the LifeToolbox program.

Progress Emails

On completion of each of the modules, a one-line email was automatically sent to participants confirming that they had completed the module. This was so that they could track where they were in the program, lest they forgot.

2.8 Ethical Considerations

2.8.1 Ethical Approval

This study was reviewed by and received ethical clearance through the Psychology Low-Risk Review Committee, City, University of London in November 2018 (Appendix A). Ethics approval code: ETH1819-0224.

2.8.2 Confidentiality & Data Storage

Only the researcher had access to the data, which was de-identified for the purposes of analysis. City's standard research data retention policy is for the data to be kept for 10 years after the research project is completed. City has put in place an agreement with Qualtrics, which sets out rights and responsibilities for both organisations with regard to personal data – how it is processed, who owns and has access to the data, security arrangements and where it is stored. City insists that personal data is held within the European Economic Area (EEA). While the agreement had been set up to protect personal data, it also affords the information governance protection required for all research data.

As part of their pre-enrolment briefing (Appendix C), participants were assured that no personally identifiable personal data would be published in the doctoral thesis or subsequent publications. They were also informed that they could leave the study, with the additional option of withdrawing their data, at any point during the data collection period and were under no obligation to disclose their reasons for doing so. No such requests were received.

2.8.3 Incentives

Participants who provided consent to partake in the research were entered into a draw to win one of four £20 Amazon vouchers at the end of the study; this was in order to incentivise and demonstrate appreciation for participation. It was made clear that entry was not contingent on the completion of the study. The draw took place following the data collection period. The participant information sheet stated that a participant could win a maximum of one voucher and no cash alternatives were available, that voucher winners would be notified via email and their details would not be shared publicly. It was thought that the value of the vouchers was enough to attract participants without inducement or coercion. Moreover, the nature of the study was thought to be resource-light and flexible with potential positive benefits to the participants.

2.8.4 Informed Consent & Debriefing

Individual electronically signed informed consent was required prior to enrolment. The basic premise of the study was communicated since there was no methodological basis for concealment. However, specific hypotheses were omitted to avoid influencing the self-reported scores. The participant information sheet (Appendix C) described the purpose of the study and the practicalities involved in taking part. It appeared at the start of the online survey, prior to the consent form (Appendix D). Participants were able to download or print it and could return to this at any time throughout the survey. It was also available on the LifeToolbox homepage hosted on Weebly via the 'About' screen. All five aspects of the consent screen (Appendix D) had to be agreed with, and an e-signature provided, in order to officially enrol in the study. While participants had to accept these conditions to proceed with the research, they were under no pressure to do so.

The debrief information sheet (Appendix E) was provided at the end of the post-intervention survey in order to remind participants of available support and further clarify the research aims. Participants were reminded of support services such as the NHS and the Samaritans, in case of distress. All participants were provided with the researcher's and university's contact details on recruitment materials and information sheets for any research-related questions.

2.8.5 Internet-Mediated Research

The British Psychological Society's Ethics Guidelines for Internet-mediated Research (BPS, 2018) were consulted prior to data collection. Concerns were raised regarding partial data and withdrawal. For example, if an individual completed baseline and did not return at Time 2 and 3, would this be synonymous with explicit withdrawal from the project? It was decided that consent would be requested at baseline only and continued consent was implied with the completion of further surveys. However, participants who did not complete the entire battery of measures (n = 22) at baseline were excluded from the study as an extra precaution.

The BPS Guidelines also highlighted concerns around scientific integrity vis-à-vis online research, where there is reduced control over the environment and access. In an effort to mitigate this somewhat, measures such as the provision of study ids and passwords as well as controls around dates of birth and university email addresses were put in place.

2.8.6 Participant Safe-Guarding

Clinical Monitoring

Participants reporting elevated symptoms on the CCAPS-34 were not monitored during the study, but all participants were provided with mental health resource information on the participant and debrief information sheets (Appendices C and E).

Clinical Deterioration

Although not anticipated, the primary potential risk for clients in participating in this study concerned temporary increases in difficult feelings and a heightened awareness of stressors. It is likely that such deterioration would have been due to general life circumstances, rather than the intervention itself. In the unlikely event that a participant was to disclose considerable risk (e.g., self-harm; suicide ideation) to the researcher via email or in an ad-hoc fashion, they would have been encouraged to contact their GP, A&E and/or the Samaritans as soon as possible. They would equally be encouraged to alert the university. Participant disclosure of considerable risk to themselves or others would have warranted a duty of care in the researcher to disclose details to a third party (e.g., the university). Participants were informed of this in the confidentiality section of the participant information sheet.

Unpleasant Feelings

Participants could have experienced some boredom, irritation or other unpleasant feelings when completing some of the forms or modules, but they have been used satisfactorily in similar previous studies.

2.8.7 Benefits of the Study

It is hoped that this approach to research and the subsequent dissemination might:

- Offer a flexible, easily accessible, de-stigmatised and cost-effective mental health resource.
- Provide findings to offer support for the use of web-based and acceptance approaches in general and specifically as early intervention and prevention strategies for university students in the UK, with potential long-term benefits.
- Contribute to policy developments and best practice for the improvement of student mental health.

- Further illuminate the ACT mechanisms of change.
- Increase public awareness of web-based interventions as called for by the literature (Apolinário-Hagen et al., 2018; Levin, Stocke, Pierce, & Levin, 2018).
- Further validate the effectiveness of using Qualtrics as a tool for quickly and economically developing and testing online interventions.
- Further validate the reliability of a new psychological flexibility tool designed for university students (AAQ-US; Levin, Krafft, Pistorello, & Seeley, 2018).

2.9 Data Analysis Overview

Qualtrics Data were output to CSV files and imported to IBM SPSS Statistics 25 for Windows in order to be analysed.

2.9.1 Preliminary Analysis

Before carrying out the primary analysis, a number of preliminary checks were required to establish if the data were normally distributed and if any methodological confounding factors were affecting the quality of the data or had the potential to affect the outcomes of the analysis. All variables were examined for accuracy of data entry, missing values, and the assumptions of multivariate analyses.

2.9.2 Primary Analysis

Four phases of primary analysis were completed, one corresponding to each hypothesis.

Hypothesis 1: *Participants in the immediate intervention group will show significantly improved mental health outcomes relative to those in the waiting-list control group following the intervention.*

A series of mixed model repeated measures (MMRM) analyses with unstructured covariance matrices were used to test for time by condition effects on each outcome and process measure using an intent-to-treat (ITT) approach such that all participants who completed baseline measures were included (n = 112). MMRM is a mixed regression method that models change even with participants who are missing data (Raudenbush & Bryk, 2002), which allowed for the inclusion of the full ITT sample randomised to treatment condition, irrespective of whether

post-intervention measures were completed. The mixed element refers to the idea that it includes both fixed (i.e., time and group) and random variables (i.e., individuals and measures; Leech, Barrett, & Morgan, 2011). Each MMRM analysis included three within-subjects measurements (i.e., time) and two between subjects (ACT and WLC) conditions.

Missing data in the SPSS MMRM algorithm was handled through a restricted-information maximum likelihood (REML) estimation procedure. This approach to missing data modelling accounts for correlations among repeated measurements within subjects and relies on the multivariate distribution of observed variables to arrive at a hypothetical covariance structure for the full data set. Maximum likelihood estimation is preferred over traditional imputation techniques for missing data, such as last observation carried forward or multiple imputation, under normal assumptions (Enders, 2012). Where significant omnibus results were found, MMRM tests were followed up with pairwise comparisons to further examine the time by condition interaction on dependent variables.

Hypothesis 2: *The whole sample will show significantly improved mental health outcomes relative to baseline following the intervention.*

Here, all participants who had completed post-intervention measures were considered as a single cohort (n = 41), regardless of their group of original allocation. This hypothesis was tested using a within-subjects repeated measures MANOVA across two time points: pre- and post-intervention. Improved mental health was defined as positive change on three dependent variables:

1. *Psychological symptoms:* To examine changes in psychological symptoms, the CCAPS-34 subscales were analysed together.

2. *Self-compassion:* To examine changes in self-compassion, the SCS-SF subscales were analysed together.

3. *Psychological inflexibility:* To examine changes in psychological inflexibility, the AAQ-II, AAQ-US, CFQ, MAAS and VQ scales were analysed together.

Where results showed a significant effect, follow-up univariate analyses of variance (ANOVA) were performed on each dependent variable separately, to establish whether individual components of mental health were affected by participating in the LifeToolbox intervention.

Hypothesis 3: *Changes in psychological flexibility and self-compassion will mediate decreases in psychological symptoms.*

To examine the ACT processes and self-compassion as mediators of pre- to post-intervention change on outcomes, the SPSS macro MEMORE (MEdiation and MOderation analysis for REpeated measures designs; Montoya & Hayes, 2016) was used. MEMORE (pronounced 'memory') estimates the total, direct, and indirect effects of *X* (time) on *Y* (primary outcome) through one or more mediators (*M*s = ACT processes and self-compassion) in a repeated measures design as well as providing confidence intervals for the indirect effect, in this case derived from 5,000 bootstrap resamples. Percentile bootstrap confidence intervals were used rather than bias-corrected and accelerated (BCa) bootstrap confidence intervals since they are more reliable for smaller samples (Creedon & Hayes, 2015). Mediation was considered to be significant when the 95% percentile confidence intervals for the indirect effects did not include zero (Preacher & Hayes, 2004). A simplified sample model can be found in Figure 2.4.

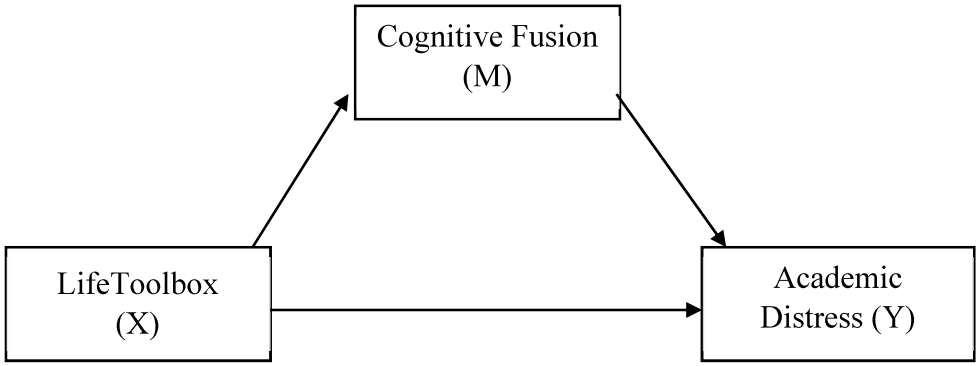


Figure 2.4 Diagrammatic representation of the mediation model, using as an example of Cognitive Fusion as the mediator and Academic Distress as the outcome variable.

Scores for each process measure (psychological inflexibility, cognitive fusion, mindful awareness, self-compassion, VQ-Obstruction and VQ-Progress) were examined as potential mediators of change on each outcome measure (academic distress, alcohol use, depression,

eating concerns, generalised anxiety, hostility, social anxiety, overall distress and self-compassion). Pre- and post-intervention scores for each primary outcome measure (*Y)* and each process measure (*M*) were entered with *X* representing the interval of time between measurements. The mediators were examined individually due to the high correlation between the variables since collinearity can compromise the significance of indirect effects in multiple mediator models (Preacher & Hayes, 2008).

Hypothesis 4: *LifeToolbox will be acceptable and usable as a self-guided application for university students.*

The acceptability and usability of LifeToolbox were evaluated using the following benchmarks:

(a) High System Usability Scale scores ($M \geq 80$)

(b) High satisfaction ratings on individual items (e.g., The program was: "Easy to understand"; "Relatable"; "Repetitive")

(c) High level of program usage (≥ 25% repeat users)

(d) Attrition rates in line with existing literature (≤ 61% at post-intervention)

Qualtrics usage metadata were also examined and compared to self-report data.

The following chapter will present the results of the data analysis.

Chapter 3: Results

3.1 Introduction

This chapter will present findings from the statistical analyses carried out to test the hypotheses outlined at the end of Chapter 1 (see Section 1.8.2). In order to examine Hypothesis 1, a series of mixed model repeated measures (MMRM) analyses were used to test for time by condition effects on each outcome and process measure using an intention-to-treat (ITT) approach such that all participants who completed baseline measures were included (n = 112). Hypothesis 2 looked at participants who completed pre- and post-intervention assessments, regardless of their original group of allocation (n = 41); a repeated measures MANOVA was performed to examine this cohort. Using the same completer sample, the SPSS MEMORE macro was used to examine Hypothesis 3, that is, the role of psychological flexibility and self-compassion as potential mediators of change (n = 41). Finally, participant feedback and limited Qualtrics metadata were examined with respect to Hypothesis 4 on program feasibility and usability (n = 39). Implications of the findings will be discussed in the subsequent Discussion chapter.

Exploratory data analysis preceded the primary analyses. This included generating descriptive statistics (mean, standard deviation, minimum, maximum), frequency distribution tables, boxplots, and histograms. Completeness of the data was checked by reconciling raw Qualtrics data with SPSS data files.

3.2 Variables

For the purposes of the thesis, and specifically Hypotheses 1 to 3, improved mental health was defined as positive change on three dependent variables:

1. *Psychological symptoms.* To examine changes in the outcome of psychological symptoms, the CCAPS-34 subscales were analysed: academic distress, alcohol use, depression, eating concerns, generalised anxiety, hostility, social anxiety and overall distress. Mental health improvements were represented by a reduction in psychological symptoms, which would be evidenced by decreases on the CCAPS subscale scores.

2. *Psychological inflexibility:* To examine changes in the process of psychological inflexibility, the AAQ-II, AAQ-US, CFQ, MAAS and VQ scales were analysed.

Mental health improvements were represented by a reduction in psychological inflexibility or an increase in psychological flexibility. These improvements would be evidenced by decreases on the general psychological inflexibility (AAQ-II and AAQ-US), cognitive fusion (CFQ) and obstruction to valued living (VQ-Obstruction) scales and increases on the mindful awareness (MAAS) and progress towards valued living (VQ-Progress) scales.

3. *Self-compassion:* To examine changes in self-compassion, participant scores on the SCS-SF were analysed. Mental health improvements were represented by an increase in self-compassion, which would be evidenced by increases on the SCS-SF scale scores. Self-compassion was evaluated as both an outcome (H1-3) and a potential mediator of change (H3).

For more details on the included measures, including Cronbach's alpha reliability coefficients, please see Section 2.4.

3.3 Between-Group Differences: ACT vs. WLC

Hypothesis 1: *Participants in the immediate intervention group will show significantly improved mental health outcomes relative to those in the waiting-list control group following the intervention.*

3.3.1 The Sample

The between-groups testing used the full ITT sample (n = 112). For the ACT group, all data collected at Time 1, 2 and 3 were included in the model. For the WLC group, all data at Time 1 and 2 were included, however, Time 3 data were excluded due to the crossover nature of the study design. In other words, for the purposes of the first hypothesis, the crossover element of the study design was irrelevant, and in the model, it appeared that the ACT group underwent the intervention while the WLC group did not. Missing data in the SPSS MMRM algorithm was handled through a restricted-information maximum likelihood (REML) estimation procedure.

3.3.2 Exploring Assumptions

Prior to examining treatment effects, preliminary analyses examined the rate and predictors of missing data. The full ITT sample was included (n = 112). A total of 48% of participants completed Time 2 assessments (n = 54), with a completion rate of 38% in the ACT condition (n = 21) and 58% in the WLC group (n = 33). An assumption of linear mixed models is that data are missing at random (Tabachnick & Fidell, 2007). IBM SPSS Missing Value Analysis was used to highlight patterns of missing data. According to Little's MCAR test, the data appeared to be missing completely at random, at Time 2, $\chi 2$ = .73, p = 1.000 and Time 3, $\chi 2$ = .38, p = .83.

Prior to the statistical analyses, extreme values on individual variables within each group were examined by means of box and whisker plots. Significant outliers were identified in the ACT group at Time 3 on the self-compassion and CCAPS depression scales, and at Times 1 and 2 on the CCAPS hostility measure; two cases were subsequently removed in order to improve the distribution, resulting in a final sample size of 110.

Multivariate outliers are combinations of extreme scores on two or more variables and can be identified using Mahalanobis Distance (Tabachnick & Fidell, 2007). Any large Mahalanobis Distance values that may have been outliers were verified based on a chi-square distribution, assessed using p = .001. According to the chi-square distribution table, with 15 dependent variables, the critical value is 37.7, so any participants with a Mahalanobis Distance value greater than this should be removed. In this case, no multivariate outliers were identified and excluded from the primary analysis as a result.

Following the removal of significant outliers, all dependent variables were inspected for assumptions of normality using skewness and kurtosis statistics at each unique level of the independent variable. Z-scores were calculated by dividing the skewness and kurtosis values by their standard errors (Field, 2016). As the sample size included more than 30 participants and was therefore fairly large, z-scores with an absolute value greater than 3.29 were considered to be non-normally distributed (Field, 2016). Using this criterion, it was observed that CCAPS hostility (z(skew) = 3.96) and depression (z(skew) = 3.38, z(kurtosis) = 5.37) scores in the ACT group were non-normally distributed, at Time 1 and Time 2, respectively. A comprehensive list of skewness and kurtosis scores for each group of the independent variable is available in Appendix S.

In an attempt to address remaining outliers and non-normal distributions, the positively skewed and kurtotic CCAPS depression and positively skewed hostility scores were transformed using square-root, logarithmic and reciprocal transformation as suggested for both positive skewness and kurtosis (Field, 2013; Tabachnick & Fidell, 2007). The square-root values resulted in normally distributed data (Appendix S) and eliminated some remaining outliers, so these values were used in all further analyses pertaining to the first hypothesis.

While it is useful to ensure the normality of dependent variables, in linear mixed models it is the residuals which are assumed to be normally distributed (Tabachnick & Fidell, 2007). Q-Q plots indicated that residuals were normally distributed for each MMRM model (Appendix T).

The ACT and WLC groups were examined for equivalency across demographic and baseline variables. A series of independent sample *t*-tests compared baseline scores on all outcome and process measures between conditions. Of the 15 comparisons (Table 3.1), a statistically significant difference between the groups was only found for the CCAPS eating concerns outcome measure. It was therefore decided to treat this as a covariate in the primary analysis, in line with previous literature (Krafft et al., 2019; Levin, Haeger, & Cruz, 2019) and in order to control for differences in this variable at baseline. Chi-square analyses were used to compare the groups on demographic data. However, where over 20% of cells had expected frequencies of fewer than five, Fisher's method for computing the exact significance was applied, since chi-square approximation of expected frequencies can be inaccurate in this circumstance (Field, 2016). No significant differences were found in terms of counselling experience, gender, ethnicity, employment or relationship status, faculty or university year, meaning that group differences in these variables were less likely to account for any potential significant results found in the analyses.

Table 3.1

Independent Samples t-tests Examining Differences in Process and Outcome Measures and Demographics between ACT and WLC Groups at Baseline (n = 110)

	***ACT* (*n* = 53)**		**WLC (*n* = 57)**				
	M	*SD*	*M*	*SD*	*t*	*df*	*p*
Psychological Processes							
Psychological Inflexibility (AAQ-II)	24.04	10.06	26.68	8.85	-1.47	108	0.15
Psychological Inflexibility (AAQ-US)	40.00	15.00	43.75	14.76	-1.32	108	0.19
Cognitive Fusion (CFQ)	22.08	9.52	23.81	9.52	-0.95	108	0.34
Mindful Awareness (MAAS)	3.28	0.81	3.25	0.72	0.22	108	0.82
Self-Compassion (SCS-SF)	2.69	0.76	2.60	0.74	0.64	108	0.53
Valued Living – Obstruction (VQ-Obs)	13.96	6.69	15.46	5.86	-1.25	108	0.22
Valued Living – Progress (VQ-Prog)	17.49	5.64	16.46	5.27	0.99	108	0.32
Psychological Symptoms (CCAPS-34)							
Academic Distress	1.61	1.01	1.97	1.01	-1.87	108	0.06
Alcohol Use	0.92	0.99	0.89	0.95	0.21	108	0.84
Depression – Transformed	1.04	0.46	1.10	0.52	-0.63	108	0.53
Eating Concerns	**1.49**	**1.37**	**2.15**	**1.36**	**-2.54**	**108**	**0.01**
Generalised Anxiety	1.52	0.86	1.73	0.74	-1.37	108	0.17
Hostility – Transformed	0.71	0.45	0.81	0.48	-1.11	108	0.27
Social Anxiety	2.15	0.91	2.13	1.07	0.13	108	0.90
Overall Distress	1.44	0.75	1.65	0.80	-1.46	108	0.15

Categorical Variable[a]	%	%	$\chi 2$	*df*	*p*
Gender (Female)	77.36	89.47	4.40 [b]	2	.09
Ethnicity (White)	84.91	87.72	11.57 [b]	11	.29
Concurrent Treatment (Counselling)	20.75	22.81	2.83 [b]	3	.42
University Year (Postgraduate)	83.63	71.93	2.21	1	.18

Notes. The final sample size was 110 following the removal of two participants with significant outlier scores on multiple variables. Statistically significant differences between the groups are highlighted in bold.

[a] Where categorical variables are used percentages and chi-squared tests are reported.

[b] Fisher's exact result is reported for categorical variables where more than 20% of cells had expected count fewer than five.

3.3.3 Does ACT Improve Mental Health Outcomes and Processes of Change?

Following the removal of two participants with significant univariate outlier scores on multiple variables, the final ITT sample analysed consisted of 110 participants. A series of MMRM analyses examined time by condition interactions on mental health outcomes and processes.

The first step was to examine the estimated means produced by the model for both process and outcome variables at the three time points; these were adjusted for missing data as well as the covariate (i.e., CCAPS Eating Concerns). Through the manual examination of the adjusted or

estimated means (Table 3.2), it is evident that the group means typically moved in the hypothesised direction, indicating support for the intervention in the improvement of mental health. For example, in the ACT group, psychological inflexibility (i.e., AAQ-II, AAQ-US, cognitive fusion, obstruction to valued living) decreased while psychological flexibility (i.e., mindful awareness, self-compassion and progress towards valued living) increased. These improvements all appeared to increase even further at Time 3, with the exception of self-compassion, which still showed an improvement from baseline. The ACT group also improved on all outcome measures, and improvements appeared to continue at Time 3 for academic distress, alcohol use, hostility and overall distress.

Table 3.2

MMRM Estimated Marginal Means of Process and Outcome Variables at Times 1, 2 and 3, Adjusted for CCAPS Eating Concerns with ITT sample (n = 110)

Process Measure	Time	ACT	WLC	Outcome Measure	ACT	WLC
Psychological Inflexibility (AAQ-II)	**1**	24.82	25.85	***Academic Distress (CCAPS-34)***	1.67	1.91
	2	22.50	25.25		1.58	1.81
	3	17.70			1.51	
Psychological Inflexibility (AAQ-US)	**1**	40.84	42.86	***Alcohol Use (CCAPS-34)***	0.93	0.88
	2	38.15	42.73		0.71	0.86
	3	32.17			0.68	
Cognitive Fusion (CFQ)	**1**	22.08	23.81	***Depression (CCAPS-34)***	1.07	1.06
	2	18.00	22.00		0.93	1.05
	3	17.63			1.01	
Mindful Awareness (MAAS)	**1**	3.23	3.31	***Generalised Anxiety (CCAPS-34)***	1.56	1.69
	2	3.76	3.29		1.28	1.62
	3	3.77			1.53	
Self-Compassion (SCS-SF)	**1**	2.64	2.65	***Hostility (CCAPS-34)***	0.75	0.77
	2	2.89	2.58		0.67	0.83
	3	2.77			0.60	
Valued Living – Obstruction (VQ-Obstruction)	**1**	14.48	14.91	***Social Anxiety (CCAPS-34)***	2.16	2.13
	2	11.71	13.73		1.72	2.16
	3	9.47			1.94	
Valued Living – Progress (VQ-Progress)	**1**	16.96	17.02	***Overall Distress (CCAPS-34)***	1.50	1.59
	2	18.28	17.13		1.25	1.53
	3	20.37			1.22	

Notes. Estimated marginal means are based on MMRM analyses using CCAPS Eating Concerns as a covariate due to significant differences between scores on this measure between the ACT and WLC groups at baseline (see Section 3.3.2). For the purposes of the between-groups testing, WLC Time 3 data were excluded due to the crossover nature of the study design (see Section 3.3.1).

Notably, based on these estimated means, at Time 2 the ACT group reported lower scores on every single measure of psychological inflexibility and psychological symptoms (CCAPS), and higher scores on each of the psychological flexibility measures in comparison with the control condition (Table 3.3). Finally, the WLC group scores did not appear to change noticeably between Time 1 and 2, as anticipated with a passive control group.

Table 3.3

Comparison of Movement in Estimated Marginal Means between Time 1 and Time 2 between the ACT and WLC Conditions

	ACT	WLC	Absolute Difference
Psychological Flexibility			
Mindful Awareness (MAAS)	+0.53	-0.02	0.55
Self-Compassion (SCS-SF)	+0.25	-0.07	0.32
Valued Living – Progress (VQ-Prog)	+1.32	+0.11	1.21
Psychological Inflexibility			
Psychological Inflexibility (AAQ-II)	-2.32	-0.60	1.72
Psychological Inflexibility (AAQ-US)	-2.69	-0.13	2.56
Cognitive Fusion (CFQ)	-4.08	-1.81	2.27
Valued Living – Obstruction (VQ-Obs)	-2.77	-1.18	1.59
Psychological Symptoms (CCAPS-34)			
Academic Distress	-0.09	-0.10	0.01
Alcohol Use	-0.22	-0.02	0.20
Depression – Transformed	-0.14	-0.01	0.13
Generalised Anxiety	-0.28	-0.07	0.21
Hostility – Transformed	-0.08	+0.06	0.14
Social Anxiety	-0.44	+0.03	0.47
Overall Distress	-0.25	-0.06	0.19

Significant time by condition interactions were found on the processes of mindful awareness, $F(1, 55.70) = 19.14$, $p < .001$, and self-compassion, $F(1, 56.47) = 6.63$, $p = .01$, as well as on the social anxiety outcome, $F(1, 59.86) = 6.30$, $p = .02$. There were no significant time by condition interactions on AAQ-II, AAQ-US, CFQ, VQ or the remaining CCAPS-34 subscales (Table 3.4). These results indicated that LifeToolbox significantly improved mindful awareness, self-compassion and social anxiety in the ACT group, and while the estimated means appeared to move in the 'right' direction, the program did not significantly improve general psychological inflexibility (AAQ-II or AAQ-US), cognitive fusion or valued living.

Table 3.4

MMRM Tests Examining Time by Condition Differences in Psychological Inflexibility and Psychological Symptoms between ACT and WLC Groups (n = 110)

	Numerator *df*	Denominator *df*	*F*	*p*
Psychological Process				
Psychological Inflexibility (AAQ-II)	1	57.19	1.17	0.28
Psychological Inflexibility (AAQ-US)	1	55.41	1.42	0.24
Cognitive Fusion (CFQ)	1	55.19	2.29	0.14
Mindful Awareness (MAAS)	**1**	**55.70**	**19.14**	*
Self-Compassion (SCS-SF)	**1**	**56.47**	**6.63**	**0.01**
Valued Living – Obstruction (VQ-Obstruction)	1	62.22	1.06	0.31
Valued Living – Progress (VQ-Progress)	1	60.55	0.76	0.39
Psychological Symptoms (CCAPS-34)				
Academic Distress	1	62.23	0.01	0.93
Alcohol Use	1	54.42	1.26	0.27
Depression – Transformed	1	61.45	1.58	0.21
Eating Concerns	1	57.49	1.25	0.27
Generalised Anxiety	1	54.27	1.62	0.21
Hostility – Transformed	1	58.65	2.49	0.12
Social Anxiety	**1**	**59.86**	**6.30**	**0.02**
Overall Distress	1	60.18	1.52	0.22

Notes. Significant time by condition effects are highlighted in bold. Baseline eating concerns was included as a covariate on all analyses except eating concerns.

* $p < .001$

Univariate follow-up tests indicated that mindful awareness only improved in the ACT group ($p = .01$), as expected. Post-hoc pairwise comparisons of the estimated marginal means indicated that in the ACT group mindful awareness improved significantly from pre- to post-intervention ($p < .001$) and that significant improvements were maintained at follow-up ($p = .01$). Similarly, self-compassion scores only improved for the ACT group, $F(2, 28.97) = 3.39$, $p = .05$. This time, while there were significant improvements for the ACT group at post-intervention ($p = .01$), improvements were not maintained at follow-up. Finally, social anxiety scores improved significantly only in the ACT group, $F(2, 14.65) = 5.15$, $p = .02$, and similar to self-compassion, while improvements were significant at post-intervention ($p = .004$), these were not maintained at follow-up, according to the model. These results may indicate that while LifeToolbox can have enduring significant results on mindful awareness, its positive impact on social anxiety and self-compassion is temporary.

3.3.4 Summary

Results from the between-groups testing indicated that LifeToolbox significantly improved mindful awareness, self-compassion and social anxiety levels in the ACT group in comparison with the WLC group. Follow-up analyses suggested that significant improvements in mindful awareness alone appeared to be maintained at Time 3. While the estimated means of all mental health outcomes and processes appeared to improve over time, improvements were not significant for the remaining examined variables.

3.4 Within-Subject Differences: Pre- to Post-intervention

Hypothesis 2: *The whole sample will show significantly improved mental health outcomes relative to baseline following the intervention.*

3.4.1 The Sample

While it was thought that power might not be achieved for Hypothesis 1, given that as a mixed analysis it would require a larger sample size (repeated measures and between groups), it was hoped that power would be achieved for the second hypothesis (repeated measures only). A power analysis using G*Power 3.1.9.2 indicated that for a repeated measures MANOVA with two time points, a medium effect size of $f = 0.25$ (Faul, Erdfelder, Buchner, & Lang, 2013), a confidence interval of 0.05 and 80% power, a sample size of 34 participants was considered adequate (Appendix G), i.e., 17 per group. Assuming an attrition rate of 22% based on a study of the effectiveness of LifeToolbox among university students in the USA (Levin, Haeger, Pierce, & Twohig, 2017), it was hoped to recruit a minimum of 44 participants. Ultimately, 112 students signed up for the LifeToolbox program and completed baseline measures; 41 of these also completed post-intervention measures (ACT = 21; WLC = 20). The following analysis focused on those 41 students who completed pre- and post-intervention measures, regardless of their group of original allocation, known here as the completer sample.

3.4.2 Exploring Assumptions

Since the sample differed from the ITT sample used in Hypothesis 1, once again extreme values on individual variables within each group were examined by means of box and whisker plots prior to the main analysis. One case was removed across the three time points as it featured significant outliers on multiple variables, resulting in a final sample size of 40. Following this, no significant outliers were observed in Time 1 or Time 2 data, and those in the follow-up data

(i.e., participants originally allocated to the ACT group who completed measures at Time 3) were left untouched given the small number of participants remaining in this group (n = 12).

Next, all dependent variables were inspected for assumptions of normality using skewness and kurtosis statistics at each unique level of the independent variable. As per Hypothesis 1, z-scores were calculated by dividing the skewness and kurtosis values by their standard errors and those with an absolute value greater than 3.29 were considered to be non-normally distributed (Field, 2016). Using this criterion, it was observed that the hostility (z(skew) = 3.46) and depression (z(skew) = 3.72, z(kurtosis) = 3.90) CCAPS subscale scores were non-normally distributed at Time 2. Skewness and kurtosis scores for dependent variables at Times 1, 2 and 3 for the completer sample are listed in Appendix U.

In an attempt to address non-normal distributions and remaining outliers, the CCAPS depression and hostility scores were transformed using square-root, logarithmic and reciprocal transformation as suggested for both positive skewness and kurtosis (Field, 2013; Tabachnick & Fidell, 2007). The square-root values improved the normality of depression and hostility scores and removed some of the remaining outliers. A few non-significant outliers remained, but it has been argued that MANOVAs are robust against mild violations of assumptions (Shinohara, Frangakis, & Lyketsos, 2012). It was duly decided to continue the analysis with parametric tests, using the transformed scores on these two variables.

A linear relationship between each dependent variable at Time 1, Time 2 and Time 3 was verified using correlation matrices (Appendix V). Multicollinearity (r>0.9; Leech et al., 2011) was not evident. However, it was noted that the CCAPS alcohol use subscale did not appear to correlate (r<0.3) with the vast majority of the other variables, so it was decided that this would not be included in the MANOVA.

Some authors consider MANOVAs to be particularly sensitive to outliers, which can be associated with Type I and Type II errors (Tabachnick & Fidell, 2007). Multivariate outliers were identified using Mahalanobis Distance and verified using the chi-square distribution table (Tabachnick & Fidell, 2007). With 14 dependent variables, respectively, the critical value is 36.1 where p = .001, so any participants with a Mahalanobis Distance value greater than 36.1 would have been considered for removal. In this case, no multivariate outliers were identified nor excluded from the primary analysis as a result.

Given that the analysis was not interested in the participants' groups of original allocation (i.e., ACT vs. WLC), there were no heterogeneity of variance or covariance assumptions to be met. Moreover, since there were only two levels of the repeated measure (i.e., time: pre- and post-intervention) in the main analysis, the sphericity assumption was redundant.

3.4.3 Does ACT Improve Mental Health Outcomes and Processes of Change?

Following the removal of one participant with significant univariate outlier scores on multiple variables, the final completer sample analysed consisted of 40 participants. A repeated measures MANOVA examined the effect of the intervention on mental health outcomes and processes within this sample.

In the first instance, an examination of the means in Table 3.5 suggested that many of the measures moved in the directions expected as a result of a transdiagnostic ACT intervention. For example, general psychological inflexibility, as measured by the AAQ-II and AAQ-US, decreased at post-intervention and decreased even further at follow-up, along with academic distress, alcohol use, eating concerns, generalised anxiety, hostility, social anxiety, overall distress, cognitive fusion, and obstruction to valued living. Depression also appeared to improve at post-intervention, and while this trend did not continue at follow-up, improvements in comparison with baseline were still observed. Meanwhile, as anticipated, mindful awareness and valued living increased over time. However, similar to the between-groups testing, while self-compassion had increased at post-intervention, this trend did not continue at follow-up, though it did remain considerably higher than the baseline level. While follow-up data was extremely limited (n = 12), the preliminary results are promising.

Table 3.5

Means and Standard Deviations for Process and Outcome Measures at Pre-Intervention, Post-Intervention and Follow-Up. Includes Pre-Post Effect Size.

	Pre-Intervention[a] (*n* =40) [b]		**Post-Intervention[a] (*n* = 40) [b]**		**Pre-Post Effect Size[c]**	**Follow-Up[a] (*n* = 12) [b]**	
	M	*SD*	*M*	*SD*	*d*	*M*	*SD*
Psychological Process							
Psychological Inflexibility (AAQ-II)	21.80	8.14	20.45	8.15	-0.17	17.17	4.93
Psychological Inflexibility (AAQ-US)	34.68	11.85	31.73	11.00	-0.26*	28.75	9.24
Cognitive Fusion (CFQ)	20.10	8.73	16.93	7.24	-0.40*	15.17	7.02
Mindful Awareness (MAAS)	3.55	0.71	3.91	0.73	0.50**	4.01	0.78
Self-Compassion (SCS-SF)	2.79	0.73	3.10	0.75	0.42**	3.07	0.66
Valued Living – Obstruction (VQ-Obs)	12.23	5.85	10.50	5.05	-0.32*	8.83	5.64
Valued Living – Progress (VQ-Prog)	18.73	4.64	19.45	5.47	0.14	21.08	3.92
Psychological Symptoms (CCAPS-34)							
Academic Distress	1.43	0.86	1.34	0.72	-0.11	1.27	0.58
Alcohol Use	1.02	0.88	0.78	0.88	-0.27	0.71	0.62
Depression – Transformed	0.97	0.50	0.87	0.43	-0.21	0.90	0.21
Eating Concerns	1.82	1.35	1.71	1.26	-0.08	1.36	1.25
Generalised Anxiety	1.38	0.78	1.20	0.65	-0.25*	1.00	0.69
Hostility – Transformed	0.75	0.47	0.60	0.44	-0.33*	0.46	0.44
Social Anxiety	2.06	0.87	1.72	0.83	-0.40**	1.50	0.76
Overall Distress	1.34	0.71	1.13	0.58	-0.32*	0.98	0.45

Notes. [a] Pre-intervention = Time 1, Post-intervention = Time 2, Follow-Up = Time 3

[b] One case was removed across the three time points as it featured significant outliers on multiple variables.

[c] Pre- to post-intervention effect sizes were calculated using the following formula for Cohen's $d = (M2 - M1) / SDpooled$ (Cohen, 1988; Viskovich & Pakenham, 2018), with negative numbers indicating a decrease in the associated variable.

* $p < .05$, ** $p \leq .001$

To examine the overall improvement in scores on mental health outcome variables from pre- to post-intervention, an omnibus repeated measures MANOVA was carried out on all of the dependent variables listed in Table 3.5, with the exception of alcohol use, which was excluded due to a violation of the linearity assumption. Using Pillai's Trace, as recommended by Field (2016), the results indicated that the LifeToolbox had significant effects on the combined mental health variables between the start and end of the course, $F(14, 26) = 4.20$, $p = .001$, Pillai's V = .69, $\eta_p^2 = .69$.

Process Changes

Looking more closely, separate univariate ANOVAs on the mental health process variables revealed there was a significant change in scores over time for general psychological inflexibility as measured by the AAQ-US at the end of the course, $F(1, 39) = 7.72$, $p = .01$, $\eta_p^2 = .17$, $d = -.26$, as well as for cognitive fusion, $F(1, 39) = 11.08$, $p = .002$, $\eta_p^2 = .22$, $d = -.40$, mindful awareness, $F(1, 39) = 23.06$, $p < .001$, $\eta_p^2 = .37$, $d = .50$, self-compassion, $F(1, 39) = 17.17$, $p < .001$, $\eta_p^2 = .31$, $d = .42$, and obstruction to valued living, $F(1, 39) = 9.00$, $p = .005$, $\eta_p^2 = .19$, $d = -.32$. However, no significant difference was found between scores over time on psychological inflexibility as measured by the AAQ-II, $F(1, 39) = 2.48$, $p = .12$, $\eta_p^2 = .06$, $d = -.17$, or progress towards valued living, $F(1, 39) = 0.87$, $p = .36$, $\eta_p^2 = .02$, $d = .14$.

Table 3.6

Univariate Analysis of Process Measures

Process Measure	*df*	*F*	η_p^2	*p*
Psychological Inflexibility (AAQ-II)	1	2.48	.06	.12
Psychological Inflexibility (AAQ-US)	**1**	**7.72**	**.17**	**.01**
Cognitive Fusion (CFQ)	**1**	**11.08**	**.22**	**.002**
Mindful Awareness (MAAS)	**1**	**23.06**	**.37**	*
Self-Compassion (SCS-SF)	**1**	**17.17**	**.31**	*
Valued Living – Obstruction (VQ-Obstruction)	**1**	**9.00**	**.19**	**.005**
Valued Living – Progress (VQ-Progress)	1	0.87	.02	.36

Notes. Statistically significant results are highlighted in bold.

* $p < .001$

Outcome Changes

Separate univariate ANOVAs were also performed on the mental health outcome variables, revealing a significant change in scores over time for the generalised anxiety, $F(1, 39) = 4.48$, $p = .04$, $\eta_p^2 = .10$, $d = -.25$, hostility, $F(1, 39) = 5.24$, $p = .03$, $\eta_p^2 = .12$, $d = -.33$, social anxiety, $F(1, 39) = 12.24$, $p = .001$, $\eta_p^2 = .24$, $d = -.40$ and the overall distress subscale, $F(1, 39) = 8.49$, $p = .01$, $\eta_p^2 = .18$, $d = -.32$. However, no significant difference was found between scores over time on academic distress, $F(1, 39) = 0.49$, $p = .49$, $\eta_p^2 = .01$, $d = -.11$, depression, $F(1, 39) = 3.13$, $p = .08$, $\eta_p^2 = .07$, $d = -.21$, or eating concerns, $F(1, 39) = 0.54$, $p = .47$, $\eta_p^2 = .01$, $d = -.08$.

Table 3.7

Univariate Analysis of Outcome Measures

Outcome Measure (CCAPS-34 Subscale)	*df*	*F*	η_p^2	*p*
Academic Distress	1	0.49	.01	.49
Depression – Transformed	1	3.13	.07	.08
Eating Concerns	1	0.54	.01	.47
Generalised Anxiety	**1**	**4.48**	**.10**	**.04**
Hostility – Transformed	**1**	**5.24**	**.12**	**.03**
Social Anxiety	**1**	**12.24**	**.24**	**.001**
Overall Distress	**1**	**8.49**	**.18**	**.01**

Notes. The CCAPS alcohol use subscale was excluded from the within-subjects testing due to a violation of the linearity assumption. Statistically significant results are highlighted in bold.

Follow-Up Analyses

Of the 21 students who completed pre- and post-intervention measures in the ACT group, only 13 of these returned to complete the Time 3 follow-up measures. A single participant was removed due to appearing as a significant outlier on multiple measures, an attempt was made to rerun the repeated measures MANOVA on 12 of these students using the three time points. Only dependent variables with significant results in the primary analyses were included given the sample size assumption, which would actually suggest a maximum of three dependent variables given this sample size and an independent variable with three levels (Leech et al., 2011). While these results would not have been statistically powered, it is interesting to note that significant effects appeared to be maintained for CCAPS hostility, $F(2, 22) = 4.309$, $p = .03$, $\eta_p^2 = .28$, mindful awareness (MAAS), $F(2, 22) = 5.61$, $p = .01$, $\eta_p^2 = .34$, and obstruction to valued living (VQ-Obstruction), $F(2, 22) = 6.67$, $p = .01$, $\eta_p^2 = .38$. However, a significant change in scores across time was not reported for the remaining variables.

3.4.4 Summary

Overall, the results of the within-subjects testing suggest that the LifeToolbox significantly improved psychological inflexibility (AAQ-US, CFQ, MAAS, VQ-Obstruction), self-compassion and psychological symptoms (generalised anxiety, hostility, social anxiety and overall distress) in the completer sample. Analysis of limited follow-up data indicated that significant improvements appeared to be maintained for hostility, mindful awareness and obstruction to valued living. However, similar to the between-groups testing, LifeToolbox did not appear to improve psychological inflexibility as measured by the AAQ-II, progress towards

valued living, academic distress, eating concerns or depression. Alcohol use was excluded from the analysis due to a violation of the linearity assumption. In line with the between-groups testing and existing literature, the strongest effect sizes were reported for mindful awareness, self-compassion (Viskovich & Pakenham, 2018) and social anxiety (Levin, Haeger, Pierce, & Twohig, 2017); the effect size for cognitive fusion was equal to that of social anxiety (Table 3.5). However, effect sizes did not appear to be as strong in the current study as those reported in the literature for self-compassion and social anxiety, though the effect size for mindful awareness was within range.

3.5 Mediation Analyses

Hypothesis 3: *Changes in psychological flexibility and self-compassion will mediate decreases in psychological symptoms.*

3.5.1 The Sample

For this analysis, the completer sample from the within-subjects testing (H2) was reused; that is, the full sample of students who completed pre- and post-intervention measures regardless of their original group of allocation with the exception of the single case which was removed due to significant outliers (n = 40).

3.5.2 Are Treatment Effects Mediated by Psychological Flexibility and Self-Compassion?

Results for the indirect effects and confidence intervals for each outcome are displayed in Table 3.8. Taking the example of the mediation effects of mindful awareness (M) on the outcome of academic distress (Y) through the intervention (X), it appears there was a significant indirect effect of LifeToolbox on academic distress through mindful awareness, B = -.24, BootSE = .09, 95% CI [-.45 to -.08]. This result indicates that participants had lower scores of academic distress at post-intervention relative to before the intervention by .24 units, through the process of mindful awareness.

Mediation analyses also indicated that general psychological flexibility as measured by the AAQ-US mediated the changes in academic distress, B = -.12, BootSE = .05, 95% CI [-.23 to -.03] and overall distress, B = -.06, BootSE = .03, 95% CI [-.12 to -.01]. Cognitive fusion was the most common mediator, mediating the changes in academic distress, B = -.14, BootSE =

.09, 95% CI [-.35 to -.01], depression, *B* = -.15, Boot*SE* = .08, 95% CI [-.33 to -.03], generalised anxiety, *B* = -.09, Boot*SE* = .05, 95% CI [-.22 to -.02], social anxiety , *B* = -.11, Boot*SE* = .05, 95% CI [-.23 to -.03] and overall distress, *B* = -.12, Boot*SE* = .05, 95% CI [-.25 to -.04]. Mindful awareness mediated changes in academic distress, *B* = -.24, Boot*SE* = .09, 95% CI [-.45 to -.08], and alcohol use, *B* = -.14, Boot*SE* = .07, 95% CI [-.29 to -.03], while self-compassion mediated changes in academic distress only, *B* = -.16, Boot*SE* = .08, 95% CI [-.32 to -.01]. Meanwhile, obstruction to valued living mediated the changes in depression, *B* = -.17, Boot*SE* = .08, 95% CI [-.36 to -.03], and overall distress, *B* = -.11, Boot*SE* = .06, 95% CI [-.24 to -.02]. Progress towards valued living did not mediate the changes in any outcomes. Notably, neither did psychological inflexibility as measured by the AAQ-II. Changes in eating concerns, hostility and self-compassion did not appear to be mediated by any of the processes.

Table 3.8

Indirect Effects of the LifeToolbox Program on Each Outcome Measure through Changes in the ACT Processes and Self-Compassion (n = 40)

Outcome	Mediator	Point Estimate	*SE*	Bootstrapping 95% CI Lower	Bootstrapping 95% CI Upper
	Psychological Inflexibility (AAQ-II)	-0.05	0.04	-0.14	0.04
	Psychological Inflexibility (AAQ-US)	**-0.12**	**0.05**	**-0.23**	**-0.03**
Academic	**Cognitive Fusion (CFQ)**	**-0.14**	**0.09**	**-0.35**	**-0.01**
Distress	**Mindful Awareness (MAAS)**	**-0.24**	**0.09**	**-0.45**	**-0.08**
	Self-Compassion (SCS-SF)	**-0.16**	**0.08**	**-0.32**	**-0.01**
	Valued Living – Obstruction (VQ-Obstruction)	-0.10	0.07	-0.25	0.01
	Valued Living – Progress (VQ-Progress)	-0.04	0.05	-0.16	0.04
	Psychological Inflexibility (AAQ-II)	-0.02	0.03	-0.09	0.05
	Psychological Inflexibility (AAQ-US)	-0.04	0.07	-0.21	0.08
Alcohol	Cognitive Fusion (CFQ)	-0.03	0.06	-0.17	0.08
Use	**Mindful Awareness (MAAS)**	**-0.14**	**0.07**	**-0.29**	**-0.03**
	Self-Compassion (SCS-SF)	0.02	0.07	-0.14	0.15
	Valued Living – Obstruction (VQ-Obstruction)	-0.09	0.07	-0.23	0.04
	Valued Living – Progress (VQ-Progress)	0.01	0.02	-0.04	0.06
	Psychological Inflexibility (AAQ-II)	-0.06	0.05	-0.17	0.01
	Psychological Inflexibility (AAQ-US)	-0.02	0.04	-0.07	0.08
	Cognitive Fusion (CFQ)	**-0.15**	**0.08**	**-0.33**	**-0.03**
Depression	Mindful Awareness (MAAS)	0.03	0.07	-0.13	0.16
	Self-Compassion (SCS-SF)	-0.05	0.06	-0.19	0.06
	Valued Living – (VQ-Obstruction)	**-0.17**	**0.08**	**-0.36**	**-0.03**
	Valued Living – Progress (VQ-Progress)	-0.03	0.05	-0.17	0.02

Table 3.8 (*contd.*)

	Psychological Inflexibility (AAQ-II)	-0.02	0.04	-0.13	0.05
	Psychological Inflexibility (AAQ-US)	-0.14	0.11	-0.38	0.02
Eating	Cognitive Fusion (CFQ)	-0.02	0.09	-0.23	0.13
Concerns	Mindful Awareness (MAAS)	-0.16	0.13	-0.43	0.09
	Self-Compassion (SCS-SF)	-0.09	0.07	-0.22	0.08
	Valued Living – Obstruction (VQ-Obstruction)	-0.17	0.10	-0.39	0.01
	Valued Living – Progress (VQ-Progress)	-0.04	0.04	-0.10	0.08
	Psychological Inflexibility (AAQ-II)	-0.04	0.04	-0.13	0.01
	Psychological Inflexibility (AAQ-US)	-0.06	0.04	-0.15	0.00
Generalised	**Cognitive Fusion (CFQ)**	**-0.09**	**0.05**	**-0.22**	**-0.02**
Anxiety	Mindful Awareness (MAAS)	0.02	0.05	-0.08	0.13
	Self-Compassion (SCS-SF)	-0.01	0.06	-0.13	0.10
	Valued Living – Obstruction (VQ-Obstruction)	-0.02	0.04	-0.13	0.04
	Valued Living – Progress (VQ-Progress)	-0.02	0.03	-0.10	0.01
	Psychological Inflexibility (AAQ-II)	-0.02	0.03	-0.09	0.02
	Psychological Inflexibility (AAQ-US)	0.00	0.04	-0.07	0.08
	Cognitive Fusion (CFQ)	-0.08	0.07	-0.25	0.02
Hostility	Mindful Awareness (MAAS)	0.00	0.07	-0.13	0.15
	Self-Compassion (SCS-SF)	-0.07	0.07	-0.21	0.06
	Valued Living – Obstruction (VQ-Obstruction)	-0.07	0.06	-0.20	0.03
	Valued Living – Progress (VQ-Progress)	-0.02	0.04	-0.15	0.01
	Psychological Inflexibility (AAQ-II)	-0.04	0.04	-0.14	0.01
	Psychological Inflexibility (AAQ-US)	-0.06	0.05	-0.18	0.01
Social	**Cognitive Fusion (CFQ)**	**-0.11**	**0.05**	**-0.23**	**-0.03**
Anxiety	Mindful Awareness (MAAS)	-0.09	0.06	-0.21	0.02
	Self-Compassion (SCS-SF)	-0.08	0.07	-0.22	0.05
	Valued Living – Obstruction (VQ-Obstruction)	-0.04	0.05	-0.16	0.04
	Valued Living – Progress (VQ-Progress)	-0.02	0.03	-0.08	0.03
	Psychological Inflexibility (AAQ-II)	-0.05	0.03	-0.12	0.01
	Psychological Inflexibility (AAQ-US)	**-0.06**	**0.03**	**-0.12**	**-0.01**
Overall	**Cognitive Fusion (CFQ)**	**-0.12**	**0.05**	**-0.25**	**-0.04**
Distress	Mindful Awareness (MAAS)	-0.03	0.05	-0.13	0.05
	Self-Compassion (SCS-SF)	-0.07	0.05	-0.17	0.02
	Valued Living – (VQ-Obstruction)	**-0.11**	**0.06**	**-0.24**	**-0.02**
	Valued Living – Progress (VQ-Progress)	-0.03	0.04	-0.12	0.02
	Psychological Inflexibility (AAQ-II)	0.04	0.03	-0.01	0.11
	Psychological Inflexibility (AAQ-US)	0.02	0.04	-0.05	0.11
Self-	Cognitive Fusion (CFQ)	0.05	0.05	-0.03	0.16
Compassion	Mindful Awareness (MAAS)	0.08	0.06	-0.02	0.20
	Valued Living – Obstruction (VQ-Obstruction)	0.04	0.04	-0.02	0.14
	Valued Living – Progress (VQ-Progress)	0.02	0.04	-0.01	0.12

Note. CI: confidence interval. Based on 5,000 bootstrapped samples. Significant mediation effects are highlighted in bold, where the indirect effects do not include zero (Preacher & Hayes, 2004).

3.5.3 Summary

Results of the mediation analyses suggest that the psychological inflexibility model explains some of the change resulting from the intervention. Specifically, elements of psychological inflexibility appeared to mediate improvements in academic distress, alcohol use, depression, generalised anxiety, social anxiety and overall distress. Cognitive fusion appeared to be the most frequent mediator. Self-compassion only acted as a mediator in improvements in academic distress; meanwhile, as a mental health outcome, self-compassion was not mediated by any of the psychological inflexibility subprocesses.

3.6 The Acceptability and Feasibility of LifeToolbox

Hypothesis 4: *LifeToolbox will be acceptable and usable as a self-guided application for university students.*

3.6.1 The Sample

All of the participants in the completer sample examined in the within-subjects (H2) and mediation (H3) analyses were given the opportunity to complete feedback questionnaires following the intervention. Two students declined and feedback from the 39 remaining students (ACT = 21, WLC = 18) was analysed in order to examine the final hypothesis.

3.6.2 Acceptability & Usability

Of the 39 students who completed the post-intervention feedback questionnaire, 85% rated the module length as "about right". Meanwhile, the majority (69%) of students considered the recommended 4-week program completion length to be "too little time", although some (28%) considered 4 weeks to be suitable and one student considered 4 weeks to be "too much time". The majority (41%) of students who completed the satisfaction questionnaire completed all 12 modules, although there was a variety of completion patterns with 33% of students completing fewer than half of the modules. Three students completed only a single module and, at the other extreme, two students "completed all of the modules and some of them more than once". For those who did not complete all of the modules, the reasons given included: prior knowledge of the material (2 students), "the program was too long and/or boring" (3 students) and "the program did not seem helpful" (1 student). However, the primary reason by far was not having

enough time (14 students). Finally, all but two students "would like to use the program again in future", with 45% strongly agreeing with this statement, and all but a single participant would recommend LifeToolbox to distressed university students (47% Strongly Agreed).

System usability ratings on the SUS fell within the 'excellent' range (M = 85.00, SD = 9.07). Moreover, individual program satisfaction ratings displayed positive responses to the program's features and characteristics (Table 3.9), with students rating the program as highly engaging, helpful, of high quality, practical, relatable, relevant, understandable and usable. ACT concepts introduced throughout the program, examples used, and format all received average ratings of above four stars out of five. Interestingly, the assignments, videos, audio and quotations all received fewer than four stars (range = 3.49–3.96).

Table 3.9

Program Satisfaction Questionnaire Ratings (n = 39)

Item[a]	*M*	*SD*	Rating of >=4/5 (%)
Assignments	3.49	1.02	48.72
Videos	3.67	1.42	61.54
Audio	3.76	1.35	69.23
Quotations	3.96	1.16	74.36
Relevant	3.99	1.19	71.79
Helpful	4.09	1.03	74.36
Format	4.14	0.99	74.36
Examples	4.14	0.99	79.49
Engaging	4.17	1.01	74.36
Practical	4.19	0.84	76.92
Quality	4.21	0.73	76.92
Relatable	4.22	1.00	79.49
Concepts	4.46	0.86	89.74
Usable	4.64	0.55	94.87
Understandable	4.72	0.48	97.44
System Usability Scale Total	85.00	9.07	

Note. [a] The maximum score for any of the individual items was 5.

3.6.3 Qualtrics Metadata

Qualtrics automatically records participant usage data (Figure 3.1; Table 3.10). It was evident from this metadata that the majority of the 112 participants who completed baseline measures also completed at least one LifeToolbox module (72.3%). Meanwhile, almost half of those who did use LifeToolbox (n = 81) completed 1–2 modules (48.1%), with a grand total of 65.4% of students completing fewer than half the modules and 19.8% completing all 12 modules. Qualtrics recorded 16 participants as having completed all 12 modules.

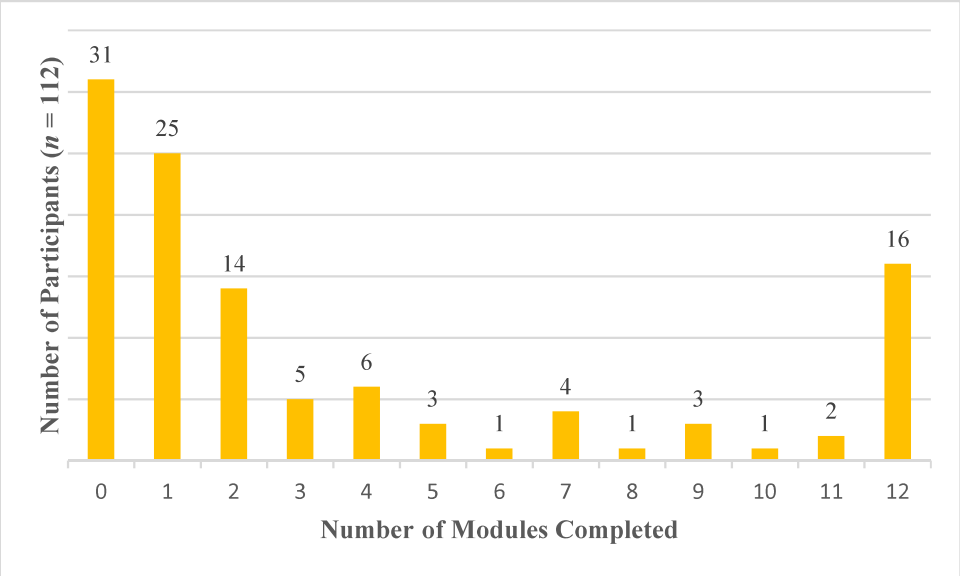


Figure 3.1 Bar Chart Displaying the Number of LifeToolbox Modules Completed by Participants.

Further analysis of Qualtrics metadata suggested that, unsurprisingly, the first module was the most popular (Table 3.10). Although users had access to all of the modules simultaneously, they appeared to typically start with Module 1; user numbers tapered off in each of the subsequent modules. The only exception to this trend was the first of the Valued Living modules (7), which attracted more users than the previous Defusion module (6). Moreover, only 78 of the 81 LifeToolbox users recorded by Qualtrics completed Module 1, indicating that three participants skipped this module completely. Table 3.10 indicates that participants completed a total of 365 modules over the data collection period, suggesting that the average number of modules completed per participant was 4.5. The data also indicate a high completion rate for those modules which were started (range: 84.3–100%). Finally, for the purposes of this analysis, modules were only considered complete when Qualtrics recorded a user's Progress at 100%, meaning that the completion figures reported here are cautiously low, for example, even

excluding modules which were 99% complete. Moreover, the results have been de-duplicated so that the same user is not included more than once in any cell or across completers and non-completers, meaning that actual usage rates are likely to be considerably higher.

Table 3.10

Qualtrics Program Usage Metadata

Module	Users	Completers		Non-Completers	
	(*n*)	(*n*)	% of Starters	(*n*)	% of Starters
1. Acceptance - Away Moves	78	68	(87.1)	10	(12.8)
2. Acceptance - Letting Go	54	51	(94.4)	3	(5.6)
3. Acceptance - Carrying Emotions With You	42	39	(92.8)	3	(7.1)
4. Defusion - Noticing Hooks	37	33	(89.1)	4	(10.8)
5. Defusion - Stepping Back	32	27	(84.3)	5	(15.6)
6. Defusion - Getting Flexible With Thoughts	25	25	(100)	0	(0.0)
7. Valued Living - Your Values	28	24	(85.7)	4	(14.2)
8. Valued Living - How You Want to Act	24	21	(87.5)	3	(12.5)
9. Valued Living - Finding Values	20	19	(95.0)	1	(5.0)
10. Action Setting Goals	20	19	(95.0)	1	(5.0)
11. Action - Making Commitments	20	20	(100)	0	(0.0)
12. Action - Returning to Commitments	20	19	(95.0)	1	(5.0)
TOTAL		365		35	

Note. These results have been de-duplicated so that the same user is not included more than once in any cell or across completers and non-completers.

3.6.4 Attrition

The dropout rate for completing the questionnaires for the overall sample between Time 1 and Time 2 was 52% and 39% between Time 2 and Time 3, with an overall attrition rate between Time 1 and Time 3 of 71%. A key issue revolves around whether those who completed Time 2 and Time 3 measures differed significantly from those who did not continue with the study. Chi-square analyses were used to compare those who completed post-intervention measures with those who did not. Similar to the examination of Hypothesis 1, where over 20% of cells had expected frequencies of fewer than five, Fisher's method for computing the exact significance was applied. No significant differences were found in terms of gender, ethnicity, disability, faculty, counselling experience, relationship or employment status. However, there

was a difference in completion rate between undergraduates and postgraduates, $\chi 2(1, 112) = .7.39$, $p = .01$, with 41% of postgraduates completing post-intervention measures, and a completion rate of only 12% among undergraduate students.

3.6.5 Summary

LifeToolbox received positive ratings from participants on both standardised and non-standardised measures, indicating that the program was acceptable to students and feasible as an intervention. Analysis of Qualtrics metadata also indicated acceptable program usage rates. The attrition rate was not modest but fell within the typical range for web-based intervention studies.

These findings and their implications for practice and future research will be discussed in the following chapter.

Chapter 4: Discussion

4.1 Introduction

This study was the first to examine the effectiveness and acceptability of an online ACT intervention for promoting mental health skills in university students in the UK. A waitlist crossover design was employed so that all participants would have the opportunity to benefit from the program without forgoing the advantage of having a control group. A total of 112 participants completed all baseline measures and were included in the analysis as part of an ITT or completer sample, in accordance with the statistical procedures. Attrition was high, with only 29% of students completing all three time points. However, the vast majority who did complete post-intervention feedback rated the LifeToolbox program as helpful and would recommend it to distressed university students.

In order to explore the effectiveness of the program, the research aims were conceptualised into four main hypotheses which suggested that LifeToolbox would significantly improve student mental health both in comparison with a WLC group and in contrast to baseline mental health measures, that psychological flexibility and self-compassion would mediate these improvements, and that the program would be acceptable to university students in the UK.

An MMRM analysis on the ITT sample revealed significant improvements on mindful awareness, self-compassion and social anxiety measures in participants receiving ACT relative to a waiting-list condition. Results from a repeated measures MANOVA on the completer sample demonstrated a significant difference from pre to post-intervention for the combined mental health variables and the majority of individual variables. As anticipated, the psychological flexibility model of change was supported: all of the ACT processes measured mediated a change in a minimum of one outcome variable, with cognitive fusion emerging as the most frequent mediator. Finally, analysis of post-intervention participant feedback revealed 'excellent' system usability scores which, in conjunction with the completion rate, provide support for the feasibility and acceptability of the program.

Overall, these findings provide further support for the use of a transdiagnostic web-based ACT program to promote mental health skills in university students in the UK. A transdiagnostic approach could simplify triage in university support services, providing a single referral point and addressing a range of issues within a single intervention. This kind of effective universal

approach towards mental health may be ideal in a service that caters to a range of mental health issues and severities, such as a university counselling service.

4.1.1 The Sample

It is interesting to compare the current sample to those in the two primary studies which most strongly informed this research set in Australia (Viskovich & Pakenham, 2018) and the USA (Levin, Haeger, Pierce, & Twohig, 2017). Here, 112 university students completed 100% of baseline measures with an average age of 31 years, considerably higher than the Australian (26 years) and US studies (21 years). The higher mean age in this sample is likely due to the opportunistic recruitment approach, which targeted many doctoral-level counselling and clinical psychology cohorts. Indeed, the majority of participants reported being late in their university career, at postgraduate level (78%), contrary to the Australian (45%) and US (1%) studies. In line with the previous research, the sample was largely female (84%), however, the rate was higher than in the studies in Australia (75%) and the USA (66%). One participant identified as non-binary. No non-binary participants were reported in the overseas studies. Also in line with the literature, the sample was homogeneous in ethnicity, with 87% identifying as White, almost identical to the rate in the US study (88%) and much higher than in the Australian study (51%). A substantial minority of participants reported attending counselling (22%) at baseline, a little higher than the rate reported in the US study (13%). This information was not available for the Australian study.

Based on empirically derived cut-off scores (CCMH, 2012), 81% of the sample reported clinically elevated scores on one or more CCAPS-34 subscales at baseline. This is much higher than the distress rates reported in the USA (68%) and Australia (59%), although it is in line with large-scale studies of university students (51.1–83.9%; Eskin et al., 2016; Stallman, 2010). The elevated scores do not necessarily indicate the presence of a diagnosis, but rather a greater likelihood of clinical problems in the subscale which may warrant further assessment given that mild-to-moderate distress levels can be predictive of future mental health problems (Kessler et al., 2002). Over one-third of the students in the sample showed signs of clinical distress in the areas of social anxiety, alcohol use and eating concerns at baseline.

One possible explanation for the elevated clinical scores in the present study could be that students were recruited across all degree levels, resulting in a higher mean age. Alternatively, the increased distress levels could reflect the trends identified in the UK, that mental health

symptoms are increasing with time among university students (The Insight Network, 2019). It is likely that the high percentage of female participants (84%) in comparison with the Australian (75%) and US (66%) samples also played a part in the high distress levels: women report significantly higher mean scores than men on the CCAPS depression, eating concerns, generalised anxiety, social anxiety, and overall distress subscales (CCMH, 2012). However, elevated scores on alcohol use cannot be explained by gender, since men have higher mean scores on alcohol use and hostility than women (CCMH, 2012).

Finally, 7% of the participants reported never having attended counselling and having no intention to attend in the future, supporting the concept that there exists a small but significant group of university students who may be open to web-based interventions and not face-to-face support (Levin, Stocke, Pierce, & Levin, 2018), and who might even be prevented from conventional treatment-seeking due to psychological barriers, such as attachment avoidance (Apolinário-Hagen et al., 2018).

4.2 Key Research Findings

4.2.1 Differences between Groups: ACT vs. WLC

The first hypothesis proposed that participants in the immediate intervention group would show significantly improved mental health outcomes relative to those in the WLC group following the intervention, informed by similar studies involving university students in the USA (Levin et al., 2014; Levin, Haeger, Pierce, & Twohig, 2017) and Finland (Räsänen et al., 2016). The benefit of comparing groups using MMRM analyses means that missing data can be modelled, thus allowing the whole ITT sample to be included, even when attrition rates are high and data is missing at some time points. This is the first time MMRM has been used to examine self-compassion in a study of this kind. Interestingly, where self-compassion has been studied, it is sometimes considered a process (Ong, Barney, Barrett et al., 2019) and sometimes an outcome measure (Viskovich & Pakenham, 2018). Here, it was considered as a process measure, though for the purposes of performing the MMRM analysis this distinction had no impact. In order to be comprehensive, in the mediation analysis (H3) it was examined as both an outcome and a process.

Outcomes

Even though symptom reduction is a by-product of ACT rather than a primary objective (Hayes et al., 1999), based on previous literature improvements were anticipated on depression and anxiety (Levin et al., 2014; Levin, Haeger, Pierce, & Twohig, 2017; Räsänen et al., 2016), as well as social anxiety and overall distress (Levin, Haeger, Pierce, & Twohig, 2017), although some research has indicated non-significant results for these outcomes (Levin et al., 2016). Significant differences were not necessarily anticipated for eating concerns, alcohol use and hostility (Levin, Haeger, Pierce, & Twohig, 2017).

In actuality, significant improvements were limited to the outcome of social anxiety; these improvements appeared to taper off at Time 3, suggesting a ceiling effect. However, they did remain above baseline level at Time 3. Although a manual examination of the group means over time for the remaining dependent variables revealed encouraging results (Tables 3.2, 3.3), there were no significant time by condition interactions on the remaining CCAPS-34 subscales.

Of note, when demographic variables were compared between the ACT and WLC groups at baseline, the variable of gender was approaching significance (Table 3.1). Interestingly, the only dependent variable which had a significant difference between the groups at baseline was eating concerns, which was significantly higher in the WLC group. In order to control for this difference, it was decided to treat eating concerns as a covariate, in line with previous literature (Krafft et al., 2019; Levin, Haeger, & Cruz, 2019). It could be that these two differences are linked and may relate to a gendered aspect of eating concerns. Indeed, women report significantly higher mean scores on the eating concerns subscale than men (CCMH, 2012).

Surprisingly, generalised anxiety and depression did not significantly change. Reported depression levels in this study were low at pre-intervention, with only 31% of students being in the clinical range for depression, and were below levels found in similar studies (e.g., 45%; Levin, Haeger, Pierce, & Twohig, 2017), potentially indicating a floor effect. It is also possible that depression was under-reported. However, generalised anxiety levels were almost identical in this study (31%) to the US study (30%), so this proposition does not necessarily hold up concerning the lack of significant improvements on generalised anxiety. This is in contrast with reports of 90% of British university students struggling with anxiety (The Insight Network, 2019). It could be that LifeToolbox did improve aspects of anxiety to which the CCAPS is not sensitive.

Although fewer variables resulted in significant improvements than anticipated, it is noteworthy that social anxiety did improve. It would be remiss not to relate this to the argument that there exists a small but significant group of university students who may be open to web-based interventions and not face-to-face support (Apolinário-Hagen et al., 2018; Levin, Stocke, Pierce, & Levin, 2018) and who might even be prevented from conventional treatment-seeking due to psychological barriers, such as attachment avoidance (Apolinário-Hagen et al., 2018). Perhaps there is also a link to cultural shame around mental health and treatment-seeking, however, research has explicitly shown that sociodemographics were not found to be predictors of attitudes to web-based interventions (Apolinário-Hagen et al., 2018). Indeed, the results of this study suggest no interaction between ethnicity or gender and attitude towards counselling, although the ethnicity results were approaching significance.

Finally, heed must be paid to the high distress levels in the sample described in Section 4.1.1. It was possible that the LifeToolbox program was not powerful enough to have a significant impact on these high baseline distress levels. Conversely, subscales with higher distress rates might be expected to improve more significantly than scores with lower ratings, which may have encountered a ceiling effect on improvements.

Processes

In terms of ACT processes, previous studies of web-based interventions for university students have shown mixed results. For example, cognitive fusion and mindful awareness have been linked to significant improvements in some research (Viskovich & Pakenham, 2018) but not consistently (Levin et al., 2016; Levin, Haeger, Pierce, & Twohig, 2017). Here, with the final ITT sample (n = 110), significant time by condition interactions were found on the processes of mindful awareness and self-compassion. Although a manual examination of the group means over time for the remaining dependent variables was encouraging, there were no significant time by condition interactions on general psychological inflexibility as measured by either of the primary measures (AAQ-II and AAQ-US), cognitive fusion or valued living, contrary to the literature (Levin, Haeger, Pierce, & Twohig, 2017).

Meanwhile, that results on the AAQ-II were not significant was not surprising given previous suggestions that it may not be sensitive to detecting treatment effects within the university student population (Levin et al., 2014; Levin, Haeger, Pierce, & Twohig, 2017). However, a significant result was anticipated on the AAQ-US, which was developed specifically for

students in response to this criticism (Levin, Krafft, Pistorello, & Seeley, 2018). Since neither proved to be significant, it is not possible to affirm the suggestion that the AAQ-II is not sensitive to university students. It also calls into question the role of psychological flexibility as a mediator of change, which is why examining the separate components of psychological inflexibility and completing mediation analysis is vital in the development of new interventions.

The results of Hypothesis 1 alone suggest mindful awareness and self-compassion as mechanisms of change. Perhaps, then, mindfulness-based and compassion-focused interventions could be equally effective for producing the level of change reported here. That mindful awareness and self-compassion improved significantly is particularly intriguing given that LifeToolbox did not include traditional and focused content for these processes in terms of specific modules. However, cognitive defusion modules did contain mindfulness exercises and it has been claimed that compassion "infuses every aspect of the ACT model" (Harris, 2019, p. 202). Moreover, acceptance and mindfulness are key components of self-compassion (Neff, 2009). The inter-relatedness of the key concepts highlights the challenges of identifying a single mechanism of change and of isolating the independent subprocesses.

Notably, follow-up univariate tests suggested that significant improvements in mindful awareness were maintained at Time 3. It could be that mindful awareness exercises are simply easier to design and engage with. Alternatively, it could be that the recent popularity of mindfulness in Western culture renders these exercises easier to digest for the students or provides more motivation for student engagement. Interestingly, a similar result was found in Finland where improvements were found in mindful awareness but not in general psychological flexibility (Räsänen et al., 2016). Mindful awareness alone is associated with a myriad of benefits for young people, such as reducing stress and anxiety, and increasing self-care, self-control and sleep quality (Halliburton and Cooper, 2015). Self-compassion improvements were consistent with previous research (Viskovich & Pakenham, 2018). Unlike with mindful awareness, self-compassion levels decreased again at Time 3. This suggests that the strength of the intervention may be short-lived. However, it is promising that although levels dropped they remained above baseline level.

That only two out of seven processes appeared to significantly improve was unexpected, although the overlapping nature of the measures meant that this was not altogether surprising.

However, an examination of univariate tests was promising. Pairwise comparisons of estimated means showed significant pre-post change for psychological inflexibility, as measured by both the AAQ-II and AAQ-US, cognitive fusion and obstruction to valued living. These univariate results were more in line with original predictions and perhaps with a larger sample size the time by condition interactions would also have produced significant results. Notably, based on these estimated means, at Time 2 the ACT group reported lower scores on every single measure of psychological symptoms and inflexibility, and higher scores on each measure of psychological *flexibility* in comparison with the control condition. Meanwhile, the WLC group scores did not appear to change noticeably between Time 1 and 2, as anticipated with a passive control group.

H1 Conclusions

Results from the between-groups analysis provided preliminary support for web-based ACT as an effective intervention for university students in the UK, particularly in terms of improvements in self-compassion, mindful awareness and social anxiety. Follow-up analyses suggested that significant improvements in mindful awareness alone appeared to be maintained at Time 3. Refinements to the LifeToolbox program might engender improvements in other aspects of psychological flexibility and mental health. That both process and outcome measures showed some significant results, indicates a degree of support for both the program and the underlying theory of change. Moreover, self-compassion and mindful awareness themselves have been linked to a range of positive mental health outcomes such as increases in well-being, optimism, and connectedness, and reductions in anxiety, depression, fear and rumination (Neff, 2009). It is also worth noting that mindful awareness is considered to be one of the three foundations of self-compassion, along with self-kindness and an awareness of common humanity (Neff, 2009). Research has already shown that people with Social Anxiety Disorder (SAD) report less self-compassion than a 'healthy' control group (Werner et al., 2012), so it is not surprising to see reduced social anxiety levels alongside increases in self-compassion. The results of this study appear to support the idea of self-compassion as a target for the treatment of SAD.

In spite of the limited significant results, it is worth highlighting that, based on an examination of the estimated means (Tables 3.2 and 3.3), it was evident that the group means moved in the hypothesised direction, with the ACT group showing improvements in mental health on every single variable from baseline to post-intervention. Meanwhile, the WLC group scores did not

appear to change noticeably between Time 1 and 2, as anticipated with a passive control group. A lack of significant between-groups results could be due to the small sample size, the elevated clinical distress levels in the sample at baseline or perhaps the limited strength of some of the LifeToolbox modules. By subsequently analysing within-subjects pre-post data, it was hoped that further light might be shed on more and less effective components of LifeToolbox.

4.2.2 Within Groups: Before & After

The second hypothesis predicted that mental health would improve from pre- to post-intervention for all participants who completed measures at both times (n = 40), regardless of their group of original allocation (i.e., ACT vs. WLC). This hypothesis was strongly informed by a strictly within-subjects study which examined an ACT web-based intervention for university students in Australia (Viskovich & Pakenham, 2018). Based on this study, improvements were expected on the outcomes of depression, generalised anxiety and self-compassion, but again, not alcohol use. Similarly, improvements were predicted on general psychological inflexibility (as measured by the AAQ-II), cognitive fusion, mindful awareness and valued living. The authors did not separate valued living in terms of progress and obstruction, but improvements were not necessarily expected on the progress towards valued living subscale, based on the findings of another study (Levin, Haeger, Pierce, & Twohig, 2017).

In the first instance, an examination of the means (Table 3.5) suggested that many of the measures moved in the expected directions. The results of the MANOVA indicated that the LifeToolbox had significant effects on the combined mental health variables between the start and end of the course.

Outcomes

In terms of outcome measures, a significant change in scores over time was found for generalised anxiety, hostility, social anxiety and overall distress. However, no significant difference was found between scores over time on the academic distress, depression, or eating concerns measures. It was particularly surprising that depression scores did not improve, considering the vast amount of research on ACT suggesting that they would, including meta-analyses (e.g., A-Tjak et al., 2015; Öst, 2008), and studies focused on web-based ACT interventions for university students (Levin et al., 2014; Levin, Haeger, Pierce, & Twohig, 2017; Räsänen et al., 2016; Viskovich & Pakenham, 2018). Again, perhaps depression levels

were simply under-reported, or the program was just not powerful enough to galvanise change. Furthermore, depression improvements were in fact significant at a level of 10%.

Processes

Significant improvements were seen in the processes of general psychological inflexibility, as measured by the AAQ-US, cognitive fusion, mindful awareness, self-compassion and obstruction to valued living. Unlike in the Australian study, no significant difference was found between scores over time on general psychological inflexibility as measured by the AAQ-II, or progress towards valued living. This could be because the Australian program included all six of the ACT processes, whereas LifeToolbox did not explicitly include traditional and focused content on self-as-context or present moment awareness. However, unlike the Australian study, the current study included a power analysis.

Follow-Up

A non-statistically powered MANOVA performed with the small follow-up sample (n =12) indicated that significant effects appeared to be maintained for hostility, mindful awareness and obstruction to valued living at Time 3. Similar to the between-groups testing, while self-compassion had increased at post-intervention, this trend did not continue at follow-up, though it did remain considerably higher than the baseline level. The results for alcohol use are unknown since it was excluded from the analysis, given its low correlation with the other outcome variables. Perhaps this also caused issues for the Australian research team. Although media reports suggest that alcohol use is decreasing among UK university students (The Independent, 2018), concerningly, almost half (45%) of British students use alcohol and drugs as coping mechanisms (The Insight Network, 2019). This is fairly in line with the one-third (34%) of students who appeared to have clinically elevated alcohol use rates in this sample.

H2 Conclusions

The statistically powered within-subjects testing of the completer sample examined seven outcome measures in total, four of which improved significantly (generalised anxiety, hostility, social anxiety and overall distress). Alcohol use was excluded from the analysis due to a violation of the linearity assumption, but significant improvements would not have been expected on this or eating concerns based on previous studies, although based on the same

studies increases on academic distress and depression were anticipated (Levin, Haeger, Pierce, & Twohig, 2017; Viskovich & Pakenham, 2018).

Of the seven processes measured, five showed significant improvements (general psychological inflexibility as measured by the AAQ-US, cognitive fusion, mindful awareness, obstruction to valued living, and self-compassion). Once again, the lack of effect on the two processes which did not show significant improvements, general psychological inflexibility, as measured by the AAQ-II, and progress towards valued living, was anticipated based on the literature (Levin, Haeger, Pierce, & Twohig, 2017). This might suggest that the AAQ-II should be excluded from future research with university students in favour of more sensitive measures. Consideration must also be given to improvements in valued living. It is interesting that obstruction to valued living improved while progress towards valued living did not, in line with previous research (Levin, Haeger, Pierce, & Twohig, 2017). Perhaps longer-term interventions are required to engage students at this level. Indeed, participants made it clear that a longer intervention period would be preferred (Section 3.6.2).

The power analysis suggests that any significant results from the primary MANOVA were statistically powered (Appendix G). Further analysis of limited follow-up data indicated that significant improvements appeared to be maintained for hostility, mindful awareness and obstruction to valued living. In conjunction with the results of the between-groups analysis, these results lend credible empirical support to the theory of psychological flexibility as a mechanism for change in positive mental health outcomes with university students, as well as for the use of web-based interventions with this population. Of course, mental health may have improved simply due to the agreement to participate in this study, as has shown to be the case with other positive psychology interventions, regardless of whether the intervention is actually completed (Seligman, Steen, Park, & Peterson, 2005). This is thought to be due to anticipatory effects and the introduction of positive information about the self. This was somewhat buffered by the use of the control group in the between-groups (H1) testing and could contribute to the non-significant results since it might suggest that the WLC group measures would have increased at Time 2 if anticipatory benefits continued. A perusal of their mean scores (Tables 3.2 and 3.3) suggests a very modest improvement in scores for the WLC at Time 2 for 10 of the 14 variables measured, the exceptions being hostility, mindful awareness, self-compassion and social anxiety. It is interesting that once again, a connection, though tenuous, is made between self-compassion, mindfulness and social anxiety. Conversely, perhaps the theory of

Seligman et al. (2005) would suggest that such positive impact would already exist during the baseline measure completion. Regardless, it is an interesting concept to hold in mind, and to an extent also assuages any uncertainty concerning the ethics of online interventions which, if this is the case, may provide mental health benefits by simply existing as an option for students.

In line with the between-groups testing (H1) and the literature, the strongest effect sizes were reported for mindful awareness, self-compassion (Viskovich & Pakenham, 2018) and social anxiety (Levin, Haeger, Pierce, & Twohig, 2017), although the effect sizes for the latter two measures were smaller than those reported in the literature. Unlike the between-groups testing, cognitive fusion also appeared to have one of the largest effect sizes, which appears to be corroborated by the results of the mediation analysis.

4.2.3 Mechanisms of Change

Processes

A major strength of the ACT model is that it provides a clear and measurable mechanism of change, extending to the identification of subprocesses. The third hypothesis examined whether changes in psychological flexibility and self-compassion would mediate decreases in overall distress for all participants who completed measures at pre- and post-intervention (n = 40). While it was predicted that self-compassion might be a key mediator through which ACT engenders psychological change based on previous research (Ong, Barney, Barrett et al., 2019; Yadavaia et al., 2014), according to the results it only mediated changes in academic distress. This result lends support to the idea that psychological flexibility is not the only mediator of change associated with ACT interventions (Ong, Barney, Barrett et al., 2019). As mentioned previously, there is a significant overlap between self-compassion and elements of psychological flexibility, such as acceptance and flexible perspective-taking. Moreover, compassion permeates the ACT model (Harris, 2019). There is likely more nuance yet to be discovered vis-à-vis ACT's mechanism of change, which is why it is so helpful to study the individual subprocesses alongside general psychological inflexibility.

A second prediction was that general psychological inflexibility and obstruction to valued living might mediate overall distress (Levin, Haeger, Pierce, & Twohig, 2017). Indeed, findings indicated that psychological inflexibility as measured by the AAQ-US mediated the

changes in both academic and overall distress. Meanwhile, as predicted, obstruction to valued living mediated the changes in depression and overall distress. Unlike previous research (Viskovich & Pakenham, 2018), ostensibly not all of the ACT processes mediated at least one primary outcome: neither progress towards valued living nor psychological flexibility, as measured by the AAQ-II, appeared to mediate the changes in any outcomes. This was expected based on the literature (Levin, Haeger, Pierce, & Twohig, 2017) and the results of the between-groups (H1) and within-subjects (H2) analysis. Moreover, changes in eating concerns, hostility and self-compassion did not appear to be mediated by any of the processes. However, in the study cited, the authors did not examine the AAQ-US, so if this is accepted as the primary measure of psychological inflexibility and the valued living subscales (obstruction and progress) are combined, the results do in fact suggest that all of the ACT processes mediated at least one primary outcome.

Finally, previous research indicated that psychological inflexibility, cognitive fusion and valued living might be the most common mediators of change (Viskovich & Pakenham, 2018). This was precisely the case, with cognitive fusion being the most common mediator, mediating the changes in five of the nine outcomes tested (academic distress, depression, generalised anxiety, social anxiety and overall distress). Mindful awareness mediated changes in academic distress and alcohol use; it did not significantly mediate changes in social anxiety, as might have been expected based on the between-groups (H1) analysis. In fact, cognitive fusion appeared to be the only significant mediator of social anxiety, which was somewhat unexpected since, in the between-groups analysis (H1), cognitive fusion did not significantly improve. However, cognitive fusion did improve in the within-subjects analysis (H2). These contradictory results might be explained by the sample used for the analysis, that is, the ITT sample (n = 110) being used for the between-groups analysis (H1) and the completer sample (n = 40) being used for the within-subjects (H2) and mediation (H3) analyses.

It was expected that the processes which had significantly improved in the within-subjects analysis (H2) might each mediate a minimum of one outcome. This was therefore anticipated with all the subprocesses with the exception of psychological inflexibility, as measured by the AAQ-II and progress towards valued living. The results of the mediation analysis corroborated this prediction. They also supported the psychological flexibility theory of change and showed the individual effectiveness of each ACT subprocess. That the AAQ-II did not appear to act as a mediator, and yet the AAQ-US and the separate components of psychological flexibility did,

provides further support to the suggestion that the AAQ-II may not be sensitive to changes in university students (Levin et al., 2014).

Outcomes

Interestingly, academic distress was the outcome which was significantly mediated by the most mediators – four in total (psychological inflexibility as measured by the AAQ-US, cognitive fusion, mindful awareness and self-compassion). This may indicate that even though significant results were not found for academic distress in the pre-post intervention testing (H2), a change likely did occur, and was at least partially mediated by psychological flexibility. Academic distress was most strongly mediated by mindful awareness and self-compassion, in line with the strong results for these processes in the between-groups (H1) testing. Similarly, depression appeared to be significantly mediated by obstruction to valued living and cognitive fusion, although obstruction to valued living appeared to be a slightly stronger mediator (Table 3.8). Changes in eating concerns were not mediated by any of the investigated processes, supporting the between (H1) and within-subjects results (H2) that eating concerns had not significantly changed. That self-compassion did appear to significantly mediate an outcome (academic distress), but was not itself mediated by changes in any of the remaining processes, could support the argument for treating self-compassion as a *process* in ACT literature (Ong, Barney, Barrett et al., 2019; Yadavaia et al., 2014), rather than an outcome (Viskovich & Pakenham, 2018).

It was interesting that some outcomes appeared not to change significantly in the within-subjects analysis (H2), and yet significant mediators were found for these scores (i.e., academic distress and depression). However, improvements in the means of these scores are evident in Table 3.5, so it could be that those small changes were significantly mediated by the model.

H3 Conclusions

Few studies on university students have examined whether ACT subprocesses and self-compassion mediate changes in psychological symptoms. The results of the mediation analysis indicated that there was a significant indirect effect of LifeToolbox on academic distress, alcohol use, depression, generalised anxiety, social anxiety and overall distress through the processes of psychological flexibility and self-compassion. These results therefore provide quantitative support for the theory of change used to explain the significant results in the between-groups (H1) and within-subjects (H2) analysis, along with the premise that

psychological flexibility is not the only mechanism of change (Ong, Barney, Barrett et al., 2019). The limited amount of the change that appears to be explained by the mediators (Table 3.8), indicates that other psychological processes might also be implicated in the ACT model of change, such as the two non-measured ACT subprocesses (self-as-context and committed action), that the selected measures are not sensitive to aspects of change or perhaps simply that the intervention lacked the strength to precipitate measurable change in the students, as suggested by the between-groups testing (H1).

Cognitive fusion appeared to be the most frequent mediator of change, indicating that the three LifeToolbox cognitive defusion modules may have had the most explicit effect of the 12 modules. That the AAQ-II did not appear to act as a mediator, and yet the AAQ-US and the separate components of psychological flexibility did, provides further support to the suggestion that the AAQ-II may not be sensitive to changes in university students (Levin et al., 2014). Interestingly, academic distress was the outcome which was significantly mediated by the most mediators. However, the majority of outcomes were mediated by at least one process, the exceptions being eating concerns, hostility and self-compassion. In combination with the results from the between (H1) and within-subjects (H2) analysis, and in line with the literature (Levin, Haeger, Pierce, & Twohig, 2017), it seems reasonable to conclude that the LifeToolbox program does not lead to improvements in eating concerns. Perhaps specialist targeted treatment is warranted for less typical problems such as eating concerns. Significant pre-post changes in hostility appear to be mediated by an unidentified process of change.

4.2.4 Satisfaction & Feasibility

The examination of Hypotheses 1–3 provided some support for the psychological flexibility model of change and the LifeToolbox program as a tool for that change in university students. However, further investment in LifeToolbox might be a poor use of resources if students are not willing to engage with the program. The fourth and final hypothesis was important in assuring the feasibility of implementation of the intervention and the satisfaction of the target audience, particularly from the perspective of using Qualtrics as the delivery method. In pilot studies, feasibility is as important, if not more important (Thabane et al., 2010), than statistical significance. In previous studies, participants have typically rated ACT web-based interventions as above average (Levin et al., 2016; Levin, Haeger, Pierce, & Twohig, 2017; Viskovich & Pakenham, 2018) to high (Levin et al., 2014; Levin et al., 2015; Räsänen et al.,

2016) on standard usability measures and non-standardised questions. However, there are exceptions, such as a more recent iteration of LifeToolbox which was rated as only adequately satisfying on non-standardised questions (Levin, Haeger, Pierce, & Twohig, 2017).

Here, it would appear the module length was acceptable to students, with the vast majority (85%) of students considering the 15-minute module length to be "about right". However, a majority (69%) considered the recommended four-week program completion length to be "too little time". The recommended completion time of 4 weeks was in line with other studies (Levin, Haeger, Pierce, & Twohig, 2017; Viskovich & Pakenham, 2018), however, previous studies contained far fewer modules (four in both cases), of unreported duration. It was considered prior to launching the study that 4 weeks might be too brief a time period, but it was selected nonetheless, given the relatively short data collection period. Moreover, although the 4-week timeframe was recommended, it was not enforced. Future studies might consider investigating the ideal recommended timeframe, so as to enhance the benefits of the intervention while not forgoing momentum.

Most students who completed the satisfaction questionnaire completed all 12 modules, although there was a variety of completion patterns from a single module to "all of the modules and some of them more than once". Unsurprisingly, the primary reason given for not completing all of the modules was not having enough time. It was interesting to compare Qualtrics usage metadata with self-report feedback measures. Qualtrics suggested that 28% of those who completed baseline measures never even logged on to LifeToolbox. Predictably, the first module was the most popular, with user numbers exhibiting a steady tapering effect in subsequent modules. However, when participants did log on to any module, they were very likely to complete it, with completion rates ranging from 84–100%. Finally, it was heartening to see that participants completed at least 365 complete modules during the data collection period, and 16 participants (14%) completed all 12 LifeToolbox modules.

Overall, system usability ratings on the SUS fell within the 'excellent' range ($M = 85.00$). This is in line with the ACT Daily App studies (Levin, Haeger, Pierce, & Cruz, 2017; Levin, Haeger, & Cruz, 2019) and substantially higher than in the most recent US study (Levin, Haeger, Pierce, & Twohig, 2017). Perhaps this is somewhat due to the novelty factor of a web-based intervention ACT intervention in the UK, whereas the students involved in the US study belonged to a university that had piloted ACT web-based interventions on several occasions.

That the program was rated more highly on the SUS (M = 85) than similar interventions in the USA (M = 71; Levin, Haeger, Pierce, & Twohig, 2017) and Australia (M = 79; Viskovich & Pakenham, 2018), is particularly interesting given that attrition was higher in this study than in those overseas. Perhaps in the UK, students who find the program less acceptable are more likely to drop out.

Students also displayed positive responses to the program's features and characteristics (Table 3.9), with participants rating the program as highly usable, understandable, of high quality, relatable, practical, relevant, engaging and helpful. Students rated the ACT concepts introduced throughout the program, examples used and the format particularly highly. Meanwhile, the assignments, videos, audio and quotations received slightly less favourable ratings, though still demonstrating approval. This implies that the ACT model and the web-based format were acceptable, but perhaps the embedded audio-visual items and the automated homework assignments require further refinement, either due to quantity, quality or some combination thereof. Collecting further feedback from participants in future could elucidate any weak aspects and suggest areas for improvement. However, even in its current state, the majority of participants "would like to use the program again in future" and would recommend LifeToolbox to distressed university students. It is worth noting that the fact that the majority of participants in this study and similar studies overseas were female (Levin, Haeger, Pierce, & Twohig, 2017; Viskovich & Pakenham, 2018) might mean that it is ostensibly more acceptable to the female student population. However, a larger male sample would be necessary to firmly draw this conclusion.

The positive ratings are notable, given that the program was developed and delivered through a survey platform, not designed for the purpose of delivering interventions, but which allows for quick program refinements, data collection, automated reminder emails, and can be easily linked to a simple program homepage, such as was hosted in this case on Weebly (Figure 2.2), a free online website builder and hosting platform. This means that these programs can be developed and advanced without the need for significant resources, such as money, expertise, and time spent on staff training and development. While custom-built websites have the benefit of being designed for purpose, they can also be a costly alternative, particularly in the early development of new interventions. The approach taken by previous researchers and replicated in this study is not designed to completely replace custom-built websites, but rather to ease the burden on researchers at this early stage of development.

Another note on attrition

Based on participant feedback, it seems reasonable to assume that high levels of attrition did not indicate absolute rejection of LifeToolbox by the target audience. It is known from previous studies that students benefit from web-based interventions even with minimal engagement (Stallman & Kavanagh, 2016). In terms of repeat-user rates, previous studies have reported that 25% (Stallman & Kavanagh, 2016) to 62% (Viskovich & Pakenham, 2018) of students visited their web-based programs on more than one occasion. Here, while that data was not available, if we define repeat-users as those who completed more than one module, 92% of those who completed feedback measures fulfil this criterion. Based on the Qualtrics metadata (Figure 3.1) which also incorporates those who did not complete feedback measures, it appears that 50% of the original ITT sample (n = 112) completed more than one module. Although these are promising repeat-user rates, they are limited by the fact that users may, in fact, have completed multiple modules in one sitting or alternatively, completed a single module in multiple sittings, meaning that it is not quite comparable to the repeat-user rates reported in the literature. Another option is to consider repeat-users to be those who signed in to LifeToolbox on more than one day; 63% of those who logged into LifeToolbox once returned to the program on at least one more day. More effective repeat-user data could be reported in future by collecting and analysing further Qualtrics metadata.

As is evident in the literature (Lappalainen et al., 2015; Levin et al., 2014; Räsänen et al., 2016), retention could be enhanced through financial or academic rewards. However, it may simply be that students "take what they need and cease use" (Viskovich & Pakenham, 2018, p. 18). Indeed, a systemic review of randomised studies examining technology-based interventions specifically for university students reported that neither the length nor frequency of interventions was associated with positive outcomes (Farrer et al., 2013).

Since complete pre-post intervention data sets were available for 41 participants, this suggests an overall pre-post attrition rate of 53%. This is consistent with the literature on web-based interventions for adults (2–83%; Melville et al., 2010), though higher than those targeting university students (2–50%; Harrer et al., 2019), general ACT interventions (23%, O'Connor et al., 2018; 0–37%, Öst, 2008), self-help ACT interventions for adults (3–46.4%, French et al., 2017), and web-based ACT interventions aimed at adults (19.19%, Kelson et al., 2019). However, it is consistent with web-based ACT intervention studies for university students which do not include monetary compensation (61%; Viskovich & Pakenham, 2018). While the

attrition rate was high, no differences were found between completers and non-completers in terms of demographic variables, with the exception of education level, where postgraduate students were both more likely to participate in the program and less likely to drop out. This could be due to a high proportion of doctoral psychology students with a deep interest in psychological interventions from a personal and professional perspective.

H4 Conclusions

The previous analyses corroborated the psychological flexibility model of change and online ACT interventions as effective in the promotion of mental health skills with university students in the UK. However, the final hypothesis testing was important in assuring the feasibility of LifeToolbox implementation and acceptability to the target audience. The participant feedback was encouragingly positive, suggesting that the LifeToolbox program was well-liked and usable, and importantly that students would be willing to use it again in the future and even recommend it to distressed university students. Qualtrics metadata provided further support, indicating very high module completion rates for participants who logged on to any individual module. Metadata also revealed that at least 14% of all participants completed all 12 LifeToolbox modules, in spite of time constraints.

The results clearly indicate further support for the use of Qualtrics as a cost-effective and user-friendly prototype intervention for university students, as reported in the USA (Levin, Haeger, Pierce, & Cruz, 2017; Levin, Haeger, Pierce, & Twohig, 2017). While the attrition rate was not ideal, it is not unusual with self-guided and non-financially incentivised web-based interventions (Melville et al., 2010; Viskovich & Pakenham, 2018). It is a reminder of the necessity to consider the balance between retention and cost-effectiveness when strategising. The high satisfaction rates for those who did complete the LifeToolbox indicate that it could be a cost-effective resource, at least for a small group of students, either through a survey-based platform such as Qualtrics or a more refined customised interface.

Finally, in terms of the original benchmarks of success suggested for Hypothesis 4 (Section 2.9.2), LifeToolbox could be considered to be both acceptable and usable, with mean SUS scores comfortably above 80/100, high satisfaction ratings on individual items and a 50% minimum repeat-user rate. The overall pre-post-intervention attrition rate of 53% is similar to typical face-to-face adherence rates with university students, which have been reported at around 50% (Lucas, 2012).

4.2.5 Summary

Results from the statistical analyses provided preliminary support for web-based ACT as an effective transdiagnostic intervention for university students in the UK in line with previous studies in other countries (Levin, Haeger, Pierce, & Twohig, 2017; Räsänen et al., 2016; Viskovich & Pakenham, 2018). Although the program did not appear to be as effective as hoped, potentially due to the small sample size, strength of the program or limited timeframe, some exciting preliminary results appeared. Results were particularly promising in terms of improvements in self-compassion, mindful awareness and social anxiety when comparing the active group with a waiting-list control condition. Moreover, significant improvements in mindful awareness appeared to be maintained at follow-up. Furthermore, manual examinations of the means in both the between-groups (H1) and within-subjects (H2) analyses showed that all outcomes and processes improved to some extent following the intervention. Pre-post intervention analysis (H2) also offered support for significant improvements in the majority of outcomes and processes. A non-statistically powered MANOVA performed with the limited follow-up sample (n =12) indicated that significant effects may even have been maintained for some variables at follow-up. Significant pre-post improvements appeared to be mediated by all of the ACT subprocesses (H3).

A lack of significant results across the board for the AAQ-II corroborates earlier reports that it may not be sensitive to psychological inflexibility changes in university students (Levin et al., 2014). However, further support for the relatively new measure of general inflexibility designed for university students was limited; while AAQ-US results improved significantly in the within-subjects analysis (H2), improvements were not significant on the between-groups testing (H1) and it only mediated changes in the outcome of academic distress (H3). In contrast, the AAQ-II did not mediate changes on academic distress nor any other outcomes, which appears consistent with the assertion that the AAQ-US is a stronger predictor of academic outcomes than the AAQ-II (Levin et al., 2018). The participant feedback was encouragingly positive (H4), suggesting that the LifeToolbox program was well-liked and usable, which was corroborated by Qualtrics usage data. The results clearly indicate further support for the use of Qualtrics as a cost-effective and user-friendly prototype intervention for university students, as reported elsewhere (Levin, Haeger, Pierce, & Cruz, 2017; Levin, Haeger, Pierce, & Twohig, 2017). While the attrition rate was not ideal, it is typical of non-guided and non-financially incentivised web-based interventions (Melville et al., 2010; Viskovich & Pakenham, 2018).

A summary of significant results across Hypotheses 1 to 3 can be found in Appendix W. Based on these results, along with existing literature (Levin, Haeger, Pierce, & Twohig, 2017), minimal support is available for online web-based programs as effective interventions for the reduction of alcohol use and eating concerns among university students. Surprisingly, academic distress and depression did not appear to improve significantly in the between-groups (H1) nor within-subjects (H2) analyses, though non-significant improvements were evidenced by changes in mean scores (Tables 3.2, 3.3, 3.5) and appeared to have been mediated by multiple ACT processes as well as self-compassion (H3). Although generalised anxiety, hostility and overall distress did not improve in comparison with the WLC, significant improvements were reported in the within-subjects analyses, and psychological inflexibility and self-compassion once again appeared to mediate the change, except in the case of hostility; it seems that changes in hostility were mediated by non-measured processes. Finally, the strongest evidence across the board was for LifeToolbox as an effective intervention for social anxiety, both from pre- to post-intervention within participants, but also when compared with a WLC condition; in this study, significant improvements in social anxiety appeared to be mediated by cognitive fusion only.

LifeToolbox could be further refined to maximise its potential in improving mental health skills based on the findings of this research. Specific suggestions are offered in Section 4.6.

4.3 Limitations of the Study

This study was designed to rapidly test the potential efficacy and acceptability of LifeToolbox, and identify areas for revision. Due to the pilot nature of the study, there were some methodological limitations which should be considered when interpreting the findings. Some of these limitations have helped to identify areas for future research, which will be discussed in Section 4.6.

Firstly, the generalisability of the results is limited by the homogeneous sample, which contained a large majority of participants who identified as female, White, and as being later in their university career, at postgraduate level. The homogeneity of the sample may be an effect of using an Internet-based survey distributed mainly via email. Although the age range was substantial (18–62), the average age was 31.4 years. This means that the findings are not necessarily generalisable to more mature students or even the typical undergraduate profile. Moreover, since recruitment primarily occurred online, individuals who do not typically use

the Internet may have been prohibited from participating. The primarily text-based nature of the program may also have excluded those who struggle with reading; however, some audio-visual exercises were included, and modules were designed to be brief, in line with the literature on the Internet habits of university students (Stallman & Kavanagh, 2016). This approach provides students access to evidence-based interventions without the commitment to prolonged treatment.

With voluntary participation and opportunity sampling, self-selection bias is inevitable. Many participants appeared to be students of social sciences (Table 2.2), who tend to report higher levels of distress, treatment-seeking inclination (Lipson et al., 2016), intellectuality and psychological mindedness (Yadavaia et al., 2014) in comparison with the general population. However, this recruitment method did allow for the recruitment of a broader range of participants from different universities, enrolment years, faculties, and even countries, with a minority of participants attending university in Scotland, Wales and Northern Ireland. The opportunistic approach to recruitment meant that uneven numbers of students enrolled across the various demographics.

Another limitation was the quasi-exclusive use of self-report measures, where fatigue, bias, commitment and social desirability effect can hamper objectivity. Some of the instruments addressed this through the use of reverse (CCAPS-34; SCS-SF; SUS) and mean scoring (CCAPS-34; MAAS; SCS-SF). Moreover, Qualtrics was set up in such a way as to randomly present the measures at each stage in an attempt to buffer order effects and limited Qualtrics metadata was included to corroborate participant self-report data on system usage. Additionally, the measures demonstrated good psychometric properties (see Section 2.4). However, not all ACT processes were measured. Self-as-context and committed action were notably absent from the measures. Similarly, explicitly focused content on the core ACT processes of present moment awareness and self-as-context was omitted, due to challenges with their operationalisation and assessment, in addition to their limited evidence base (Godbee & Kangas, in press; Levin et al., 2012). If these elements are so challenging to fully define and measure, this could be symptomatic of the immaturity of the ACT model. However, there is an argument that these skills are subsumed in the remaining target content, given the overlapping nature of the six ACT processes, which is supported here by the significant mindful awareness results, despite the fact that the program did not include modules targeting present moment awareness (Table 2.1).

While Qualtrics proved to be successful in the administration of LifeToolbox, the immodest number of measures presented may have deterred some students. That the design insisted on 100% of questions being answered when completing the measures may have also reduced the number of prospective participants. However, when it came to analysis, time was saved in not having to account for missing data from this vantage.

A passive control group was used for comparison purposes. This does not control for demand characteristics, expectancy and other effects of signing up to a self-help program. Other possible confounding variables include concomitant treatment, natural fluctuations in symptomatology, and previous exposure to ACT. In an effort to control for some confounding variables, groups were compared on demographic and baseline variables to verify the randomisation process and identify any significant differences which may have compromised the ability to attribute positive results to the intervention; eating concerns was treated as a covariate in the between-groups (H1) analysis as a result. While not all confounding variables were controlled for, demand characteristics may have been partially mitigated by facilitating strict confidentiality policies. By using an active control group in future, the potential confounding anticipatory effect might also be reduced. Fluctuations in subclinical symptomatology are especially notable given that the data collection period spanned over Easter and summer holidays, potentially rendering some of the measure items less relevant (e.g., “I put off schoolwork when I feel bad”). This may have been mitigated by the high volume of postgraduate participants who may not have adhered to a typical university timetable. The relevancy and relatability of the program might have also been compromised by a design overly geared towards a US audience, using US spellings and vignettes that may have been less relatable to British students. Nevertheless, participants rated the program as 4.0 on Relevancy and 4.2 out of 5 on Relatability (Table 3.9).

While the waitlist crossover design maximised potential benefits for participants, the follow-up data was extremely limited and therefore not statistically powered to form meaningful conclusions. As expected, attrition was high and actually higher than similar studies in Finland (Räsänen et al., 2016), Australia (Viskovich & Pakenham, 2018) and the USA (Levin et al., 2014; Levin, Haeger, Pierce, & Twohig, 2017). Furthermore, no qualitative data was collected, which excludes a comprehensive appraisal of LifeToolbox.

Over 100 RCTs have now been published which show how ACT can be used to improve mental health issues associated with university students (A-Tjak et al., 2015; Hooper & Larsson, 2015; Öst, 2008). However, it is fair to say that the research on transdiagnostic ACT approaches, while promising, is still too preliminary to ascertain whether it would be helpful for typical clinical symptomatology in university students. For example, there is a lack of support with regard to the outcomes of alcohol use, eating concerns and hostility both here and in previous studies (Levin, Haeger, Pierce, & Twohig, 2017). Perhaps certain clinical issues require a more tailored approach to treatment. Larger sample sizes with adequate representation of these problem areas would enable the conducting of moderation analysis for specific clinical diagnoses. That the positive impact of ACT on mental health is "unusually broad" (Hayes, 2004, p. 657) could be why the literature is grappling to keep up. Here, the results were not quite as broad as expected. Perhaps the scope of ACT is narrower than anticipated with university students when it comes to statistically powered and significant results.

In summary, this study shares many of the limitations described in the literature review in Section 1.7. These limitations prevail as a consequence of the tenuous balance between quality research and pragmatic resource constraints.

4.4 Strengths of the Study

The study demonstrates a number of strengths. Firstly, it comes at a time when there is a veritable mental health crisis among university students in the UK (The Insight Network, 2019; IPPR, 2017). Hence it is hoped that this study will contribute to the development of interventions, and especially web-based interventions, by professional organisations but also by counselling and clinical psychology trainees. This was the first study of its kind in the UK and it corroborated promising results from similar studies in Finland (Räsänen et al., 2016), Australia (Viskovich & Pakenham, 2018) and the USA (Levin et al., 2014; Levin, Haeger, Pierce, & Twohig, 2017). The waitlist crossover design was unique among this small group of web-based ACT studies with university students and provided all participants with access to the intervention, while maintaining the benefits of a control condition. Although the control group was passive, other studies have not included any control condition (e.g., Viskovich & Pakenham, 2018). Moreover, Qualtrics was used to automatically randomise participants into groups rather than relying on manual randomisation (e.g., Viskovich & Pakenham, 2018). Even though follow-up data was limited and not powered, other studies have not included any follow-up data (Levin, Haeger, Pierce, & Twohig, 2017; Viskovich & Pakenham, 2018). In

line with these other studies, robust measures were used to record not only outcome data but also data on the mechanisms of change. Measuring change processes is more straightforward when content is clearly documented and evidence-based, in this case, anchored on the ACT model of psychological flexibility.

Most of the interventions reviewed in Chapter 1 were tested by the intervention developers; this may be the first time a web-based ACT intervention for university students was tested by an independent researcher and also in a different country to where the tool was developed. The study also benefited from the inclusion of between-groups (H1), within-subjects (H2) and mediation (H3) analyses, along with the analysis of participant feedback data and even limited Qualtrics metadata. Advanced statistical analysis was used to compare groups using the MMRM method so that an ITT sample could be analysed, rather than deleting incomplete data per a traditional analysis of variance (Leech et al., 2011). Meanwhile, in order to be comprehensive, a statistically powered MANOVA was also performed to evaluate the effectiveness of the intervention using a completer sample.

Possibly the primary strength of this study was its practical relevance. Above all, it appeared to benefit a somewhat diverse sample of university students by significantly increasing self-compassion and mindful awareness, while decreasing social anxiety. Findings confirmed that university students in the UK can improve on aspects of psychological flexibility and psychological symptoms using a low-cost online self-help program, with zero clinical guidance. Qualtrics allowed for the quick and efficient development of a tool and the administration of measures, along with randomisation and scheduling capabilities. This type of online software, which is typically available to university students free-of-charge, substantially reduces the costs of developing web-based interventions and provides database integration while ensuring General Data Protection Regulation (GDPR) compliance (Qualtrics, n.d.).

Along with the positive feedback from the limited pilot and study participants, it was most gratifying to receive an unsolicited email from a participant who kindly provided consent to include an anonymous quotation here:

> Loved completing the modules… I hope you do well in your research, it certainly has changed the way I think about online mental health apps. I'm a CBT therapist and have to overcome objections to online programs all the time.

> This has given me the opportunity to really experience it. I will definitely be letting clients know the benefit. It's helped me too. Thanks so much for letting me take part.

While this participant may have found the concepts easier to understand given their background in CBT and also their professional motivation, equally this demonstrates further support for the existing assertion that online ACT programs are helpful for practitioners both personally and professionally (Luoma & Vilardaga, 2013; Moyer et al., 2016; Pakenham & Stafford-Brown, 2013; Wardley et al., 2016).

Finally, while this study offered a small financial incentive for taking part in the form of a draw for monetary vouchers (Section 2.7.1), participants were aware that this was not guaranteed. Therefore this study offers some support to the idea of university students participating in online self-help interventions for mental health reasons, with minimal external incentivisation, in contrast with financially or academically incentivised studies (Levin et al., 2014; Levin, Haeger, Pierce, & Twohig, 2017).

The findings from this study have theoretical and practical implications. These will be discussed in the next section, followed by specific recommendations for future research.

4.5 Implications

4.5.1 Clinical Implications

The results of the study appear to support the psychological flexibility model of change, with all of the ACT processes appearing to mediate changes in at least one psychological symptom. The promising results are supportive of a clinical emphasis on second-order change, and corroborate the idea that targeting the content of thoughts may not be a necessary component of therapeutic interventions (Hayes, 2004). The results demonstrated that an online self-help program, with no clinical guidance, significantly improves aspects of psychological inflexibility and symptoms in university students in the UK. This is important given the low cost involved in the deployment and maintenance of the program. Such programs can increase access to psychological support without the need for huge investments in software or staff. The flipside of the ease with which web-based interventions can be disseminated, is the risk of the

propagation of non-evidence-based, ineffective and even harmful interventions, to the public. Psychologists can mitigate this by developing and/or actively endorsing validated interventions within the community as well as with other health professionals, students and the general public.

It must be emphasised that this program was aimed at a non-clinical population and is not designed to replace either medical or clinical care. This caveat must be emphasised to students who enrol in such programs. In the context of the introduction of GDPR and recent media debates over the sharing of student mental health information with parents and guardians, explicit informed consent is vital. Fortunately, two-thirds of UK students now support the sharing of mental health information with parents and guardians (Neves & Hillman, 2019). That programs like LifeToolbox could be used to track mental health patterns and create alerts for connected crises is an advantage if monitored carefully, however, this surveillance would obviously augment the university's duty of care so must be carefully considered by individual university well-being services prior to implementation. The collection of this data could be invaluable in the identification of trends in student mental health, such as precursors to suicide attempts.

There is a dearth of research on online intervention studies for university students in the UK literature. Counselling psychologists must be made aware of the availability and effectiveness of online interventions, not as a complete replacement for face-to-face treatment, but as an adjunct and stopgap to traditional treatment in line with public attitudes to web-based interventions (Apolinário-Hagen et al., 2018). This is vital given the inability of university counselling services to meet student demands (Stallman & Kavanagh, 2016). This solution has the capacity to provide a constant source of support to students, regardless of the time of day, week or year. Moreover, online interventions should be highlighted as the potential primary source of support for a small group of students who may not otherwise access treatment, as suggested by the 7% of participants who reported never having attended counselling and having no intention to attend in the future. They might even act as a gateway to further support for this group, potentially through reducing social anxiety, and provide assistance to all students as they transition away from university life.

By learning how to treat this population en masse, pathways for the treatment of individual university students might also be elucidated. Furthermore, the evidence-based approach of

ACT, with rigorous scientific roots in behaviour analysis, Relational Frame Theory, and CBT, is in line with the scientist-practitioner facet of counselling psychology. A perusal of the bibliography might convince the reader of the relevance of this topic across the globe and in the myriad fields related to counselling psychology. Additionally, whether it is applied in the therapy room or not, counselling psychology trainees and professionals can personally benefit from studying ACT (Luoma & Vilardaga, 2013; Moyer et al., 2016; Wardley et al., 2016). Crucially, limited ACT interventions can even boost therapeutic alliance (Pakenham & Stafford-Brown, 2013), which is paramount to successful therapeutic outcomes (Lambert & Barley, 2001).

Although web-based interventions are not the first choice of mental health support for many university students (Apolinário-Hagen et al., 2018; Levin et al., 2018), we must consider this within the context of our under-resourced university well-being services. Moreover, whether they are perfectly acceptable or not, this study adds to the mounting evidence of their efficacy and acceptability with a cohort of students. Policymakers are urged to support ongoing research focused on establishing empirically supported web-based interventions for university students as a whole, but also for specific minority groups. University mental health guidelines should be developed with the knowledge that there appears to exist a small group of students who are open to web-based interventions, but not face-to-face support. Web-based interventions must be actively promoted in order to educate the public on this offering, with an emphasis on how to recognise and access validated and confidential services. It is also worth considering incorporating such programs into standard university induction and exit programs.

4.5.2 Research Implications

Unfortunately, at present the majority of mental health apps, and indeed many mental health practitioners, do not use evidence-based methods and treatment dosage is often too low to effect change (Levin, Stocke, Pierce, & Levin, 2018). It is hoped that this research might encourage counselling and clinical psychology students to employ online survey software in the further development and examination of LifeToolbox and other therapeutic interventions, with varying levels of clinical guidance and incentivisation. This could expedite the evolution of evidence-based interventions. As mentioned previously, there is an opportunity for counselling psychologists to spearhead the development or at the very least, the endorsement, of evidence-based online interventions.

Based on participant feedback, it is suggested that a 12-module online program would benefit from a longer intervention period (i.e., greater than 4 weeks). Researchers are urged to continue to measure mechanisms of change, perhaps employing measures for committed action and self-as-context, particularly given the limited results with general psychological inflexibility measures in this study and the existing literature (e.g., Levin et al., 2014). One of the aims of this study was to further validate the reliability of a relatively new psychological inflexibility measure designed for university students (AAQ-US; Levin, Krafft, Pistorello, & Seeley, 2018). However, even though the subprocesses of psychological inflexibility appeared to significantly improve in the between-groups (H1) and within-subjects (H2) analyses, general psychological inflexibility as measured by the AAQ-US did not, meaning that support for this new tool is not corroborated here.

Given that the most significant results were found for self-compassion, mindful awareness and social anxiety, it could be worth comparing online ACT, CFT and MBCT interventions on university student mental health outcomes. It could be equally interesting to compare online ACT interventions with traditional SAD interventions. Since some of the processes did not significantly improve in the between-groups (H1) comparison, it might be worth amending LifeToolbox to incorporate alternative ACT exercises in a bid to lead to stronger effects. By studying these processes separately, areas for revision can be identified more easily. In addition, the assignments and audio-visual elements of LifeToolbox were less popular with participants (Table 3.9). It is not clear whether this was due to the quality or quantity of these items, or indeed, technical issues. Collecting qualitative feedback on this would be particularly useful and revisions may lead to greater program retention rates. That such changes could be completed quickly and with minimal resources highlights the benefits of developing online interventions on web-based platforms such as Qualtrics.

Engagement is an ongoing issue when it comes to online interventions for university students. Perhaps if online self-help courses were promoted as part of student onboarding, for example, through endorsements in welcome packs or alongside mandatory health and safety training, they could be normalised and reach more students from different minority groups across the disciplines; the scale of this type of implementation would have the additional benefit of sufficiently powering future studies. Although LifeToolbox was available to all faculties and years in this study, the opportunistic nature of the recruitment meant that students of social sciences were most commonly targeted and engaged. The effectiveness of new programs with

different groups must continue to be monitored to ensure that the dialogue on mental health remains inclusive. Moreover, programs must be screened for cultural sensitivity, for example, ensuring case studies, vignettes, images and names include a diversity of protected characteristics.

On the issue of inclusivity, web-based interventions are obviously only available to those who have access to certain technologies. While it is reasonable to assume that university students would at the very least have access to campus-based computers, the use of these might diminish any privacy and convenience benefits associated with web-based interventions, particularly for those living in remote locations. Moreover, lower socioeconomic status is associated with higher rates of psychological problems (Hudson, 2005) and lower rates of Internet access (Anderson & Kumar, 2019). University counselling services might consider lending devices to students temporarily to enable them to partake in web-based interventions, such as in the ACT smartphone app studies (e.g., Levin, Haeger, Pierce, & Cruz, 2017). However, this might nullify two of the primary benefits of web-based interventions – namely cost-effectiveness and stigma – as well as come with additional ethical and policy considerations, such as procedures around unreturned devices.

4.6 Future

The results highlighted some potential recommendations for future research. The collection of qualitative feedback is recommended to elucidate reasons for the rate of engagement and aspects of the program which were less popular, such as the homework assignments. Feedback could also be collected on the automated reminder emails in order to analyse their impact on program engagement and acceptability. The revision of modules on ACT processes which appeared to be less effective, such as valued living, the inclusion of modules on subprocesses which were not included previously (self-as-context and present moment awareness), and the measurement of all six subprocesses in various combinations would allow for a more comprehensive evaluation of the ACT mechanism of change. Researchers might also consider excluding the AAQ-II from future studies on university students in favour of more sensitive measures. Consideration must also be given to improvements in progress towards valued living. Perhaps longer-term interventions are required to engage students at this level. Indeed, participants made it clear that a longer intervention phase would have been preferable. Future studies might consider investigating the ideal recommended timeframe, so as to retain the benefits of the intervention while not forgoing momentum. More extensive follow-up periods

would also allow researchers to explore specific treatment mechanisms and any longer-term effects of the program, perhaps even following students for a period of time after graduation and along other routes of transition from university.

As more large-scale high-quality RCTs of ACT web-based interventions for university students emerge, systematic reviews and meta-analyses can provide a clearer indication of which problems ACT best serves in this population. Larger sample sizes with adequate representation of specific clinical diagnoses and minority subgroups would enable the development of more specific clinical recommendations and an inclusive dialogue going forward. It is recommended that future studies include active control groups, perhaps comparing ACT with CFT or MBCT interventions or even neutral content to control for confounding anticipation effects.

It remains unclear how best to engage students, but researchers might consider recruitment strategies which target students from diverse groups (e.g., through university social societies). Further research might also investigate specific barriers to using online self-help in the student population because any boost in engagement rate could have a profound effect on student mental health. The same help-seeking barriers were identified in the USA (Levin, Stocke, Pierce, & Levin, 2018) and Germany (Apolinário-Hagen et al., 2018): concerns around data privacy, stigma, and intervention credibility. It would be useful to understand if and how barriers might differ in the UK; meanwhile, the identification of these barriers is a helpful starting position. Until barriers to online self-help are better understood and reduced, engagement can be increased by incentivising students with course credits or financial incentives, as per previous studies (Levin et al., 2014; Levin, Haeger, Pierce, & Twohig, 2017). Later iterations of the program and prompts could even be tailored to the individual, such as with the Daily ACT App studies where skill sessions were displayed based on the user's check-in information (Levin, Haeger, Pierce, & Cruz, 2017; Levin, Haeger, & Cruz, 2019). Researchers might also consider including targeted content for specific clinical symptoms and comparing outcomes to conventional treatment.

Final recommendations include an ACT summary page to convey key information for those who only visit the program on a single occasion or simply to act as a reminder for repeat users. Were resources to allow it, extending data collection to behavioural indexes, structured interviews, physiological indicators and therapist-rated measures could identify further strengths and limitations associated with the intervention, while engaging therapists with the

development of online interventions, similar to the organic therapist engagement reported in the ACT Daily App study (Levin, Haeger, Pierce, & Cruz, 2017). Metadata such as information on repeat users should also be collected and analysed so that user patterns can be discovered and inform future program development and engagement campaigns. Finally, it is recommended that independent researchers continue to examine existing programs which have shown promising results around the world, so that the dialogue continues both locally and globally and resources are pooled in true contextual behavioural style (Levin, Smith, & Smith, 2019). From a local point of view, further studies with university students in the UK are clearly warranted to validate these promising early results and to build a case for further funding from private, public and governmental bodies.

4.7 Final Research Reflections

My choice to conduct a quantitative study was informed by my professional background in data analysis, with the hope that my skills would facilitate the research process and in order to boost the profile of quantitative work in counselling psychology. While it was true that my skills engendered a level of comfort with data cleaning, manipulation and analysis that I may not otherwise have experienced, the new skills I had to acquire were complex and challenging. For example, facing the dilemma of whether to complete a second MANOVA for the between-groups testing or challenging myself to conduct an MMRM analysis. Ultimately, I was gratified in allowing the data to dictate the analysis method, just as the research question helped to establish the quantitative methodology. In this example, the high attrition rate would have undermined any MANOVA results but was easily catered to using MMRM. I implore counselling psychology programs to encourage students with the appetite to do so to conduct quantitative analyses through the provision of lectures, tutorials and access to expertise, so that our evidence base may be both quantitative and qualitative, rather than weighted towards the latter.

One of the challenges throughout the research was attempting to balance my quantitative-scientist mode with my reflective-practitioner mode, which I currently experience more akin to a shift of cognitive gears rather than a true integration. I would like to integrate these roles more fully in the coming years, particularly as I balance working as a chartered psychologist with my role as a data analyst. I am reminded again of Carl Rogers' description of the mature person holding multiple opposing ideas in mind simultaneously (Rogers, 2004[1961]),

mentioned in the Preface. Perhaps there is a further step, where the ideas not only exist in parallel, but rather symbiotically nurture each other. Throughout the majority of my education and professional training, I was encouraged to write in the third person passive in order to confer an air of objective professionalism. As a result, I still feel a strong urge to separate the reflective and scientific aspects of my voice on the page. I note too, that it is extremely uncommon to encounter a first person narrative in quantitative literature. Perhaps counselling psychology is a natural home for the integration of the two**,** so that reflective and scientific are not presented as alternative modes of the practitioner's identity, but rather as a 'both-and'.

While I enjoyed the challenge and pragmatism of using Qualtrics and SPSS, I was curious about how my research experience might have differed had I taken the qualitative route. What if I had examined the experience of university students in an ACT intervention group, or explored the embodied experience of self-as-context or acceptance? There is no doubt that I find comfort in the rationality of numbers, similar to the reassurance of engaging in manualised treatment with a client. However, there is still an opportunity for creativity in quantitative research and I enjoyed dynamically exploring the data set from several angles – intention-to-treat and completer, between-groups and within-subjects, outcomes and processes, effects and mechanisms of change.

Naturally, I hoped that LifeToolbox would decrease levels of student distress, but the literature review and real-life experience of online interventions meant that I was not expecting a perfect solution to the mental health crisis. While I was disheartened that the between-groups investigation did not reveal significant results on more process and outcome variables, it was interesting to consider the variables that did significantly change: social anxiety, self-compassion, and mindful awareness. This was especially of interest since no modules explicitly targeted social anxiety or self-compassion. I was particularly struck by the significance of these results when I read about the devastating case of a University of Bristol physics student in the media, which I hope to respectfully address in the subsequent section (4.8).

While I was not surprised by the high attrition rates in the study, when the trend began to appear, I did become concerned about the suitability and effectiveness of the program. It was therefore extremely gratifying to find such positive user satisfaction results when examining Hypothesis 4, on the feasibility and usability of the program. Receiving the unsolicited email mentioned in Section 4.4 was also a pleasant and encouraging surprise.

Although I look forward to incorporating the ACT skills I have learned into my work with clients, I am aware that it is not a panacea. Indeed, it is clear that elements of ACT, such as self-as-context, are seriously lacking in empirical support, and that ACT does not appear to be effective for less common clinical symptomatology, such as eating concerns and alcohol use, at least within the university student population. Studies such as this one are necessary in order to navigate the complexity of introducing and developing new models of psychotherapy, particularly when they are as broad-ranging as ACT. This stage of research and development is expedited in a community where resources are enthusiastically shared, such as that of ACT. This is an ethos which I have now experienced first-hand; the US psychologist Mike Levin shared the LifeToolbox content with me swiftly and graciously, which was a reassuring and warm welcome into the world of contextual behavioural science.

4.8 Conclusions

This research intended to evaluate the effectiveness of an online ACT intervention with university students in the UK, following similar successful studies in Australia (Viskovich & Pakenham, 2018), the USA (Levin et al., 2014; Levin, Haeger, Pierce, & Twohig, 2017) and Finland (Räsänen et al., 2016), and as a response to an urgent mental health crisis within this population (The Insight Network, 2019; IPPR, 2017). It was the first study of its kind to take place in the UK and the promising results of the program suggest that online self-guided ACT interventions have the potential to promote mental health skills in university students, with the major benefits of being scalable while low on costs and maintenance. There is now an imperative for researchers, and counselling psychologists in particular, to use this widely available technology to develop and test these interventions using a variety of models, designs, incentivisation and guidance levels so that this under-served population can be quickly and efficiently supported. Meanwhile, in its current state LifeToolbox has already promoted psychological skills in the sample studied. So while further refinement is recommended, it could already be made available in its existing format.

While the improvements were not as significant as expected when comparing the ACT and WLC conditions (H1), the fact that LifeToolbox appeared to improve self-compassion, mindful awareness and social anxiety should not be underestimated. In fact, it calls to mind the tragic case of a Bristol university student who died by suicide in 2018. Her parents and the coroner attributed her devastating death to a failure of the NHS and the university to provide care for

her with regard to her severe social anxiety (BBC, 2019); she died on the day she was due to give a formal presentation to a group of students and staff. Sadly she was one of 13 students who have died by suicide at the University of Bristol alone in the last three years (The Independent, 2019). As counselling psychologists, we must not disregard our duty of care to this neglected population.

Although pre-post analysis (H2) indicated that LifeToolbox did not lead to improvements on all measures, those processes that did significantly improve also significantly mediated treatment effects, corroborating the psychological flexibility theory of change (Bond et al., 2011) and the promising results with university students in other countries (Levin, Haeger, Pierce, & Twohig, 2017; Viskovich & Pakenham, 2018). However, it must be emphasised that LifeToolbox did not appear to improve eating concerns, progress towards valued living or general psychological inflexibility as measured by the AAQ-II in any of the statistical analyses, as per previous research (Levin, Haeger, Pierce, & Twohig, 2017). The results do not refute the suggestion that the AAQ-II appears to lack sensitivity to this population (Levin et al., 2014). However, neither do the results unequivocally support the AAQ-US as a more suitable measure of general psychological inflexibility since it showed significant improvements on the within-subjects (H2) analysis, but not on the between-groups testing (H1). Moreover, the AAQ-US only appeared to mediate the outcome of academic distress (H3). This highlights the imperative to continue testing ACT subprocesses as mediators of change.

Further research is needed to test the impact of a transdiagnostic ACT self-help website relative to active comparison programs and on long-term outcomes in the hope that the development of web-based interventions might provide treatment to students who are restricted by geography, disability, finances, or psychological barriers, those on the waiting list and those seeking further or alternative support to face-to-face treatment, all while maintaining a high level of treatment fidelity.

In conclusion, the current study is a response to the urgent calls in the literature and the media for solutions to promote psychological skills in university students. The results indicated that an online self-guided ACT intervention was sufficiently acceptable to university students in the UK and engendered improvements in a range of, but not all, included outcomes. Moreover, results supported the psychological flexibility model of change as well as self-compassion as a mediator of academic and overall distress. Key areas for further revision were included, such

as the testing of LifeToolbox relative to active comparison programs and on long-term outcomes. Meanwhile, student engagement was highlighted as an ongoing challenge. Researchers are strongly encouraged to adopt this cost-effective prototyping approach to trialling student interventions. Overall, online transdiagnostic ACT interventions appear to be a promising adjunct in the provision of mental health support to university students.

References (Section A)

Anderson, M., & Kumar, M. (2019). *Digital divide persists even as lower-income Americans make gains in tech adoption.* Retrieved from https://www.pewresearch.org/fact-tank/2019/05/07/digital-divide-persists-even-as-lower-income-americans-make-gains-in-tech-adoption/

Apolinário-Hagen, J., Harrer, M., Kählke, F., Salewski, C., & Ebert, D. D. (2018). Public attitudes toward guided Internet-based therapies: Web-based survey study. *Journal of Medical Internet Research*, *5*(2), e10735. https://doi.org/10.2196/10735

Association for Contextual Behavioral Science (2020, May 19). State of the ACT Evidence. *ACBS*. Retrieved from https://contextualscience.org/state_of_the_act_evidence

Association for University and College Counseling Center Directors (2014). *The Association for University and College Counseling Center Directors annual survey*. Retrieved from http://www.aucccd.org/assets/documents/2014%20aucccd%20monograph%20-%20public%20pdf.pdf

A-Tjak, J. G., Davis, M. L., Morina, N., Powers, M. B., Smits, J. A., & Emmelkamp, P. M. (2015). A meta-analysis of the efficacy of acceptance and commitment therapy for clinically relevant mental and physical health problems. *Psychotherapy and Psychosomatics, 84*(1), 30–36. http://dx.doi.org/10.1159/000365764

Bangor, A., Kortum, P. T., & Miller, J. T. (2008). An empirical evaluation of the System Usability Scale. *International Journal of Human-Computer Interaction*, *24*, 574–594.

Barker, C., Pistrang, N., & Elliott, R. (2002). *Research methods in clinical psychology: An introduction for students and practitioners* (2nd ed.). Chichester: Wiley.

BBC (2019, May 30). Natasha Abrahart suicide: Parents say she ‘wasn't helped’. *BBC*. Retrieved from https://www.bbc.co.uk/news/uk-england-bristol-48254007

Billingham, S. A. M., Whitehead, A. L. & Julious, S. A. (2013). An audit of sample sizes for pilot and feasibility trials being undertaken in the United Kingdom registered in the United Kingdom Clinical Research Network database. *BMC Medical Research Methodology, 13*(104).

Blanco, C., Okuda, M., Wright, C., Hasin, D. S., Grant, B. F., Liu, S. M., & Olfson, M. (2008). Mental health of college students and their non-college-attending peers. *Archives of General Psychiatry*, *65*(12), 1429–1437. https://doi.org/10.1001/archpsyc.65.12.1429

Bohlmeijer, E. T., & Hulsbergen, M. (2008). *Voluit leven. Mindfulness of de kunst van het aanvaarden, nu als praktisch hulpboek* [Living to the full. Mindfulness or the art of acceptance, now as a practical help book]. Amsterdam: Boom.

Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K., Orcutt, H. K., Waltz, T., … Zettle, R. D. (2011). Preliminary psychometric properties of the Acceptance and Action Questionnaire–II: A revised measure of Psychological Inflexibility and acceptance. *Behavior Therapy*, *42*, 676–688.

British Psychological Society (2018). *Ethics guidelines for Internet-mediated research* [PDF file]. Retrieved from https://www.bps.org.uk/sites/bps.org.uk/files/Policy/Policy%20-%20Files/Ethics%20Guidelines%20for%20Internet-mediated%20Research%20%282017%29.pdf

British Psychological Society (2019). *Standards for the accreditation of Doctoral programmes in counselling psychology.* Retrieved from https://www.bps.org.uk/sites/bps.org.uk/files/Accreditation/Counselling%20Accreditation%20Handbook%202019.pdf

Brooke, J. (1996). SUS: a “quick and dirty” usability scale. In P. W. Jordan, B. Thomas, B. A. Weerdmeester, & I. L. McClelland (Eds.), *Usability evaluation in industry* (pp. 189–194). London: Taylor and Francis.

Brown, F. J., & Hooper, S. (2009). Acceptance and commitment therapy (ACT) with learning disabled young person experiencing anxious and obsessive thoughts. *Journal of Intellectual Disabilities, 13*, 195–201.

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

Brown-Iannuzzi, J. L., Adair, K. C., Payne, B. K., Richman, L. S., & Fredrickson, B. L. (2014). Discrimination hurts, but Mindful Awareness may help: Trait Mindful Awareness moderates the relationship between perceived discrimination and depressive symptoms. *Personality and Individual Differences, 56*, 201–205.

Browne, R. H. (1995). On the use of a pilot sample for sample size determination. *Statistics in Medicine, 14*(17), 1933–1940.

Burns, J. M., Davenport, T. A., Durkin, L. A., Luscombe, G. M., & Hickie, I. B. (2010). The Internet as a setting for mental health service utilisation by young people. *Medical Journal of Australia*, *192*(11), S22–S26.

Center for Collegiate Mental Health (CCMH) (2012). *CCAPS 2012 technical manual*. University Park, PA.

Center for Collegiate Mental Health (CCMH) (2018). *CCAPS user manual*. University Park, PA.

Chase, J. A., Houmanfar, R., Hayes, S. C., Ward, T. A., Vilardaga, J. P., & Follette, V. (2013). Values are not just goals: Online ACT based values training adds to goal setting in improving undergraduate college student performance. *Journal of Contextual Behavioral Science*, *2*(3–4), 79–84. https://doi.org/10.1016/j.jcbs.2013.08.002

Ciarrochi, J., Atkins, P. W. B., Hayes, L. L., Sahdra, B. K., & Parker, P. (2016). Contextual positive psychology: Policy recommendations for implementing positive psychology

into schools. *Frontiers in Psychology, 7*, 1561. https://doi.org/10.3389/psyg.2016.01561

Ciarrochi, J., Kashdan, T. B., & Harris, R. (2013). The foundations of flourishing. In T. B. Kashdan & J. Ciarrochi (Eds.), *Mindful Awareness, acceptance, and positive psychology: The seven foundations of well-being* (pp. 1–29). Oakland, CA: Context Press.

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

Creedon, P. J., & Hayes, A. F. (2015). *Small sample mediation analysis: How far can you push the bootstrap*? Paper presented at the Annual Conference of the Association for Psychological Science, New York, NY.

Cuijpers, P., Donker, T., van Straten, A., Li, J., & Andersson, G. (2010). Is guided self-help as effective as face-to-face psychotherapy for depression and anxiety disorders? A systematic review and meta-analysis of comparative outcome studies. *Psychological Medicine*, *40*(12), 1943–1957. https://doi.org/10.1017/S0033291710000772

Eisenberg, D., Speer, N., & Hunt, J. B. (2012). Attitudes and beliefs about treatment among college students with untreated mental health problems. *Psychiatric Services, 63*, 711–713.

Enders, C. K. (2012). Dealing with missing data in developmental research. *Child Development Perspectives, 7*, 27–31.

Eskin, M., Sun, J., Abuidhail, J., Yoshimasu, K., Janghorbani, M., Flood, C., … Yoshimasu, K. (2016). Suicidal behavior and psychological distress in university students: A 12-nation study. *Archives of Suicide Research, 20*(3), 369–388. https://doi.org/10.1080/13811118.2015.1054055

Farrand, P., & Woodford, J. (2013). Impact of support on the effectiveness of written cognitive behavioural self-help: A systematic review and meta-analysis of randomised

controlled trials. *Clinical Psychology Review*, *33*(1), 182–195. https://doi.org/10.1016/j.cpr.2012.11.001

Farrer, L., Gulliver, A., Chan, J. K. Y., Batterham, P. J., Reynolds, J., Clin, M., … Griffiths, K. M. (2013). Technology-based interventions for mental health in tertiary students: Systematic review. *Journal of Medical Internet Research, 15*(5), e101. https://doi.org/10.2196/jmir.2639

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2013). *G*Power Version 3.1.2* [Computer software]. Universität Kiel, Germany. Retrieved from http://www.psycho.uni-duesseldorf.de/abteilungen/aap/gpower3/download-andregister

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). London: Sage.

Field, A. (2016). *An adventure in statistics: The reality enigma*. London: Sage.

Fledderus, M., Bohlmeijer, E. T., Pieterse, M. E., & Schreurs, K. M. G. (2012). Acceptance and commitment therapy as guided self-help for psychological distress and positive mental health: A randomized controlled trial. *Psychological Medicine, 42*(3), 485–495. http://dx.doi.org/10.1017/S003329711001206007

French, K., Golijani-Moghaddam, N., & Schröder, T. (2017). What is the evidence for the efficacy of self-help acceptance and commitment therapy? A systematic review and meta-analysis. *Journal of Contextual Behavioral Science, 6*(4), 360–374.

Fry, J. P., & Neff, R. A. (2009). Periodic prompts and reminders in health promotion and health behavior interventions: Systematic review. *Journal of Medical Internet Research*, *11*, e16.

Gallagher, R. P. (2014). *National survey of college counseling centers 2013. Section one: 4-year directors*. Pittsburgh, PA: University of Pittsburgh.

Gilbert, P. (2004). *Compassion: Conceptualisations, research and use in psychotherapy.* London: Routledge.

Gillanders, D. T., Bolderston, H., Bond, F. W., Dempster, M., Flaxman, P. E., Campbell, L., … Remington, B. (2014). The development and initial validation of the Cognitive Fusion Questionnaire. *Behavior Therapy*, *45*, 83–101. https://doi.org/10.1016/j.beth.2013.09.001

Godbee, M., & Kangas, M. (in press).The relationship between flexible perspective-taking and emotional well-being: A systematic review of the 'Self-As-Context' component of acceptance and commitment therapy (ACT). *Behavior Therapy*. https://doi.org/10.1016/j.beth.2019.12.010

Gutek, G. (2014). *Philosophical, ideological, and theoretical perspectives on education.* New Jersey: Pearson.

Hacker, T., Stone, P., & Macbeth, A. (2016). Acceptance and commitment therapy – Do we know enough? Cumulative and sequential meta-analyses of randomized controlled trials. *Journal of Affective Disorders*, *190*, 551–565. https://doi.org/10.1016/j.jad.2015.10.053

Halliburton, A. E., & Cooper, L. D. (2015). Applications and adaptations of acceptance and commitment therapy (ACT) for adolescents. *Journal of Contextual Behavioral Science, 4*(1), 1–11. https://doi.org/10.1016/j.jcbs.2015.01.002

Harrer, M., Adam, S. H., Baumeister, H., Cuijpers, P., Karyotaki, E., Auerbach, R. P., … Ebert, D. D. (2019). Internet interventions for mental health in university students: A systematic review and meta-analysis. *International Journal of Methods in Psychiatric Research*, *28*(2), e1759.

Harris, R. (2019). *ACT made simple: An easy-to-read primer on acceptance and commitment therapy*. Oakland, CA: New Harbinger Publications.

Hayes, S. C. (2004). Acceptance and commitment therapy, relational frame theory, and the third wave of behavioral and cognitive therapies. *Behavior Therapy, 35*, 639–665.

Hayes, S. C. (2013). The genuine conversation. In T. B. Kashdan & J. Ciarrochi (Eds.), *Mindful Awareness, acceptance, and positive psychology: The seven foundations of well-being* (pp. 303–319). Oakland, CA: Context Press.

Hayes, S. C., Barnes-Holmes, D., & Roche, B. (2001). *Relational frame theory: A post-Skinnerian account of language and cognition.* New York: Kluwer Academic/ Plenum Publishers.

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy, 44*(1), 1–25. doi:10.1016/j.brat.2005.06.006

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

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

Hayes, S. C., Strosahl, K. D., Wilson, K. G., Bissett, R. T., Pistorello, J., Toarmino, D., … McCurry, S. M. (2004). Measuring experiential avoidance: A preliminary test of a working model. *Psychological Record, 54*, 553–578.

Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. D. (1996). Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology, 64*(6), 1152–1168.

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

Howell, A., & Passmore, H.-A. (2019). Acceptance and commitment training (ACT) as a positive psychological intervention: A systematic review and initial meta-analysis regarding ACT's role in well-being promotion among university students. *Journal of Happiness Studies, 20*(6), 1995–2010. https://doi.org/10.1007/s10902-018-0027-7

Hudson, C. G. (2005). Socioeconomic status and mental illness: Tests of the social causation and selection hypotheses. *American Journal of Orthopsychiatry, 75*(1), 3–18. http://dx.doi.org/10.1037/0002-9432.75.1.3

The Independent (2018, September 24). One in five university students say they do not drink any alcohol. *The Independent.* Retrieved from https://www.independent.co.uk/news/education/education-news/students-drinking-university-teetotal-freshers-week-nus-alcohol-consumption-a8549381.html

The Independent (2019, August 10). Chemistry student dies suddenly in 13th suspected suicide at Bristol University in three years. *The Independent.* Retrieved from https://www.independent.co.uk/news/uk/home-news/student-death-suicide-bristol-university-maria-stancliffe-cook-a9051606.html

The Insight Network (2019). *University student mental health survey 2018.* London: The Insight Network. Retrieved January 02, 2020, from https://uploads-ssl.webflow.com/561110743bc7e45e78292140/5c7d4b5d314d163fecdc3706_Mental%20Health%20Report%202018.pdf

Institute for Public Policy Research (2017). *Not by degrees: Improving student mental health in the UK's universities*. Retrieved from https://www.ippr.org/publications/not-by-degrees

James, W. (1977). *The meaning of truth: A sequel to "Pragmatism".* Oxford: Longmans, Green. (Original work published 1909).

Julious, S. A. (2005). Sample size of 12 per group rule of thumb for a pilot study: Pharmaceutical statistics. *The Journal of Applied Statistics in the Pharmaceutical Industry, 4*(4), 287–291.

Kelson, J., Rollin, A., Ridout, B., & Campbell., A. (2019). Internet-delivered acceptance and commitment therapy for anxiety treatment: Systematic review. *Journal of Medical Internet Research, 21*(1), e12530. https://doi.org/10.2196/12530

Kessler, R. C., Andrews, G., Colpe, L. J., Hiripi, E., Mroczek, D. K., Normand, S. L. T., … Zaslavsky, A. M. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine*, *32*(6), 959–976. https://doi.org/10.1017/s0033291702006074

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the national comorbidity survey replication. *Archives of General Psychiatry, 62*(6), 593–602.

Krafft, J., Ferrell, J., Levin, M. E., & Twohig, M. P. (2018). Psychological inflexibility and stigma: A meta-analytic review. *Journal of Contextual Behavioral Science, 7*, 15–28.

Krafft, J., Potts, S., Schoendorff, B., & Levin, M. E. (2019). A randomized controlled trial of multiple versions of an acceptance and commitment therapy Matrix App for well-being. *Behavior Modification, 43*(2), 246–272. doi:10.1177/0145445517748561

Lambert, M. J., & Barley, D. E. (2001). Research summary on the therapeutic relationship and psychotherapy outcome. *Psychotherapy, 38,* 357–361.

Lappalainen, P., Granlund, A., Siltanen, S., Ahonen, S., Vitikainen, M., Tolvanen, A., & Lappalainen, R. (2014). ACT Internet-based vs face-to-face? A randomized controlled trial of two ways to deliver acceptance and commitment therapy for depressive symptoms: An 18-month follow-up. *Behaviour Research and Therapy, 61*, 43–54. https://doi.org/10.1016/j.brat.2014.07.006

Lappalainen, P., Langrial, S., Oinas-Kukkonen, H., Tolvanen, A., & Lappalainen, R. (2015). Web-based acceptance and commitment therapy for depressive symptoms with minimal support: A randomized controlled trial. *Behavior Modification, 39*(6), 805–834. https://doi.org/10.1177/0145445515598142

Leech, N. L., Barrett, K. C., & Morgan, G. A. (2011). *IBM SPSS for intermediate statistics: Use and interpretation* (4th ed.). New York: Routledge.

Levin, M. E., Haeger, J., & Cruz, R. A. (2019). Tailoring acceptance and commitment therapy skill coaching in the moment through smartphones: Results from a randomized controlled trial. *Mindful Awareness, 10*, 689–699. https://doi.org/10.1007/s12671-018-1004-2

Levin, M. E., Haeger, J., Pierce, B., & Cruz, R. (2017). Evaluating an adjunctive mobile app to enhance Psychological Flexibility in acceptance and commitment therapy. *Behavior Modification, 41*, 846–867.

Levin, M. E., Haeger, J., Pierce, B., & Twohig, M. P. (2017). Web-based acceptance and commitment therapy for mental health problems in college students: A randomized controlled trial. *Behavior Modification, 41,* 141–162.

Levin, M. E., Hayes, S. C., Pistorello, J., & Seeley, J. R. (2016). Web-based self-help for preventing mental health problems in universities: Comparing acceptance and commitment training to mental health education: Preventing mental health problems in universities. *Journal of Clinical Psychology, 72*(3), 207–225. https://doi.org/10.1002/jclp.22254

Levin, M. E., Hildebrandt, M. J., Lillis, J., & Hayes, S. C. (2012). The impact of treatment components suggested by the Psychological Flexibility model: A meta-analysis of laboratory-based component studies. *Behavior Therapy, 43*, 741–756.

Levin, M. E., Krafft, J., Pistorello, J., & Seeley, J. R. (2018). Assessing Psychological Inflexibility in university students: Development and validation of the acceptance and action questionnaire for university students (AAQ-US). *Journal of Contextual Behavioral Science, 12,* 199–206. https://doi.org/10.1016/j.jcbs.2018.03.004

Levin, M. E., Pistorello, J., Hayes, S. C., Seeley, J. R., & Levin, C. (2015). Feasibility of an acceptance and commitment therapy adjunctive web-based program for counseling centers. *Journal of Counseling Psychology*, *62*(3), 529–536. https://doi.org/10.1037/cou0000083

Levin, M. E., Pistorello, J., Seeley, J. R., & Hayes, S. C. (2014). Feasibility of a prototype web-based acceptance and commitment therapy prevention program for college students. *Journal of American College Health*, *62*(1), 20–30. https://doi.org/10.1080/07448481.2013.843533

Levin, M. E., Smith, B. M., & Smith, G. S. (2019). The potential benefits of flexibility for dissemination and implementation: Acceptance and commitment therapy as an example. *Perspectives on Behavior Science, 42*, 223–232.

Levin, M. E., Stocke, K., Pierce, B., & Levin, C. (2018). Do college students use online self-help? A survey of intentions and use of mental health resources, *Journal of College Student Psychotherapy, 32*(3), 181–198. doi:10.1080/87568225.2017.1366283

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

Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis.* Thousand Oaks, CA: Sage Publications.

Lipson, S. K., Zhou, S., Wagner, B., Beck, K., & Eisenberg, D. (2016). Major differences: Variations in undergraduate and graduate student mental health and treatment utilisation across academic disciplines. *Journal of College Student Psychotherapy, 30*, 23–41. doi:10.1080/87568225.2016.1105657

Lucas, M. (2012). Counselling on campus: Client persistence and progress. *Journal of College Student Psychotherapy, 26,* 227–240.

Luoma, J. B., & Vilardaga, J. P. (2013). Improving therapist Psychological Flexibility while training acceptance and commitment therapy: A pilot study. *Cognitive Behaviour Therapy, 42*, 1–8. http://dx.doi.org/10.1080/16506073.2012.701662.

Mauthner, N., & Doucet, A. (2003). Reflexive accounts and accounts of reflexivity in qualitative data analysis. *Sociology, 37*(3), 413–431.

Melville, K. M., Casey, L. M., & Kavanagh, D. J. (2010). Dropout from Internet-based treatment for psychological disorders. *British Journal of Clinical Psychology*, *49*(4), 455–471. https://doi.org/10.1348/014466509X472138

Montoya, A. K., & Hayes, A. F. (2016). Two-condition within-participant statistical mediation analysis: A path-analytic framework. *Psychological Methods*, *22*(1), 6–27. https://doi.org/10.1037/met0000086

Moyer, D. N., Murrell, A. R., Connally, M. L., & Steinberg, D. S. (2016). Showing up for class: Training graduate students in acceptance and commitment therapy. *Journal of Contextual Behavioral Science, 6(*1), 114–118. https://doi.org/10.1016/j.jcbs.2016.12.001

Neff, K. D. (2003). The development and validation of a scale to measure self-compassion. *Self and Identity, 2*(3), 223–250.

Neff, K. D. (2009). The role of Self-Compassion in development: A healthier way to relate to oneself. *Human Development, 52*(4), 211–214. https://doi.org/10.1159/000215071

Neves, J., & Hillman, N. (2019). *Student academic experience survey 2019*. Oxford: Higher Education Policy Institute.

Newsome, S., Waldo, M., & Gruszka, C. (2012). Mindful awareness group work: Preventing stress and increasing self-compassion among helping professionals in training. *Journal for Specialists in Group Work*, *37*(4), 297–311. https://doi.org/10.1080/01933922.2012.690832

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

Ong, C. W, Barney, J. L., Barrett, T. S., Lee, E. B., Levin, M. E., & Twohig, M. P. (2019). The role of Psychological Inflexibility and Self-Compassion in acceptance and

commitment therapy for clinical perfectionism. *Journal of Contextual Behavioral Science, 13*, 7-16. https://doi.org/10.1016/j.jcbs.2019.06.005

Ong, C. W., Lee, E. B., Levin, M. E., & Twohig, M. P. (2019). A review of AAQ variants and other context-specific measures of Psychological Flexibility. *Journal of Contextual Behavioral Science, 12,* 329–346. doi:10.1016/j.jcbs.2019.02.007

Orbach, G., Lindsay, S., & Grey, S. (2007). A randomised placebo-controlled trial of a self-help Internet-based intervention for test anxiety. *Behaviour Research and Therapy, 45*(3), 483–496.

Öst, L. (2008). Efficacy of the third wave of behavioral therapies: A systematic review and meta-analysis. *Behaviour Research and Therapy, 46*(3), 296–321.

Pakenham, K. I., & Stafford-Brown, J. (2013). Postgraduate clinical psychology students' perceptions of an acceptance and commitment therapy stress management intervention and clinical training. *Clinical Psychologist, 17*, 56–66.

Plumb, J. C., Stewart, I., Dahl, J., & Lundgren, T. (2009). In search of meaning: Values in modern clinical behavior analysis. *The Behavior Analyst, 32*, 85–103.

Polk, K. L., & Schoendorff, B. (Eds.). (2014). *The ACT Matrix: A new approach to building Psychological Flexibility across settings and populations*. Oakland, CA: New Harbinger.

Ponterotto, J. G. (2005). Qualitative research in counseling psychology: A primer on research paradigms and philosophy of science. *Journal of Counseling Psychology, 52*(2), 126–136.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, *36*(4), 717–731. https://doi.org/10.3758/BF03206553

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

Qualtrics (n.d.). *Qualtrics & GDPR compliance.* Retrieved December 14, 2019, from https://www.qualtrics.com/support/survey-platform/getting-started/qualtrics-gdpr-compliance/

Raes, F., Pommier, E., Neff, K., & Van Gucht, D. (2011). Construction and factorial validation of a short form of the Self-Compassion Scale. *Clinical Psychology and Psychotherapy, 18,* 250–255.

Räsänen, P., Lappalainen, P., Muotka, J., Tolvanen, A., & Lappalainen, R. (2016). An online guided ACT intervention for enhancing the psychological well-being of university students: A randomized controlled clinical trial. *Behaviour Research and Therapy, 78,* 30–42. https://doi.org/10.1016/j.brat.2016.01.001

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Newbury Park, CA: Sage.

Reilly, E. D., Ritzert, T. R., Scoglio, A. A. J., Mote, J., Fukuda, S. D., Ahern, M. E., & Kelly, M. M. (2019). A systematic review of values measures in acceptance and commitment therapy research. *Journal of Contextual Behavioral Science, 12*, 290–304. https://doi.org/10.1016/j.jcbs.2018.10.004

Richards, D., & Richardson, T. (2012). Computer-based psychological treatments for depression: A systematic review and meta-analysis. *Clinical Psychology Review, 32*, 329–342.

Rickwood, D., Deane, F. P., Wilson, C. J., & Ciarrochi, J. (2005). Young people's help-seeking for mental health problems. *Australian E-Journal for the Advancement of Mental Health*, *4*(3), 1–34.

Robinson, O. (2014). Re-examining the epistemological foundations of quantitative psychology: Pluralism, not positivism. *QMiP Bulletin*, *17,* 5–9.

Rogers, C. R. (2004). *On becoming a person: A therapist's view of psychotherapy*. London: Constable and Company. (Original work published 1961).

Royal College of Psychiatrists (2011). *Mental health of students in higher education college report CR166* [PDF file]. Retrieved from http://www.rcpsych.ac.uk/publications/collegereports/cr/cr166.aspx

Ruiz, F. J. (2012). Acceptance and commitment therapy versus traditional cognitive behavioural therapy: A systematic review and meta-analysis of current empirical evidence. *International Journal of Psychology and Psychological Therapy, 12*, 333–357.

Ryan, L., & Golden, A. (2006). "Tick the box please": A reflexive approach to doing quantitative social research. *Sociology*, *40*(6), 1191–1200.

Sandoz, E. K., Kellum, K. K., & Wilson, K. G. (2017). Feasibility and preliminary effectiveness of acceptance and commitment training for academic success of at-risk college students from low income families. *Journal of Contextual Behavioral Science, 6*(1), 71–79. https://doi.org/10.1016/j.jcbs.2017.01.001

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2012). *Mindful awareness-based cognitive therapy for depression.* New York: Guilford Press.

Seligman, M. E., Steen, T. A., Park, N., & Peterson, C. (2005). Positive psychology progress: Empirical validation of interventions. *American Psychologist, 60*, 410–421.

Shinohara, R., Frangakis, C., & Lyketsos, C. (2012). A broad symmetry criterion for nonparametric validity of parametrically based tests in randomized trials. *Biometrics, 68,* 85–91.

Smout, M. F., Davies, M., Burns, N., & Christie, A. (2014). Development of the Valuing Questionnaire. *Journal of Contextual Behavioral Science*, *3*, 164–172.

Stallman, H. M. (2010). Psychological distress in university students: A comparison with general population data. *Australian Psychologist*, *45*(4), 249–257. https://doi.org/10.1080/00050067.2010.482109

Stallman, H. M., & Kavanagh, D. J. (2016). Development of an Internet intervention to promote well-being in college students. *Australian Psychologist, 53*(1), 60–67. https://doi.org/10.1111/ap.12246

Stewart, C. G., White, R., Ebert, B., Mays, I., Nardozzi, J., & Bockarie, H. (2016). A preliminary evaluation of acceptance and commitment therapy (ACT) training in Sierra Leone. *Journal of Contextual Behavioral Science, 5,* 16–22. https://doi.org/10.1016/j.jcbs.2016.01.001

Sylvester, M. (2011). *Acceptance and commitment therapy for improving adaptive functioning in persons with a history of pediatric acquired brain injury* (Unpublished doctoral dissertation). University of Nevada, Reno.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). New York: Harper Collins.

Thabane, L., Ma, J., Chu, R., Cheng, J., Ismaila, A., Rios, L. P., … Goldsmith, C. H. (2010). A tutorial on pilot studies: The what, why and how. *BMC Medical Research Methodology, 10*(1), 1–10. doi:10.1186/1471-2288-10-1

Twohig, M. P., & Levin M. E. (2017). Acceptance and commitment therapy as a treatment for anxiety and depression: A review. *Psychiatric Clinics, 40*, 751–770.

University of Cambridge (n.d.). *CCAPS at the UCS.* Retrieved December 17, 2019, from https://www.counselling.cam.ac.uk/studentcouns/ccaps

Viskovich, S., & Pakenham, K. I. (2018). Pilot evaluation of a web-based acceptance and commitment therapy program to promote mental health skills in university students. *Journal of Clinical Psychology*, *74*(12), 2047–2069.

Wardley, M. N. J., Flaxman, P. E., Willig, C., & Gillanders, D. (2016). 'Feel the feeling': Psychological practitioners' experience of acceptance and commitment therapy well-being training in the workplace. *Journal of Health Psychology, 21*, 1536–1547. http://dx.doi.org/10.1177/1359105314557977

Werner, K. H., Jazaieri, H., Goldin, P. R., Ziv, M., Heimberg, R. G., & Gross, J. J. (2012). Self-compassion and Social Anxiety disorder. *Anxiety, Stress & Coping, 25*(5), 543–558. https://doi.org/10.1080/10615806.2011.608842

Williams, R., Farquharson, L., Palmer, L., Bassett, P., Clarke, J., Clark, D. M., & Crawford, M. J. (2016). Patient preference in psychological treatment and associations with self-reported outcome: National cross-sectional survey in England and Wales. *BMC Psychiatry, 16*(4). doi:10.1186/s12888-015-0702-8

WMH-ICS (2018). *The WHO World Mental Health International College Student initiative.* Retrieved from https://www.hcp.med.harvard.edu/wmh/college_student_survey.php

Yadavaia, J. E., Hayes, S. C., & Vilardaga, R. (2014). Using acceptance and commitment therapy to increase self-compassion: A randomized controlled trial. *Journal of Contextual Behavioral Science*, *3*(4), 248–257. https://doi.org/10.1016/j.jcbs.2014.09.002

Yardley, L., & Marks, D. F. (2004). Introduction to research methods in clinical and health psychology. In D. F. Marks & L. Yardley (Eds.), *Research methods for clinical and health psychology* (pp. 1–20). New Delhi, India: Sage Publications.

Appendices

Appendix A: Ethical Approval

Decision - Ethics ETH1819-0224: Holly Conheady (Low risk)
Research Ethics Online <haplo@city.ac.uk>
Thu 22/11/2018 17:00
To: Conheady, Holly <Holly.Conheady.1@city.ac.uk>

City, University of London

Dear Holly
Reference: ETH1819-0224
Project title: EVALUATION OF A WEB-BASED ACCEPTANCE & COMMITMENT
THERAPY PROGRAM TO PROMOTE MENTAL HEALTH SKILLS IN UNIVERSITY
STUDENTS
Start date: 3 Dec 2018
End date: 3 Feb 2020
I am writing to you to confirm that the research proposal detailed above has been granted formal approval from the Psychology low risk review. The Committee's response is based on the protocol described in the application form and supporting documentation. Approval has been given for the submitted application only and the research must be conducted accordingly. You are now free to start recruitment.
The approval was given with the following conditions:

- ...
- ... ...
- Please ensure that you are familiar with City's Framework for Good Practice in Research and any appropriate Departmental/School guidelines, as well as applicable external relevant policies.

Please note the following:
Project amendments/extension
You will need to submit an amendment or request an extension if you wish to make any of the following changes to your research project:

- Change or add a new category of participants;
- Change or add researchers involved in the project, including PI and supervisor;
- Change to the sponsorship/collaboration;
- Add a new or change a territory for international projects;
- Change the procedures undertaken by participants, including any change relating to the safety or physical or mental integrity of research participants, or to the risk/benefit

assessment for the project or collecting additional types of data from research participants;

- Change the design and/or methodology of the study, including changing or adding a new research method and/or research instrument;
- Change project documentation such as protocol, participant information sheets, consent forms, questionnaires, letters of invitation, information sheets for relatives or carers;
- Change to the insurance or indemnity arrangements for the project; Change
- the end date of the project.

Adverse events or untoward incidents

You will need to submit an Adverse Events or Untoward Incidents report in the event of any of the following:

a) Adverse events
b) Breaches of confidentiality
c) Safeguarding issues relating to children or vulnerable adults
d) Incidents that affect the personal safety of a participant or researcher

Issues a) and b) should be reported as soon as possible and no later than five days after the event. Issues c) and d) should be reported immediately. Where appropriate, the researcher should also report adverse events to other relevant institutions, such as the police or social services.

Should you have any further queries relating to this matter, please do not hesitate to contact me. On behalf of the Psychology low risk review, I do hope that the project meets with success.

Should you have any further queries relating to this matter please do not hesitate to contact me.

Kind regards
Andreas Kappes
Psychology low risk review
City, University of London

Ethics ETH1819-0224: Holly Conheady (Low risk)

Appendix B: Recruitment Advert

Department of Psychology
City, University of London

PARTICIPANTS NEEDED FOR A STUDY ON WEB-BASED ACCEPTANCE AND COMMITMENT THERAPY FOR UNIVERSITY STUDENTS

Do you feel stress a lot of the time? Are you searching for meaning and purpose in your life? If you think you might be interested in participating in a web-based self-help program, as part of a project exploring the value of this new approach to working with mental health, we are looking for volunteers to take part in our study.

Participants should be over 18 years of age and enrolled at a UK-based university.

Your participation would involve completing a range of questionnaires and twelve online Acceptance and Commitment Therapy modules free of charge. Each module is approximately fifteen minutes. You will have four weeks to complete the program in your own time; it is accessible through any good web browser.

In appreciation for your time, you will be entered into a prize draw for one of four £20 Amazon vouchers.

For more information about this study, or to take part, go to:
https://tinyurl.com/lifetoolboxuk

Alternatively, please contact:
Principal Investigator: Holly Conheady - *Holly.Conheady.1@city.ac.uk*
or
Research Supervisor: Dr Jessica Jones Nielsen - *Jones.Nielsen.1@city.ac.uk*

This study has been reviewed by and received ethics clearance through the P*sychology Low Risk Review* Committee, City, University of London. Ethics approval code: *ETH1819-0224.* If you would like to complain about any aspect of the study, please contact the Secretary to the Senate Research Ethics Committee on 020 7040 3040 or via email: Anna.Ramberg.1@city.ac.uk. City, University of London is the data controller for the personal data collected for this research project. If you have any data protection concerns about this research project, please contact City's Information Compliance Team at dataprotection@city.ac.uk.

Appendix C: Participant Information Sheet

We would like to invite you to take part in a research study. Before you decide whether you would like to take part it is important that you understand why the research is being done and what it would involve for you. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

Principal Investigator: Holly Conheady - *Holly.Conheady.1@city.ac.uk*
Research Supervisor: Dr Jessica Jones Nielsen - *Jones.Nielsen.1@city.ac.uk*

Title of Study: EVALUATING THE IMPACT OF A WEB-BASED ACCEPTANCE AND COMMITMENT THERAPY PROGRAM ON MENTAL HEALTH SKILLS IN UNIVERSITY STUDENTS

What is the purpose of the study?
This study is being undertaken as part of a Professional Doctorate in Counselling Psychology at City, University of London. The research is expected to be completed in 2019. The aim of this study is to explore the usefulness of an online self-help program for University students in the UK. Acceptance and Commitment Therapy (ACT) teaches mindfulness and acceptance skills and helps to clarify an individual's values and to use that knowledge to encourage value-based behaviour. Please note that personal data (i.e., ethnicity; sexual orientation) will be gathered in order to explore the effectiveness of the program with different groups. Any results of the study will be written up anonymously.

Why have I been invited?
You have been invited because you are over eighteen years of age and enrolled at a UK-based University.

Do I have to take part?
Participation is voluntary. You can choose not to participate in part or all of the project and you may withdraw from the project at any stage and without giving a reason, during the data collection period (December 2018 – September 2019). Should you choose to withdraw, you will not be penalised or disadvantaged in any way. Taking part in the research will not affect your grades. It is up to you to decide whether or not to take part. If you do decide to take part, you will be asked to sign a consent form.

What will happen if I take part?
Participants will be given access to an online self-help program within one month of enrolment. Participants will have 4 weeks in which to complete twelve online modules focusing on different skills, such as mindfulness and personal value identification. Participants will be asked to complete a series of online questionnaires before and after they complete the online program. These questionnaires will be used to measure the effectiveness

of the online program. ***Please allow 10-20 minutes to complete the questionnaires at each point in time.***

Expenses and Payments

You will not have to pay for participating in the online program (and you will not be paid for your participation). However, participants will be entered into a prize draw for one of four £20 Amazon vouchers. Entry will not be contingent on the completion of the study. The draw will take place following the data collection period. A participant can win a maximum of one voucher and no cash alternatives will be available. Voucher winners will be notified via email and their details will not be shared publicly.

What do I have to do?

You will be asked to complete a twelve-module online program in your own time, over the course of 4 weeks. You will also be asked to complete questionnaires before and after the online program.

What are the possible disadvantages and risks of taking part?

There is a chance that you may experience a temporary increase in difficult feelings and a heightened awareness of the things that make you worried and upset. If you are experiencing distress that you are concerned about, please contact the NHS or the Samaritans using the details at the end of this information sheet.

What are the possible benefits of taking part?

We hope that you will experience a reduction in distress and that your ability to live in a way that is consistent with your values will be enhanced. The study will also contribute to knowledge about the best psychological therapies for university students.

What will happen when the research study stops?

Data will be stored securely electronically for ten years, in line with the University's guidelines. If the project is abandoned before completion, all data will be destroyed.

Will my taking part in the study be kept confidential?

Only the researcher will have access to the demographic and questionnaire data before it has been anonymised. No data will be shared with any staff member of the university other than those in the research team. Your personal information will be kept confidential for a minimum period of ten years in line with University guidelines.

Please note that in the unlikely event that you communicate considerable risk to the researcher, such as plans to harm yourself or another, the researcher would have a duty of care to disclose this to a third party (i.e., the university).

What should I do if I want to take part?

Please contact the researcher at Holly.Conheady.1@city.ac.uk.

What will happen to the results of the research study?
The results of the study will be written up for a doctoral thesis and potentially academic or clinical publications related to Counselling Psychology. No identifiable personal data will be published.

What will happen if I do not want to carry on with the study?
The participant is free to leave, without explanation or penalty, at any time during the study. Data may be withdrawn at any stage during the data collection period (December 2018 – September 2019).

Who has reviewed the study?
This study has been approved by City, University of London Psychology Low-Risk Review Research Ethics Committee

Further Support
Whatever you are going through, you can also call the Samaritans free any time, from any phone on 116 123.
Your GP can provide further support. There is also a crisis and emergency service available to support people who are experiencing a mental health crisis and who need help quickly. The service can be accessed through your GP and by calling 111. Lines are open 24 hours, 7 days a week.

****
****

Data Protection Privacy Notice: What are my rights under the data protection legislation?
City, University of London is the data controller for the personal data collected for this research project. Your personal data will be processed for the purposes outlined in this notice. The legal basis for processing your personal data will be that this research is a task in the public interest, that is City, University of London considers the lawful basis for processing personal data to fall under Article 6(1)(e) of GDPR (public task) as the processing of research participant data is necessary for learning and teaching purposes and all research with human participants by staff and students has to be scrutinised and approved by one of City's Research Ethics Committees.

Further, City considers the processing of special category personal data will fall under Article 9(2)(g) of the GDPR as the processing of special category data has to be for the public interest in order to receive research ethics approval and occurs on the basis of law that is, inter alia, proportionate to the aim pursued and protects the rights of data subjects.
The rights you have under the data protection legislation are listed below, but not all of the rights will apply to the personal data collected in each research project.

- right to be informed; right of access; right to rectification; right to erasure; right to restrict processing; right to object to data processing; right to data portability; right to object; rights in relation to automated decision making and profiling

For more information, please visit www.city.ac.uk/about/city-information/legal

What if I have concerns about how my personal data will be used after I have participated in the research?

In the first instance you should raise any concerns with the research team, but if you are dissatisfied with the response, you may contact the Information Compliance Team at dataprotection@city.ac.uk or phone 0207 040 4000, who will liaise with City's Data Protection Officer Dr William Jordan to answer your query. If you are dissatisfied with City's response you may also complain to the Information Commissioner's Office at www.ico.org.uk

What if there is a problem?

If you have any problems, concerns or questions about this study, you should ask to speak to a member of the research team. If you remain unhappy and wish to complain formally, you can do this through City's complaints procedure. To complain about the study, you need to phone 020 7040 3040. You can then ask to speak to the Secretary to Senate Research Ethics Committee and inform them that the name of the project is: EVALUATING THE IMPACT OF A WEB-BASED ACCEPTANCE AND COMMITMENT THERAPY PROGRAM ON MENTAL HEALTH SKILLS IN UNIVERSITY STUDENTS.

You could also write to the Secretary at:

Anna Ramberg
Research Integrity Manager
Research & Enterprise
City, University of London
Northampton Square
London
EC1V 0HB
Email: Anna.Ramberg.1@city.ac.uk

City holds insurance policies which apply to this study. If you feel you have been harmed or injured by taking part in this study, you may be eligible to claim compensation. This does not affect your legal rights to seek compensation. If you are harmed due to someone's negligence, then you may have grounds for legal action.

THANK YOU FOR TAKING THE TIME TO READ THIS INFORMATION SHEET.

Appendix D: Consent Form

English - United Kingdom

Ethics approval code: ETH1819-0224

Please tick all the boxes on the righthand side and sign below should you consent to take part in the research project. **Please note that in order to proceed with the study you must provide full consent below, be at least eighteen years of age and enrolled at a UK-based university.**

	I agree
I am eighteen years of age or above.	☐
I am enrolled as a student at a UK-based university.	☐
I agree to take part in the above City, University of London research project. I have had the project explained to me, and I have read the participant information sheet, which I may keep for my records. I understand this will involve: • completing a questionnaire involving personal data (e.g., ethnicity; sexual orientation) at the start of the study • completing questionnaires asking me about my emotions, behaviours and experiences on three separate occasions over a period of approximately two months • completing an online self-help program in my own time over a period of four weeks • the use of my personal, questionnaire and program usage data for the purposes of evaluating an online self-help program	☐

I understand that this information will be held by City as data controller and processed for the following purpose(s): To address the research questions.

Public Task: The legal basis for processing your sensitive and personal data will be that this research is a task in the public interest, that is City, University of London considers the lawful basis for processing personal data to fall under Article 6(1)(e) of GDPR (public task) as the processing of research participant data is necessary for learning and teaching purposes and all research with human participants by staff and students has to be scrutinised and approved by one of City's Research Ethics Committees. ☐

I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party. No identifiable personal data will be published. The identifiable data will not be shared with any other organisation. ☐

I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the data collection period without being penalised or disadvantaged in any way. ☐

I agree to City recording and processing this information about me. I understand that this information will be used only for the purpose(s) set out in this statement and my consent is conditional on City complying with its duties and obligations under the General Data Protection Regulation (GDPR). ☐

I agree to the arrangements for data storage, archiving, sharing. ☐

I agree to take part in the above study. ☐

Participant Name

If you agree to all of the points above and provide your consent to take part in the following study please sign in the space below.

× SIGN HERE

clear

Appendix E: Debrief Information Sheet

EVALUATING THE IMPACT OF A WEB-BASED ACCEPTANCE & COMMITMENT THERAPY PROGRAM ON MENTAL HEALTH SKILLS IN UNIVERSITY STUDENTS

DEBRIEF INFORMATION

Thank you for taking part in this study. Now that it's finished we'd like to tell you a bit more about it.

This research aims to explore the effect of an online Acceptance and Commitment Therapy program on university student mental health. Student distress levels were measured at the beginning and end of treatment to record and compare any movement. It is expected that the web-based ACT program would decrease levels of student distress and increase levels of self-compassion. Participants were randomly assigned into two groups, one of which had immediate access to the program and one of which was asked to wait 4 weeks before being provided with access. Comparing these groups will help us to understand the effectiveness of the online program. The data we have collected will also be analysed by demographics such as gender and age, to find out if the program is more effective with particular groups.

If you are experiencing distress, whatever you are going through, you can call the Samaritans free any time, from any phone on 116 123.

Your GP can provide further support. There is also a crisis and emergency service available to support people who are experiencing a mental health crisis and who need help quickly. The service can be accessed through your GP and by calling 111. Lines are open 24 hours, 7 days a week.

We hope you found the study interesting. If you have any other questions, please do not hesitate to contact us at the following:

Holly Conheady
Holly.Conheady.1@city.ac.uk

Dr Jessica Jones Nielsen
Jones.Nielsen.1@city.ac.uk

Ethics approval code: ETH1819-0224

Appendix F: LifeToolbox Sample Screenshots

This session will explore ways you can react more flexibly to your thoughts, helping you get unhooked and see thoughts as just thoughts. We will:

- Present several strategies for becoming flexible with thinking.
- Help you find which strategies work best for you.

"The mind is a powerful force. It can enslave us or empower us. It can plunge us into the depths of misery or take us to the heights of ecstasy. Learn to use the power wisely."
-David Cuschieri

Write Down A Thought

In this session we will have you try out a whole set of different strategies to relate to your thoughts more flexibly - to step back and get unhooked from them. Before we get into the strategies, we need you to pick a thought to work with.

- Consider your difficult thinking patterns:
- Click here for examples of thoughts

Write in a thought that you get hooked by and struggle with.

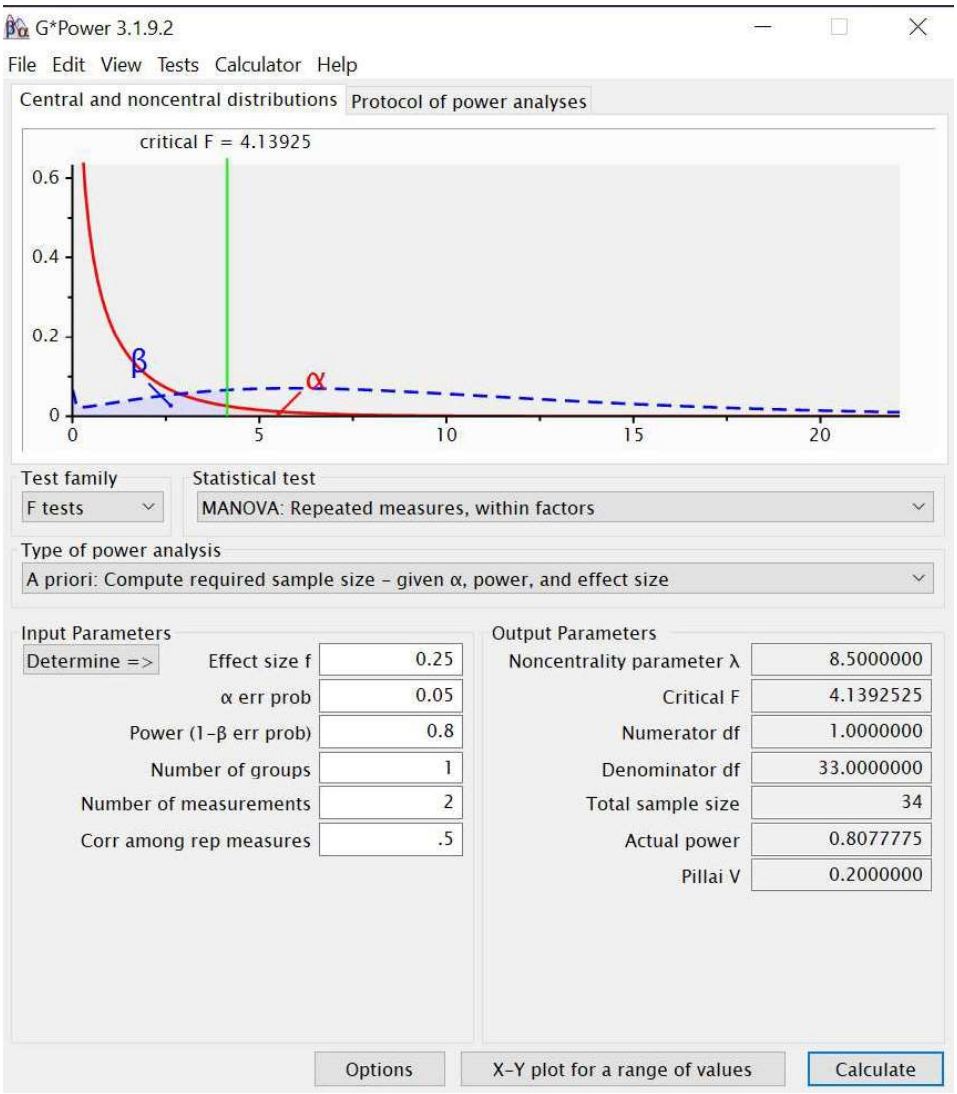
Rate this thought in terms of...

Not at all — Very much so

0 20 40 60 80 100

How hooked you are by this thought right now (how much do you think its true)

Appendix G: Power Analysis



Appendix H: Automated Emails

Login Details Emails

Thank you for completing today's questionnaires. They will help us to evaluate the effectiveness of the online intervention. Click here to access the online program.

Your login details are as follows:
Study ID: [*five-digit number randomly assigned by Qualtrics*]
Password: [*standard*]

If you are experiencing distress, whatever you are going through, you can call the Samaritans free any time, from any phone on 116 123.

Your GP can provide further support. There is also a crisis and emergency service available to support people who are experiencing a mental health crisis and who need help quickly. The service can be accessed through your GP and by calling 111. Lines are open 24 hours, 7 days a week.

Principal Investigator: Holly Conheady - *Holly.Conheady.1@city.ac.uk*
Research Supervisor: Dr Jessica Jones Nielsen - *Jones.Nielsen.1@city.ac.uk*

Spotlight Emails – Spotlight on Cognitive Defusion Example

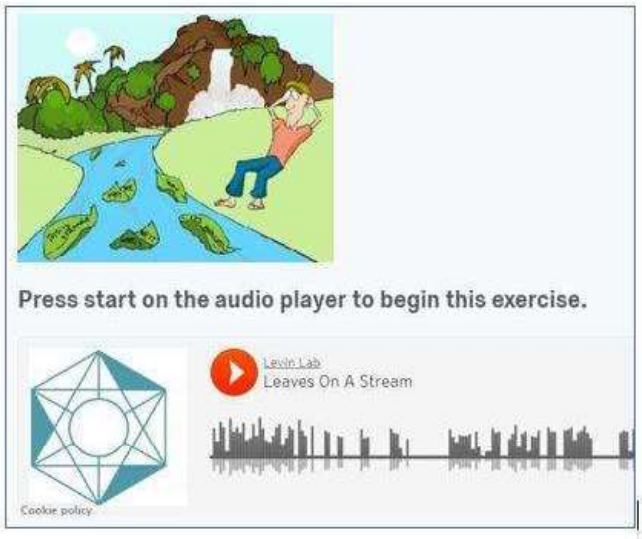
Hi,

Thanks again for participating in our study. You have now had access to the online Acceptance and Commitment Therapy program for one week. A gentle reminder that we recommend you complete the program over a period of 4 weeks. The program includes guided mindfulness, personal value and goal-setting exercises. To continue with the program, please click here.

Your login details are as follows:
Study ID: ${e://Field/Random%20ID}
Password: ACT219!

Best wishes,
Holly Conheady
Principal Investigator
holly.conheady.1@city.ac.uk

Spotlight on Cognitive Defusion Modules – stepping back from unhelpful thoughts



Change The Symbols

Another way to look at your thoughts as just a bunch of funny symbols is to write it out in different ways and play with the language.

First, write the thought backwards. For example, "I'm worthless" would be written "sselhtrow m'I".

Prompt Emails – WLC Time 2 Example

Hi,

Thanks again for participating in our research. Please complete the surveys here and then proceed to the online program. We suggest that you complete the twelve Life Toolbox modules in order over the next 4 weeks. Your Study ID is ${e://Field/Random%20ID}.

Reminder Emails

Hi,

Thanks again for participating in our research. We would be really grateful if you could **click here** to complete a few of the surveys ***(approx. 10 minutes)*** **one last time** to help us to evaluate the effectiveness of the program. **Your Study ID is ${m://FirstName}**

Thanks again for your time!
Link not working?
Copy and paste the URL below into your Internet browser:
${l://SurveyURL}
Follow the link to opt out of future emails:
${l://OptOutLink?d=Click here to unsubscribe}

Opt-Out Emails

Hi,

We have noticed that you have not been responding to our reminder emails. We don't want to clog up your inbox, so this is the last one. Sorry to see you go! Do get in touch if you have any questions.

If you have 10 minutes, please complete the survey here to help us to evaluate the effectiveness of the program. **Your Study ID is ${m://FirstName}.**

Thanks again for your time!

Follow the link to opt out of future emails:
${l://OptOutLink?d=Click here to unsubscribe}

Progress Emails

Congratulations! You have completed Session 1 – Away Moves.
Congratulations! You have completed Session 2 – Letting Go.
Congratulations! You have completed Session 3 – Carrying Emotions with You.
Congratulations! You have completed Session 4 – Noticing Hooks.
Congratulations! You have completed Session 5 – Stepping Back.
Congratulations! You have completed Session 6 – Getting Flexible with Thoughts.
Congratulations! You have completed Session 7 – Your Values.
Congratulations! You have completed Session 8 – How You Want to Act.
Congratulations! You have completed Session 9 – Finding Values.
Congratulations! You have completed Session 10 – Setting Goals.
Congratulations! You have completed Session 11 – Making Commitments.
Congratulations! You have completed Session 12 – Returning to Commitments.

Appendix I: Participant Demographic Form

1 What is your gender?

Male ☐ Female ☐ Other, please describe……

2 What is your ethnic group? (please tick one answer)

White
1. English/ Welsh/ Scottish/ Northern Irish/ British
2. Irish
3. Gypsy or Irish Traveller
4. Any other White background, please describe……...

Mixed/Multiple ethnic groups
5. White and Black Caribbean
6. White and Black African
7. White and Asian
8. Any other Mixed/Multiple ethnic background, please describe……

Asian/Asian British
9. Indian
10. Pakistani
11. Bangladeshi
12. Chinese
13. Any other Asian background, please describe……

Black/ African/Caribbean/Black British
14. African
15. Caribbean
16. Any other Black/African/Caribbean background, please describe

Other ethnic group
17. Arab
18. Any other ethnic group, please describe……

3 What is your date of birth?

Day…… Month……. Year…….

4 Do you have a disability?

Yes ☐ No ☐

If yes, please specify……

5 What is your employment status?

1. Full-time
2. Part-time
3. Not employed
4. Any other employment status, please describe……

6 What is your relationship status?

1. Single
2. In a relationship
3. Married/Registered
4. Divorced/Separated
5. Any other relationship status, please describe……...

7 In which year of University are you currently enrolled?

1. Undergraduate – Year 1
2. Undergraduate – Year 2
3. Undergraduate – Year 3
4. Postgraduate – Taught
5. Postgraduate – Research
6. Any other enrolment status, please describe……..

8 What faculty are you in?

1. Arts
2. Social Science
3. Science
4. Law
5. Business
6. Medicine
7. Education
8. Engineering
9. Other, please describe……..

9 What is the name of your University?

Abertay University; Aberystwyth University; Anglia Ruskin University; Arden University; Aston University; Bangor University; Bath Spa University; Birkbeck, University of London; Birmingham City University; Bishop Grosseteste University; Bournemouth University; BPP University; Brunel University; Buckinghamshire New University; Canterbury Christ Church University; Cardiff Metropolitan University; Cardiff University; City, University of London; Courtauld Institute of Art; Coventry University; Cranfield University; De Montfort University; Durham University; Edge Hill University; Edinburgh Napier University; Falmouth University; Glasgow Caledonian University; Goldsmiths, University of London; Harper Adams University; Heriot-Watt University; Imperial College London; Institute of Cancer Research; Keele University; King's College London; Kingston University; Lancaster University; Leeds Arts University; Leeds Beckett University; Leeds Trinity University; Liverpool Hope University; Liverpool John Moores University; London Business School; London Metropolitan University; London School of Economics and Political Science (LSE); London School of Hygiene and Tropical Medicine; London South Bank University; Loughborough University; Manchester Metropolitan University; Middlesex University; Newcastle University; Newman University; Northumbria University; Norwich University of the Arts; Nottingham Trent University; Oxford Brookes University; Plymouth Marjon University; Queen Margaret University; Queen Mary, University of London; Queen's University Belfast; Ravensbourne University London; Regent's University London; Roehampton University; Royal Academy of Music; Royal Agricultural University; Royal Central School of Speech and Drama; Royal Holloway, University of London; Royal Veterinary College; School of Oriental and African Studies (SOAS); Sheffield Hallam University; Solent University; St George's, University of London; St Mary's University, Twickenham; Staffordshire University; Swansea University; Teesside University; The Arts University Bournemouth; The Open University; The Robert Gordon University; Ulster University; University College Birmingham; University College London (UCL); University for the Creative Arts; University of Aberdeen; University of Bath; University of Bedfordshire; University of Birmingham; University of Bolton; University of Bradford; University of Brighton; University

of Bristol; University of Buckingham; University of Cambridge; University of Central Lancashire; University of Chester; University of Chichester; University of Cumbria; University of Derby; University of Dundee; University of East Anglia; University of East London; University of Edinburgh; University of Essex; University of Exeter; University of Glasgow; University of Gloucestershire; University of Greenwich; University of Hertfordshire; University of Huddersfield; University of Hull; University of Kent; University of Law; University of Leeds; University of Leicester; University of Lincoln; University of Liverpool; University of Manchester; University of Northampton; University of Nottingham; University of Oxford; University of Plymouth; University of Portsmouth; University of Reading; University of Salford; University of Sheffield; University of South Wales; University of Southampton; University of St Andrews; University of Stirling; University of Strathclyde; University of Suffolk; University of Sunderland; University of Surrey; University of Sussex; University of the Arts London; University of the Highlands & Islands; University of the West of England; University of the West of Scotland; University of Wales; University of Wales, Trinity Saint David; University of Warwick; University of West London; University of Westminster; University of Winchester; University of Wolverhampton; University of Worcester; University of York; Wrexham Glyndŵr University; York St John University; Other, please describe…….

10 Which best describes your experience of personal counselling?

1. I am currently engaging in personal counselling and have done so in the past.
2. I have engaged in personal counselling in the past and not at present.
3. I have never attended personal counselling and I might at some stage.
4. I have never attended personal counselling and do not intend to.

Appendix J: Acceptance & Action Questionnaire (AAQ-II)

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1 =	2 =	3 =	4 =	5 =	6 =	7 =
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1.	My painful experiences and memories make it difficult for me to live a life that I would value.	1	2	3	4	5	6	7
2.	I'm afraid of my feelings.	1	2	3	4	5	6	7
3.	I worry about not being able to control my worries and feelings.	1	2	3	4	5	6	7
4.	My painful memories prevent me from having a fulfilling life.	1	2	3	4	5	6	7
5.	Emotions cause problems in my life.	1	2	3	4	5	6	7
6.	It seems like most people are handling their lives better than I am.	1	2	3	4	5	6	7
7.	Worries get in the way of my success.	1	2	3	4	5	6	7

Note. This is a one-factor measure of psychological inflexibility, or experiential avoidance. Score the scale by summing the seven items. Higher scores equal greater levels of psychological inflexibility.

Appendix K: Acceptance & Action Questionnaire for University Students (AAQ-US)

AAQ-US

Below you will find a list of statements regarding experiences university students might have. Please rate how true each statement is for you. Use the scale below to make your choice.

1 =	2 =	3 =	4 =	5 =	6 =	7 =
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

8.	I put off schoolwork when I feel bad	1	2	3	4	5	6	7
9.	It seems like I'm just "going through the motions" at school	1	2	3	4	5	6	7
10.	I struggle with my thoughts about school	1	2	3	4	5	6	7
11.	I find myself avoiding going to classes when I feel anxious or depressed	1	2	3	4	5	6	7
12.	When I think an assignment is too hard or confusing, I give up	1	2	3	4	5	6	7
13.	It's hard for me to focus on what my professors are saying in classes	1	2	3	4	5	6	7
14.	I get so worried about upcoming exams that I feel paralyzed and can't study	1	2	3	4	5	6	7
15.	Worries get in the way of my success at school	1	2	3	4	5	6	7
16.	My thoughts and feelings get in the way of studying	1	2	3	4	5	6	7
17.	I don't get anything out of a class when I'm having negative thoughts	1	2	3	4	5	6	7
18.	I often believe that I'm not smart enough to be in college or in this major	1	2	3	4	5	6	7
19.	I get so caught up in my worries during tests that I have trouble focusing on the test itself	1	2	3	4	5	6	7

Scale Scoring Instructions

These 12 items are added together for a total score on the AAQ-US. There are no subscales or reverse scored items for the AAQ-US.

Appendix L: Cognitive Fusion Questionnaire (CFQ)

CFQ

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1.	My thoughts cause me distress or emotional pain	1	2	3	4	5	6	7
2.	I get so caught up in my thoughts that I am unable to do the things that I most want to do	1	2	3	4	5	6	7
3.	I over-analyse situations to the point where it's unhelpful to me	1	2	3	4	5	6	7
4.	I struggle with my thoughts	1	2	3	4	5	6	7
5.	I get upset with myself for having certain thoughts	1	2	3	4	5	6	7
6.	I tend to get very entangled in my thoughts	1	2	3	4	5	6	7
7.	It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful	1	2	3	4	5	6	7

Thank you for completing this questionnaire

Appendix M: Mindful Awareness Attention Scale (MAAS)

Instructions: Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be. Please treat each item separately from every other item.

1	2	3	4	5	6
almost always	very frequently	somewhat frequently	somewhat infrequently	very infrequently	almost never

_____ 1. I could be experiencing some emotion and not be conscious of it until some time later.
_____ 2. I break or spill things because of carelessness, not paying attention, or thinking of something else.
_____ 3. I find it difficult to stay focused on what's happening in the present.
_____ 4. I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.
_____ 5. I tend not to notice feelings of physical tension or discomfort until they really grab my attention.
_____ 6. I forget a person's name almost as soon as I've been told it for the first time.
_____ 7. It seems I am "running on automatic," without much awareness of what I'm doing.
_____ 8. I rush through activities without being really attentive to them.
_____ 9. I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.
_____ 10. I do jobs or tasks automatically, without being aware of what I'm doing.
_____ 11. I find myself listening to someone with one ear, doing something else at the same time.
_____ 12. I drive places on 'automatic pilot' and then wonder why I went there.
_____ 13. I find myself preoccupied with the future or the past.
_____ 14. I find myself doing things without paying attention.
_____ 15. I snack without being aware that I'm eating.

Scoring: To score the scale, simply compute a mean (average) of the 15 items.

Appendix N: Valuing Questionnaire (VQ)

Please read each statement carefully and then circle the number which best describes how much the statement was for you DURING THE PAST WEEK, INCLUDING TODAY

0 Not at all true	1	2	3	4	5	6 Completely true		
Q1) I spent a lot of time thinking about the past or future, rather than being engaged in activities that mattered to me	0	1	2	3	4	5 6	–	–
Q2) I was basically on "auto-pilot" most of the time	0	1	2	3	4	5 6		–
Q3) I worked toward my goals even if I didn't feel motivated to	0	1	2	3	4	5 6	–	
Q4) I was proud about how I lived my life	0	1	2	3	4	5 6	–	
Q5) I made progress in the areas of my life I care most about	0	1	2	3	4	5 6	–	
Q6) Difficult thoughts, feelings or memories got in the way of what I really wanted to do	0	1	2	3	4	5 6		–
Q7) I continued to get better at being the kind of person I want to be	0	1	2	3	4	5 6	–	
Q8) When things didn't go according to plan, I gave up easily	0	1	2	3	4	5 6		–
Q9) I felt like I had a purpose in life	0	1	2	3	4	5 6	–	
Q10) It seemed like I was just "going through the motions" rather than focusing on what was important to me	0	1	2	3	4	5 6		–
						Progress:	–	
						Obstruction:		–

Appendix P: Self-Compassion Scale – Short Form (SCS–SF)

HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

Almost never				**Almost always**
1	**2**	**3**	**4**	**5**

_____1. When I fail at something important to me I become consumed by feelings of inadequacy.

_____2. I try to be understanding and patient towards those aspects of my personality I don't like.

_____3. When something painful happens I try to take a balanced view of the situation.

_____4. When I'm feeling down, I tend to feel like most other people are probably happier than I

am.

_____5. I try to see my failings as part of the human condition.

_____6. When I'm going through a very hard time, I give myself the caring and tenderness I need.

_____7. When something upsets me I try to keep my emotions in balance.

_____8. When I fail at something that's important to me, I tend to feel alone in my failure

_____9. When I'm feeling down I tend to obsess and fixate on everything that's wrong.

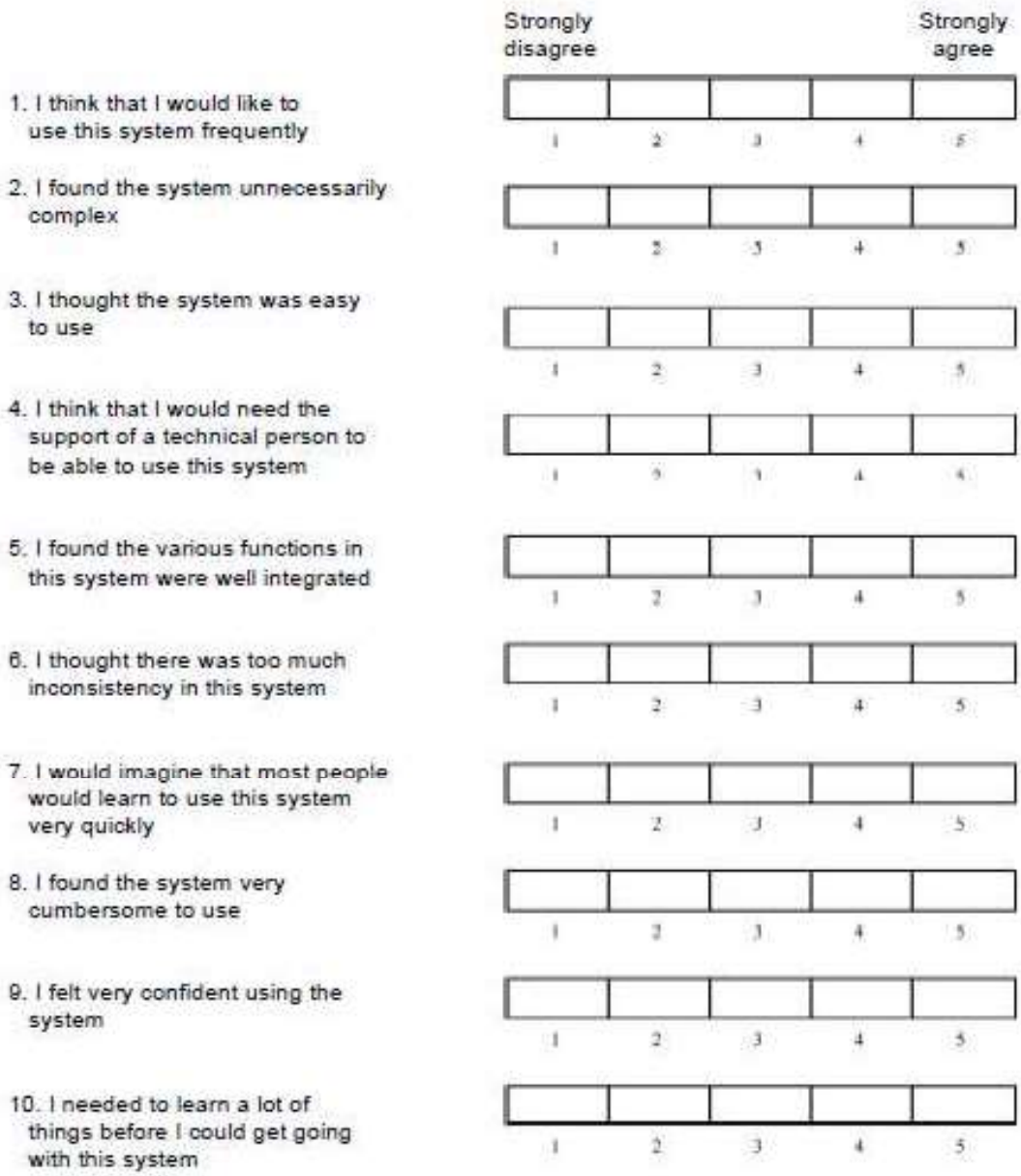
_____10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy

are shared by most people.

_____11. I'm disapproving and judgmental about my own flaws and inadequacies.

_____12. I'm intolerant and impatient towards those aspects of my personality I don't like.

Appendix Q: System Usability Scale (SUS)



Appendix R: Participant Satisfaction Questions

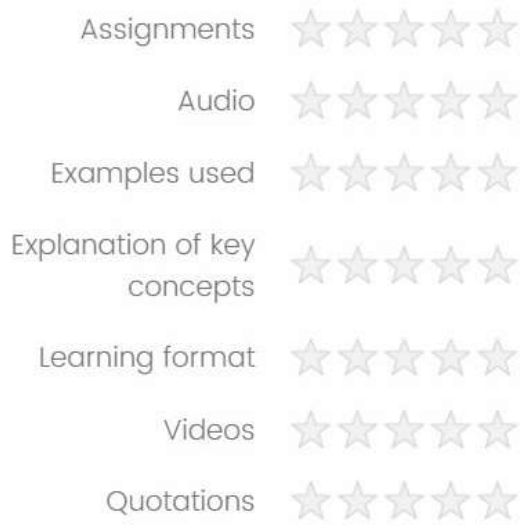
How many of the twelve modules did you complete?

- ○ None (0)
- ○ One (1)
- ○ Less than half (2-5)
- ○ Half (6)
- ○ More than half (7-11)
- ○ All 12 (12)
- ○ I completed all 12 sessions and some of them more than once (12)

If you did not go through the entire Life Toolbox program (i.e., complete all twelve lessons) in the last four weeks please describe why. Check all that apply.

- ☐ Knew what was covered in the program already
- ☐ I wasn't interested in the self-help program
- ☐ I didn't have enough time
- ☐ The program was too long and/or boring
- ☐ The program did not seem helpful
- ☐ I had trouble accessing program
- ☐ I was uncomfortable with the content of the program
- ☐ Other
- ☐ **Not Applicable; I went through the entire program**

Thinking about the Life Toolbox program, please rate the following:



The length of the twelve individual modules was (please select one):

- ◯ Too long
- ◯ Too short
- ◯ About right

Having four weeks to complete the program was (please select one):

- ◯ Too much time
- ◯ Too little time
- ◯ About right

Please rate the following. The content of the program was:

Easy to understand	☆☆☆☆☆
Easy to use	☆☆☆☆☆
Engaging	☆☆☆☆☆
Helpful	☆☆☆☆☆
High Quality	☆☆☆☆☆
Practical	☆☆☆☆☆
Relatable	☆☆☆☆☆
Relevant to Me	☆☆☆☆☆
Repetitive	☆☆☆☆☆

Please answer the following questions regarding the Life Toolbox self-help program.

	Strongly disagree	Mostly disagree	Slightly disagree	Slightly agree	Mostly agree	Strongly agree
I would like to use the program again in the future.	○	○	○	○	○	○
I think the program would be helpful for distressed university students.	○	○	○	○	○	○

Appendix S: Skewness and Kurtosis - ITT Sample (*n* = 110)

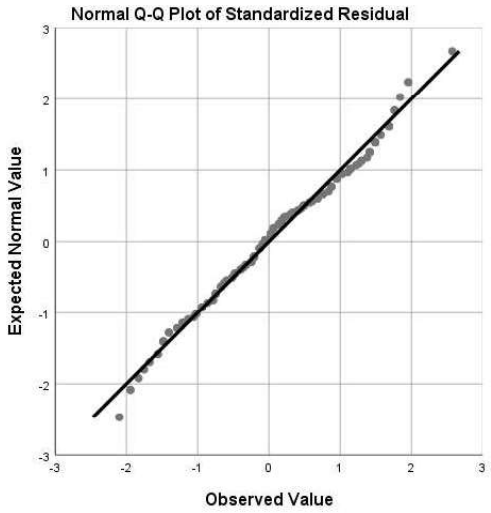
		Skewness			Kurtosis		
		Statistic	Std. Error	*Z*-score	Statistic	Std. Error	*Z*-score
	CCAPS Academic Distress	0.285	0.327	0.871	-0.807	0.644	-1.253
	CCAPS Alcohol Use	0.972	0.327	2.968	0.106	0.644	0.164
	CCAPS Generalised Anxiety	0.505	0.327	1.542	-0.280	0.644	-0.434
	CCAPS Depression	0.834	0.327	2.546	0.333	0.644	0.517
	CCAPS Depression Transformed	-0.339	0.327	-1.035	-0.006	0.644	-0.009
	CCAPS Distress	0.399	0.327	1.218	-0.407	0.644	-0.631
	CCAPS Eating Concerns	0.394	0.327	1.203	-1.412	0.644	-2.192
Time 1	**CCAPS Hostility**	**1.298**	**0.327**	**3.963**	1.422	0.644	2.206
ACT	CCAPS Hostility Transformed	-0.044	0.327	-0.135	-0.525	0.644	-0.815
	CCAPS Social Anxiety	-0.338	0.327	-1.032	-0.229	0.644	-0.356
	Psychological Inflexibility (AAQ-II)	0.289	0.327	0.881	-0.353	0.644	-0.548
	Psychological Inflexibility (AAQ-US)	0.323	0.327	0.985	-0.271	0.644	-0.420
	Cognitive Fusion (CFQ)	0.152	0.327	0.465	-0.927	0.644	-1.439
	Mindful Awareness (MAAS)	0.112	0.327	0.341	-0.043	0.644	-0.066
	Self-Compassion (SCS-SF)	0.273	0.327	0.835	-0.761	0.644	-1.181
	Valued Living – Obstruction (VQ-Obs)	-0.196	0.327	-0.599	-0.603	0.644	-0.936
	Valued Living - Progress (VQ-Prog)	-0.274	0.327	-0.838	-0.801	0.644	-1.243
	CCAPS Academic Distress	0.479	0.512	0.936	-0.074	0.992	-0.075
	CCAPS Alcohol Use	1.117	0.512	2.182	0.339	0.992	0.341
	CCAPS Generalised Anxiety	-0.122	0.512	-0.238	-0.096	0.992	-0.096
	CCAPS Depression	**1.732**	**0.512**	**3.382**	**5.324**	**0.992**	**5.365**
	CCAPS Depression Transformed	-0.070	0.512	-0.136	0.907	0.992	0.914
	CCAPS Distress	-0.257	0.512	-0.501	-1.136	0.992	-1.145
	CCAPS Eating Concerns	0.547	0.512	1.068	-0.488	0.992	-0.492
Time 2	CCAPS Hostility	1.515	0.512	2.959	1.508	0.992	1.520
ACT	CCAPS Hostility Transformed	0.303	0.512	0.591	-0.354	0.992	-0.357
	CCAPS Social Anxiety	-0.078	0.512	-0.152	-0.327	0.992	-0.329
	Psychological Inflexibility (AAQ-II)	-0.526	0.512	-1.027	-0.943	0.992	-0.950
	Psychological Inflexibility (AAQ-US)	0.155	0.512	0.303	-0.554	0.992	-0.559
	Cognitive Fusion (CFQ)	-0.077	0.512	-0.150	-1.008	0.992	-1.015
	Mindful Awareness (MAAS)	-0.112	0.512	-0.218	-0.308	0.992	-0.310
	Self-Compassion (SCS-SF)	0.091	0.512	0.178	-0.770	0.992	-0.776
	Valued Living – Obstruction (VQ-Obs)	-0.160	0.512	-0.313	-0.957	0.992	-0.965
	Valued Living - Progress (VQ-Prog)	-0.425	0.512	-0.829	-0.175	0.992	-0.177
	CCAPS Academic Distress	0.979	0.687	1.424	1.968	1.334	1.475
	CCAPS Alcohol Use	0.358	0.687	0.522	0.179	1.334	0.134
	CCAPS Generalised Anxiety	1.019	0.687	1.484	1.622	1.334	1.216
	CCAPS Depression	0.047	0.687	0.069	0.158	1.334	0.119
	CCAPS Depression Transformed	-0.756	0.687	-1.100	1.271	1.334	0.953
	CCAPS Distress	0.911	0.687	1.326	0.194	1.334	0.146
	CCAPS Eating Concerns	0.222	0.687	0.324	-1.591	1.334	-1.192

Time 3	CCAPS Hostility	0.230	0.687	0.335	-1.165	1.334	-0.873
ACT	CCAPS Hostility Transformed	-0.471	0.687	-0.685	-1.556	1.334	-1.166
	CCAPS Social Anxiety	-0.059	0.687	-0.085	-1.014	1.334	-0.760
	Psychological Inflexibility (AAQ-II)	0.200	0.687	0.291	-0.873	1.334	-0.654
	Psychological Inflexibility (AAQ-US)	0.403	0.687	0.586	0.959	1.334	0.719
	Cognitive Fusion (CFQ)	0.589	0.687	0.858	-1.350	1.334	-1.012
	Mindful Awareness (MAAS)	0.209	0.687	0.304	-0.342	1.334	-0.256
	Self-Compassion (SCS-SF)	-0.367	0.687	-0.534	-0.579	1.334	-0.434
	Valued Living – Obstruction (VQ-Obs)	0.000	0.687	0.000	-1.033	1.334	-0.774
	Valued Living - Progress (VQ-Prog)	0.449	0.687	0.654	-1.231	1.334	-0.923
	CCAPS Academic Distress	0.024	0.316	0.074	-0.871	0.623	-1.398
	CCAPS Alcohol Use	0.767	0.316	2.426	-0.737	0.623	-1.183
	CCAPS Generalised Anxiety	0.235	0.316	0.742	-0.395	0.623	-0.634
	CCAPS Depression	0.566	0.316	1.790	-0.533	0.623	-0.855
	CCAPS Depression Transformed	-0.413	0.316	-1.304	-0.380	0.623	-0.611
	CCAPS Distress	0.448	0.316	1.415	-0.434	0.623	-0.697
	CCAPS Eating Concerns	-0.277	0.316	-0.875	-1.312	0.623	-2.105
Time 1	CCAPS Hostility	0.966	0.316	3.053	0.429	0.623	0.688
WLC	CCAPS Hostility Transformed	-0.118	0.316	-0.374	-0.730	0.623	-1.171
	CCAPS Social Anxiety	-0.169	0.316	-0.536	-0.850	0.623	-1.364
	Psychological Inflexibility (AAQ-II)	-0.028	0.316	-0.087	-0.959	0.623	-1.538
	Psychological Inflexibility (AAQ-US)	0.151	0.316	0.477	-0.896	0.623	-1.439
	Cognitive Fusion (CFQ)	0.011	0.316	0.034	-0.983	0.623	-1.577
	Mindful Awareness (MAAS)	0.448	0.316	1.416	0.644	0.623	1.034
	Self-Compassion (SCS-SF)	0.393	0.316	1.241	-0.057	0.623	-0.091
	Valued Living – Obstruction (VQ-Obs)	-0.448	0.316	-1.418	0.735	0.623	1.179
	Valued Living - Progress (VQ-Prog)	-0.229	0.316	-0.725	-0.472	0.623	-0.757
	CCAPS Academic Distress	-0.197	0.409	-0.483	-0.404	0.798	-0.506
	CCAPS Alcohol Use	0.608	0.409	1.489	-1.208	0.798	-1.513
	CCAPS Generalised Anxiety	0.289	0.409	0.708	-0.971	0.798	-1.216
	CCAPS Depression	0.618	0.409	1.512	-0.473	0.798	-0.593
	CCAPS Depression Transformed	-0.323	0.409	-0.790	-0.407	0.798	-0.509
	CCAPS Distress	0.347	0.409	0.848	-0.218	0.798	-0.273
	CCAPS Eating Concerns	-0.113	0.409	-0.278	-1.109	0.798	-1.388
Time 2	CCAPS Hostility	0.232	0.409	0.568	-0.938	0.798	-1.175
WLC	CCAPS Hostility Transformed	-0.596	0.409	-1.457	-0.506	0.798	-0.634
	CCAPS Social Anxiety	0.482	0.409	1.180	-0.043	0.798	-0.054
	Psychological Inflexibility (AAQ-II)	0.020	0.409	0.049	-0.754	0.798	-0.944
	Psychological Inflexibility (AAQ-US)	-0.276	0.409	-0.676	-0.432	0.798	-0.540
	Cognitive Fusion (CFQ)	0.091	0.409	0.223	-1.268	0.798	-1.588
	Mindful Awareness (MAAS)	0.612	0.409	1.497	-0.660	0.798	-0.826
	Self-Compassion (SCS-SF)	0.160	0.409	0.393	-0.936	0.798	-1.173
	Valued Living – Obstruction (VQ-Obs)	0.335	0.409	0.820	-0.505	0.798	-0.632
	Valued Living - Progress (VQ-Prog)	-0.591	0.409	-1.447	0.324	0.798	0.406

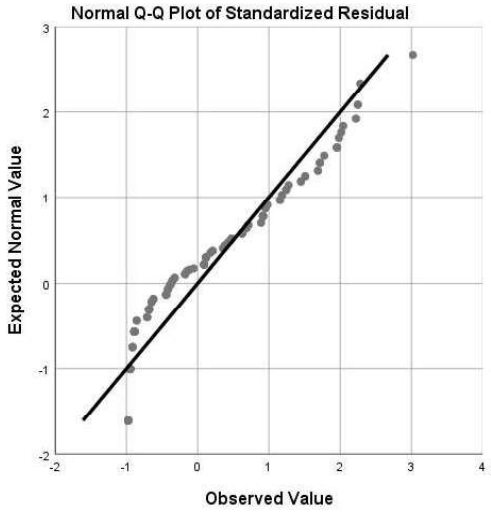
Notes. Z-scores with an absolute value greater than 3.29 were considered to be non-normally distributed (Field, 2016) and highlighted in bold. CCAPS depression and hostility scores fulfilled this criterion and were subsequently transformed using square-root transformations.

Appendix T: Q-Q Plots of the Residuals for each MMRM Model.

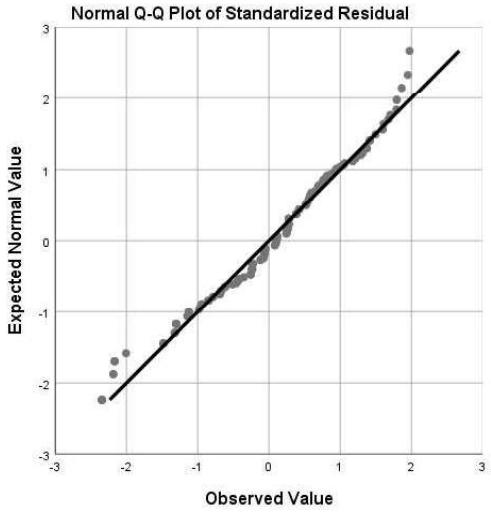
1. CCAPS Academic Distress



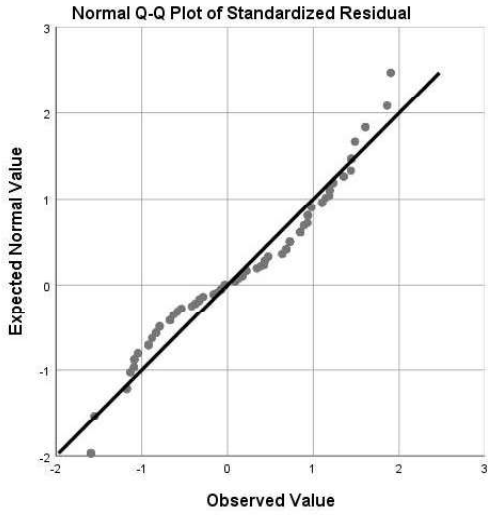
2. CCAPS Alcohol Use



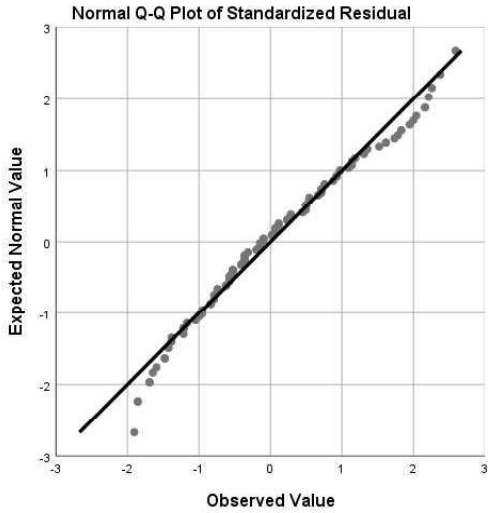
3. CCAPS Depression – Transformed



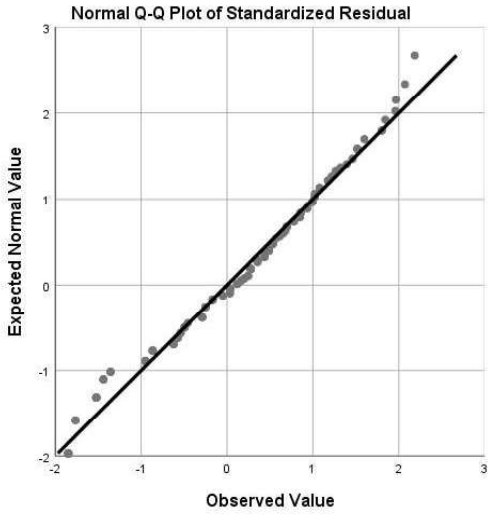
4. CCAPS Eating Concerns



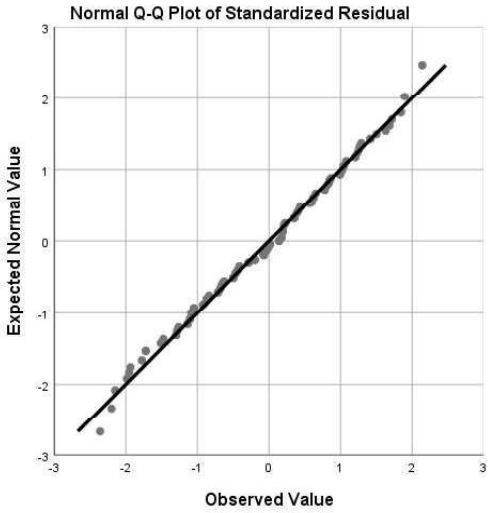
5. CCAPS Generalised Anxiety



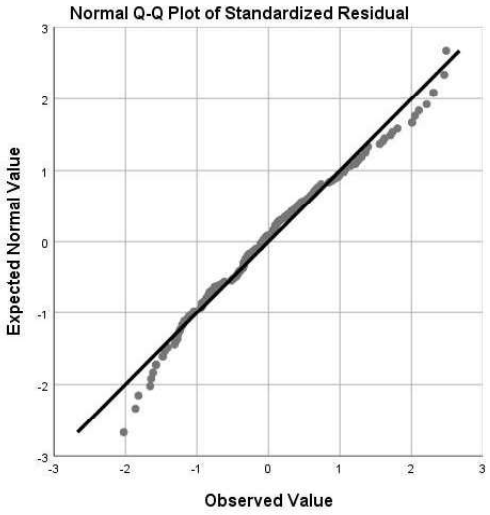
6. CCAPS Hostility – Transformed



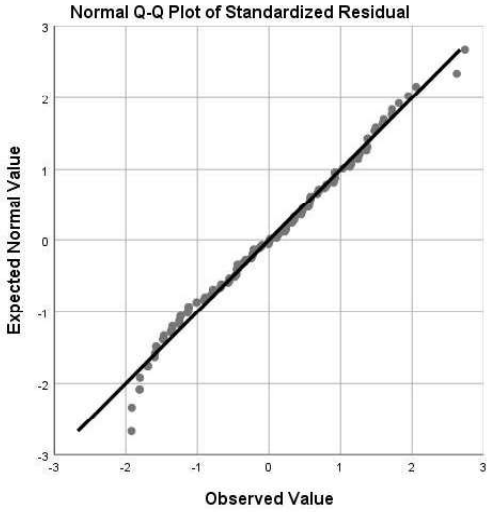
7. CCAPS Social Anxiety



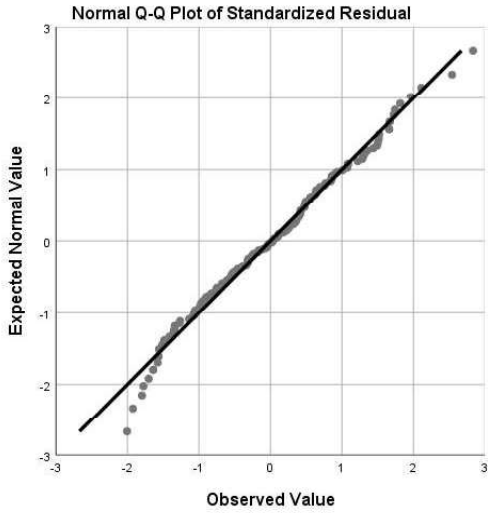
8. CCAPS Overall Distress



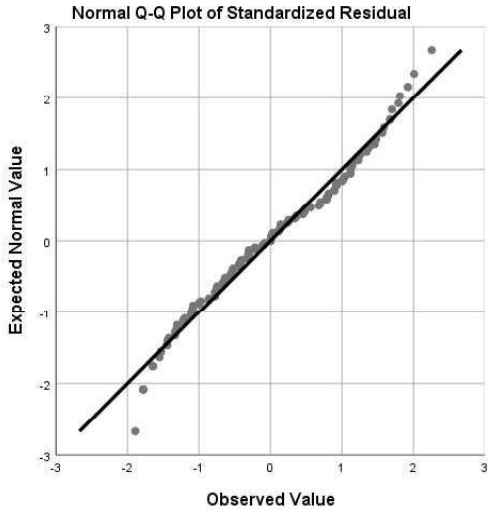
9. Psychological Inflexibility (AAQ-II)



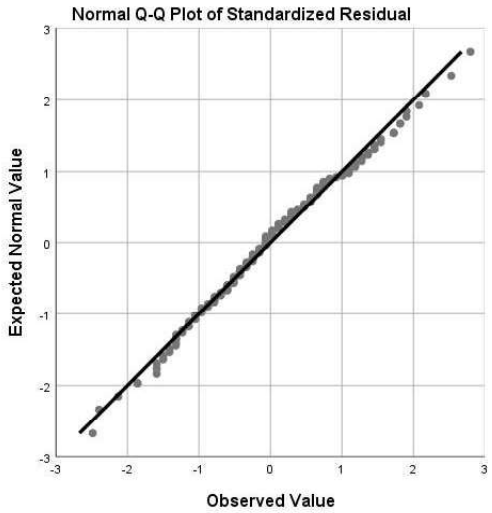
10. Psychological Inflexibility (AAQ-US)



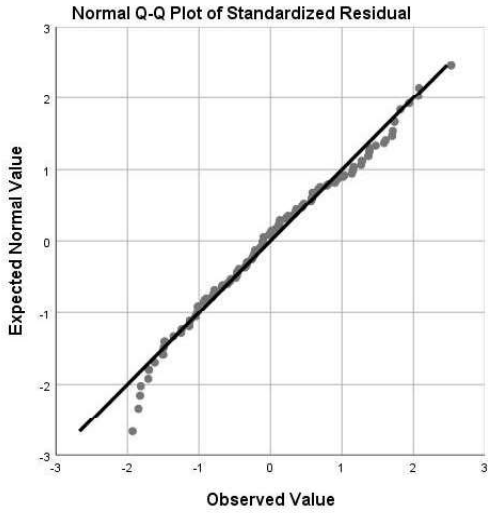
11. Cognitive Fusion (CFQ)



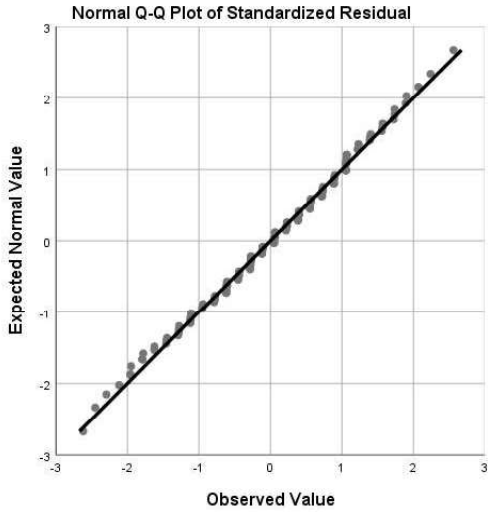
12. Mindful Awareness (MAAS)



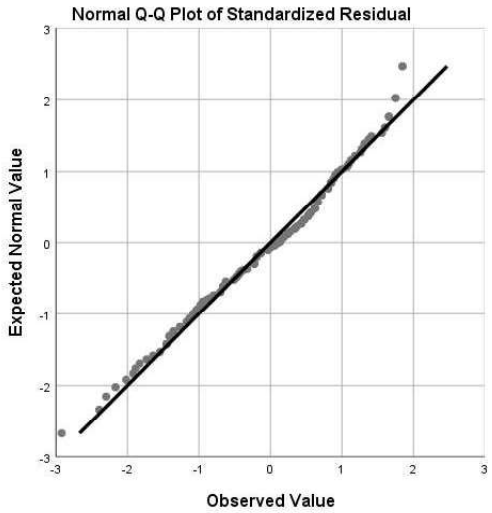
13. Self-Compassion (SCS-SF)



14. Valued Living (VQ-Obstruction)



15. Valued Living (VQ-Progress)



Appendix U: Skewness and Kurtosis - Completer Sample (n = 40)

		Skewness			Kurtosis		
		Statistic	Std. Error	*Z*-score	Statistic	Std. Error	*Z*-score
	CCAPS Academic Distress	0.225	0.374	0.601	-0.663	0.733	-0.905
	CCAPS Alcohol Use	0.289	0.374	0.774	-1.235	0.733	-1.686
	CCAPS Generalised Anxiety	0.887	0.374	2.373	0.374	0.733	0.510
	CCAPS Depression	0.720	0.374	1.926	-0.355	0.733	-0.485
	CCAPS Depression Transformed	-0.218	0.374	-0.584	-0.617	0.733	-0.842
	CCAPS Distress	0.622	0.374	1.665	-0.029	0.733	-0.040
	CCAPS Eating Concerns	0.016	0.374	0.042	-1.364	0.733	-1.862
	CCAPS Hostility	0.909	0.374	2.431	0.361	0.733	0.492
	CCAPS Hostility Transformed	-0.145	0.374	-0.389	-0.867	0.733	-1.184
Time	CCAPS Social Anxiety	0.088	0.374	0.237	0.276	0.733	0.377
1	Psychological Inflexibility (AAQ-II)	0.310	0.374	0.828	-0.628	0.733	-0.857
	Psychological Inflexibility (AAQ-US)	0.251	0.374	0.672	-0.456	0.733	-0.623
	Cognitive Fusion (CFQ)	0.210	0.374	0.561	-1.002	0.733	-1.368
	Mindful Awareness (MAAS)	0.202	0.374	0.540	-1.039	0.733	-1.419
	Self-Compassion (SCS-SF)	0.190	0.374	0.510	-0.779	0.733	-1.063
	Valued Living – Obstruction (VQ-Obs)	0.135	0.374	0.361	-0.664	0.733	-0.906
	Valued Living - Progress (VQ-Prog)	-0.566	0.374	-1.514	0.183	0.733	0.250
	CCAPS Academic Distress	0.273	0.374	0.731	0.405	0.733	0.553
	CCAPS Alcohol Use	1.005	0.374	2.688	0.030	0.733	0.041
	CCAPS Generalised Anxiety	0.212	0.374	0.566	-0.241	0.733	-0.329
	CCAPS Depression	**1.390**	**0.374**	**3.717**	**2.854**	**0.733**	**3.896**
	CCAPS Depression Transformed	-0.281	0.374	-0.752	0.338	0.733	0.462
	CCAPS Distress	0.048	0.374	0.129	-0.666	0.733	-0.909
	CCAPS Eating Concerns	0.279	0.374	0.746	-1.053	0.733	-1.438
	CCAPS Hostility	**1.292**	**0.374**	**3.458**	1.166	0.733	1.591
	CCAPS Hostility Transformed	0.676	0.374	1.810	-0.378	0.733	-0.516
Time	CCAPS Social Anxiety	0.349	0.374	0.932	-0.254	0.733	-0.347
2	Psychological Inflexibility (AAQ-II)	0.083	0.374	0.221	-0.361	0.733	-0.493
	Psychological Inflexibility (AAQ-US)	0.356	0.374	0.952	-0.106	0.733	-0.145
	Cognitive Fusion (CFQ)	0.449	0.374	1.201	-0.639	0.733	-0.873
	Mindful Awareness (MAAS)	0.001	0.374	0.002	-0.027	0.733	-0.037
	Self-Compassion (SCS-SF)	-0.087	0.374	-0.233	0.753	0.733	1.027
	Valued Living – Obstruction (VQ-Obs)	-0.043	0.374	-0.116	-0.798	0.733	-1.089
	Valued Living - Progress (VQ-Prog)	-0.694	0.374	-1.857	0.120	0.733	0.163
	CCAPS Academic Distress	0.354	0.637	0.556	1.015	1.232	0.824
	CCAPS Alcohol Use	0.614	0.637	0.964	-0.011	1.232	-0.009
	CCAPS Generalised Anxiety	1.112	0.637	1.745	2.215	1.232	1.797
	CCAPS Depression	0.079	0.637	0.123	0.817	1.232	0.663
	CCAPS Depression Transformed	-0.851	0.637	-1.335	2.071	1.232	1.681
	CCAPS Distress	1.206	0.637	1.892	0.927	1.232	0.753
	CCAPS Eating Concerns	0.244	0.637	0.383	-1.487	1.232	-1.207
	CCAPS Hostility	0.552	0.637	0.866	-1.062	1.232	-0.862
	CCAPS Hostility Transformed	0.000	0.637	0.000	-1.969	1.232	-1.598
Time	CCAPS Social Anxiety	0.202	0.637	0.318	-0.643	1.232	-0.522
3	Psychological Inflexibility (AAQ-II)	-0.229	0.637	-0.359	-0.308	1.232	-0.250
	Psychological Inflexibility (AAQ-US)	0.333	0.637	0.523	0.533	1.232	0.432
	Cognitive Fusion (CFQ)	0.779	0.637	1.222	-0.875	1.232	-0.710
	Mindful Awareness (MAAS)	0.459	0.637	0.721	-0.700	1.232	-0.568
	Self-Compassion (SCS-SF)	2.002	0.637	3.141	3.465	1.232	2.812
	Valued Living – Obstruction (VQ-Obs)	0.237	0.637	0.371	-1.107	1.232	-0.898
	Valued Living - Progress (VQ-Prog)	0.067	0.637	0.105	-1.327	1.232	-1.077

Notes. Z-scores with an absolute value greater than 3.29 were considered to be non-normally distributed (Field, 2016) and highlighted in bold. CCAPS depression and hostility scores fulfilled this criterion and were subsequently transformed using square-root transformations.

Appendix V: Within-Subjects Testing Correlational Matrices

Time 1

Variables	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
1. Psychological Inflexibility (AAQ-II)																	
2. Psychological Inflexibility (AAQ-US)	.729**																
3. Cognitive Fusion (CFQ)	.788**	.695**															
4. Mindful Awareness (MAAS)	-.483**	-.519**	-.474**														
5. Self-Compassion (SCS-SF)	-.596**	-.634**	-.647**	.562**													
6. Valued Living (VQ-Obstruction)	.688**	.694**	.684**	-.628**	-.612**												
7. Valued Living (VQ-Progress)	-.528**	-.541**	-.454**	.401**	.613**	-.583**											
8. Academic Distress	.701**	.817**	.653**	-.503**	-.607**	.643**	-.596**										
9. Alcohol Use	-.010	.019	-.017	-.040	-.107	-.001	-.103	.043									
10. Depression	.687**	.661**	.634**	-.392**	-.651**	.632**	-.595**	.679**	.028								
11. Depression – Transformed	.701**	.696**	.606**	-.430**	-.639**	.611**	-.550**	.714**	.058	.956**							
12. Eating Concerns	.396**	.300**	.419**	-.377**	-.428**	.363**	-.378**	.214*	-.028	.320**	.335**						
13. Generalised Anxiety	.682**	.625**	.606**	-.431**	-.422**	.574**	-.355**	.618**	.117	.638**	.649**	.242*					
14. Hostility	.496**	.457**	.465**	-.371**	-.447**	.471**	-.350**	.462**	.117	.546**	.504**	.350**	.506**				
15. Hostility – Transformed	.482**	.452**	.460**	-.411**	-.435**	.484**	-.322**	.442**	.143	.512**	.479**	.380**	.473**	.944**			
16. Social Anxiety	.527**	.546**	.508**	-.409**	-.633**	.467**	-.529**	.541**	.141	.574**	.575**	.221*	.495**	.334**	.305**		
17. Overall Distress	.776**	.768**	.723**	-.516**	-.661**	.709**	-.587**	.810**	.089	.895**	.882**	.374**	.860**	.667**	.629**	.663**	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Time 2

Variables	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
1. Psychological Inflexibility (AAQ-II)																	
2. Psychological Inflexibility (AAQ-US)	.705**																
3. Cognitive Fusion (CFQ)	.883**	.711**															
4. Mindful Awareness (MAAS)	-.644**	-.528**	-.569**														
5. Self-Compassion (SCS-SF)	-.709**	-.664**	-.702**	.475**													
6. Valued Living (VQ-Obstruction)	.790**	.704**	.837**	-.627**	-.644**												
7. Valued Living (VQ-Progress)	-.453**	-.274	-.437**	.260	.430**	-.378*											
8. Academic Distress	.737**	.732**	.700**	-.476**	-.584**	.644**	-.476**										
9. Alcohol Use	.261	.073	.189	-.494**	-.230	.335*	-.172	.175									
10. Depression	.675**	.484**	.686**	-.348*	-.606**	.512**	-.479**	.413**	.062								
11. Depression – Transformed	.746**	.509**	.705**	-.420**	-.628**	.581**	-.543**	.525**	.191	.935**							
12. Eating Concerns	.581**	.305	.609**	-.359*	-.574**	.563**	-.379*	.408**	.394*	.617**	.611**						
13. Generalised Anxiety	.595**	.462**	.515**	-.566**	-.325*	.457**	-.315*	.471**	.257	.486**	.599**	.232					
14. Hostility	.385*	.228	.434**	-.230	-.315*	.398*	-.408**	.231	.278	.363*	.436**	.264	.419**				
15. Hostility – Transformed	.487**	.286	.488**	-.352*	-.364*	.447**	-.410**	.300	.291	.450**	.556**	.303	.566**	.937**			
16. Social Anxiety	.571**	.520**	.478**	-.331*	-.564**	.416**	-.347*	.294	.250	.491**	.563**	.218	.472**	.381*	.460**		
17. Overall Distress	.816**	.621**	.798**	-.541**	-.634**	.674**	-.509**	.617**	.246	.829**	.890**	.521**	.812**	.589**	.691**	.644**	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Time 3

Variables	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
1. Psychological Inflexibility (AAQ-II)																	
2. Psychological Inflexibility (AAQ-US)	.592*																
3. Cognitive Fusion (CFQ)	.369	.148															
4. Mindful Awareness (MAAS)	-.584*	-.608*	-.460														
5. Self-Compassion (SCS-SF)	-.467	-.417	-.406	.679*													
6. Valued Living (VQ-Obstruction)	.890**	.554	.283	-.745**	-.535												
7. Valued Living (VQ-Progress)	-.617*	-.341	-.391	.527	.362	-.761**											
8. Academic Distress	.524	.703*	.257	-.475	-.675*	.496	-.352										
9. Alcohol Use	.099	.058	.106	-.091	-.379	.225	-.120	.145									
10. Depression	.357	.589*	.355	-.252	.017	.254	-.320	.613*	-.327								
11. Depression – Transformed	.247	.535	.357	-.213	.090	.123	-.198	.531	-.390	.983**							
12. Eating Concerns	.814**	.449	.003	-.356	-.261	.757**	-.378	.564	.070	.378	.276						
13. Generalised Anxiety	.395	.313	.452	-.193	-.077	.376	-.491	.558	-.256	.830**	.754**	.414					
14. Hostility	.401	.256	.064	-.435	-.426	.404	-.105	.293	.186	.081	.051	.307	-.026				
15. Hostility – Transformed	.415	.171	.146	-.403	-.525	.411	-.166	.353	.203	.055	.008	.302	.051	.971**			
16. Social Anxiety	.136	.651*	.000	-.497	-.075	.254	-.351	.377	-.058	.516	.536	.143	.127	.038	-.093		
17. Overall Distress	.538	.638*	.419	-.385	-.261	.479	-.499	.775**	-.126	.931**	.863**	.510	.875**	.273	.293	.417	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix W: Summary of Results Based on the Examination of Hypotheses 1 to 3.

	Hypothesis 1 **Between Groups** **(n = 110)[a]**	**Hypothesis 2** **Within Groups** **(n = 40)[a]**	**Hypothesis 3** **Mediation** **(n = 40)[a]**
	Significant Improvement		Significant Mediator
Psychological Flexibility			
Psychological Inflexibility (AAQ-II)	N	N	N/A [b]
Psychological Inflexibility (AAQ-US)	N	**Y***	N/A [b]
Cognitive Fusion (CFQ)	N	**Y***	N/A [b]
Mindful Awareness (MAAS)	**Y****	**Y****	N/A [b]
Valued Living – Obstruction (VQ-Obs)	N	**Y***	N/A [b]
Valued Living – Progress (VQ-Prog)	N	N	N/A [b]
Self-Compassion (SCS-SF)	**Y***	**Y****	N/A [b]
Psychological Symptoms (CCAPS-34)			
Academic Distress	N	N	**AAQ-US; CFQ; MAAS; SCS-SF**
Alcohol Use	N	Unknown [c]	**MAAS**
Depression	N	N	**CFQ; VQ-OBS**
Eating Concerns	N	N	**-**
Generalised Anxiety	N	**Y***	**CFQ**
Hostility	N	**Y***	**-**
Social Anxiety	**Y***	**Y****	**CFQ**
Overall Distress	N	**Y***	**AAQ-US; CFQ; VQ-OBS**

Notes. Significant results are highlighted in bold.

[a] Final sample sizes exclude any cases that were removed due to significant outliers.

[b] Psychological flexibility and self-compassion processes were included as possible mediators in the model. Where results were significant, mediators have been recorded in the related CCAPS-34 row below.

[c] Alcohol use was excluded from the MANOVA due to a lack of correlation with the other outcome variables.

* $p < .05$, ** $p \leq .001$