

The Meaning and Doing of Mindfulness: The Role of Values-based Behaviour in the
Link Between Mindfulness and Wellbeing

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Declaration

I declare that this thesis reports my original work, no part of this thesis has been accepted previously and presented for the award of any degree or diploma from any university, and to the best of my knowledge no material published or written by another individual is included in this thesis, except where due acknowledgement is given.



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Alison Mardy Saint-Teresa Christie

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Abstract

In the past decade, mindfulness training has become a common and well-accepted addition to, or basis for, clinical interventions. However, there is little clear understanding of the mechanisms through which mindfulness improves wellbeing and reduces psychological distress. This thesis explores whether mindful behaviour in line with values, or values-based action, is one of these mechanisms. Study 1 was a cross-sectional study examining the role of values-based action in the relationship between trait mindfulness and wellbeing in two university samples. In both samples, significant indirect effects were identified from mindfulness to wellbeing through Values Progress and Values Obstruction. Study 2 was a randomised controlled trial (RCT) comparing a mindfulness-based intervention (MBI) and an intervention integrating mindfulness and values (an acceptance and commitment therapy [ACT] intervention). The sample was $n = 199$ higher degree university students. Outcomes were measured at baseline (T1), post-intervention (T2) and at four weeks follow-up (T3). Using a mixed linear approach, results indicated that both MBI and ACT interventions resulted in significant improvements in Flourishing, Positive Experiences, Perceived Stress, Non-judging, Acting with Awareness, and managing Values Obstruction (compared with the control group) from T1 to T3. Only the MBI group decreased significantly in Negative Experiences and only the ACT group improved significantly in Values Progress. Further, increases in Values Progress (T1 to T2) and Values Obstruction (T1 to T3) were significantly greater in the ACT group compared with the MBI group. A limitation of this study was that despite randomisation, two key variables were significantly different between groups at baseline. Therefore, data were re-analysed in Study 3 using a series of path analyses models that controlled for baseline differences between groups. In these results, both ACT and MBI groups changed significantly more than the control group in all outcomes and process variables and there were no significant differences between MBI and ACT groups in change in any variables. However, based on all

results it was concluded that ACT was superior to MBI in improving Non-judging from T1 to T2 and Values Progress and Values Obstruction and MBI was superior to ACT in reducing Negative Experiences. Mediation analyses found the effect of ACT on Perceived Stress (from T2-T3) was mediated by Values Progress (T1-T2), the effect of ACT on Negative Experiences (T2-T3) was mediated by Non-judging (T1-T2) and the effect of MBI on Flourishing (T2-T3) was mediated by Values Obstruction (T1-T2). Concurrent mediation analyses found the effect of ACT and MBI groups on all outcomes (T1-T3) was mediated through Values Progress and Values Obstruction (T1-T3). Other results supported conclusions that values-based action was a more robust mediator of change in the ACT group than the MBI group. Overall, results indicated that values-based action is likely to be one of the mechanisms by which both MBI and ACT interventions improve wellbeing and reduced psychological distress. Results also suggest that formal mindfulness practice may be better for reducing negative experiences than a therapeutic approach integrating mindfulness and values.

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Chapter 1

Overview and Rationale

Mindfulness, as a state, process, practice or intervention, has been linked to a vast array of positive outcomes ranging from improved memory, health, relationships, self-esteem and sports performance, to spiritual enlightenment (e.g., Brown, Creswell, & Ryan, 2015). Mindfulness as a practice, or a skill to be cultivated, traces its roots to ancient Eastern contemplative traditions and was introduced in the 1980s to clinical psychology as a group-based intervention to reduce the impact of chronic pain and reduce stress (Kabat-Zinn, 1982). Since then, mindfulness-based interventions (MBIs), such as mindfulness-based stress reduction (MBSR), and interventions incorporating mindfulness, such as acceptance and commitment therapy (ACT), have grown in popularity and have been found to be effective in addressing a great variety of problems and clinical presentations including anxiety, depression, stress and physical illnesses (e.g., A-Tjak et al., 2015; Khoury et al., 2013; Khoury, Sharma, Rush, & Fourniermar, 2015).

The use of mindfulness training and MBIs as adjuncts to other therapeutic approaches has also increased in popularity. For example, mindfulness training has been recommended as an adjunct to pharmacotherapy for smoking cessation and as an adjunct to standard treatments for substance use disorder (Khusid & Vythilingam, 2016). Mindfulness-based treatment packages (such as MBSR) have been recommended as adjuncts to many existing evidence-based treatment including those for chronic pain (Marchand, 2013), post-traumatic stress disorder (PTSD; Khusid & Vythilingam, 2016a) and eating disorders (Wanden-Berghe, Sanz-Valero, & Wanden-Berghe, 2011). However, most of the evidence supporting the use of mindfulness and MBIs as adjuncts to other approaches has focused on measuring the effectiveness of the

whole treatment package, with relatively little attention given to examining or identifying which elements of the package contribute to change and how it achieves it.

Research focused on identifying mechanisms of change, defined as “the processes or events responsible for change in an intervention; or the reason why change occurred or how change came about” (Kazdin, 2007, p. 3), is still in its infancy. However, this line of research has been identified as vital for the ongoing evolution of evidence-based practice (Kazdin, 2007). Research aimed at establishing which aspects of an intervention most affect change is expected to yield better therapeutic outcomes by producing more efficient interventions that focus on active components (Kraemer, Wilson, Fairburn, & Agras, 2002). Also, the identification of mechanisms of change is expected to improve individual case conceptualisation and treatment planning by increasing understanding of the likely flow-on effects of targeting specific processes (Kazdin, 2007, 2009).

Research on mechanisms of mindfulness has generally concentrated on the relationship between mindfulness as either a trait or as an intervention (e.g. MBSR) and distress or wellbeing outcomes, through proposed mediators (e.g., Gu, Strauss, Bond, & Cavanagh, 2015; Keng, Smoski, & Robins, 2011). While some of these mediators are well supported empirically, others are the subject of ongoing investigation (Gu et al., 2015). For example, as outlined in Chapter 2, the role of reduced worry and rumination in mediating the relationship between MBIs and reduced psychological distress, is strongly supported, while other potential mediators that are believed to flow from mindfulness practice, such as self-compassion, are garnering evidence (e.g., Gu et al., 2015; Keng, Smoski, Robins, Ekblad, & Brantley, 2012).

Most of the proposed mechanisms of change that have been investigated have focused on psychological constructs that: (i) are directly targeted in the MBIs (e.g. awareness, acceptance or self-compassion); or (ii) relate to symptoms or variables that

maintain or reduce dysfunction (e.g. worry, rumination, or emotional regulation) (Gu et al., 2015). But a number of theoretical and empirical studies have also examined how mindfulness impacts on wellbeing through mechanisms related to personal values (or ‘meaning’) and overt behavioural change (e.g., Brown & Ryan, 2003; Carmody, Baer, Lykins, & Olendzki, 2009) (or ‘doing’). In this thesis, constructs related to meaning and doing are posited to be important mechanisms through which mindfulness improves wellbeing and reduces psychological distress because they are linked to both motivation and means for change. Specifically, values are closely linked to meaning, motivation, vitality and overt behaviour (e.g., Rokeach, 1979; Ryan & Deci, 2002; M. Villate, Villatte, & Hayes, 2016; Wagner & Sanchez, 2002) and overt behaviour is generally under more volitional control for individual change than cognitions or the environment (e.g., Levin, Luoma, & Haeger, 2015; Lyubomirsky, Sheldon, & Schkade, 2005).

The therapeutic approach that focuses most explicitly on the connection between mindfulness and aspects of meaning and doing is ACT. ACT explicitly targets the cultivation of both mindfulness and values-based action and both theory and evidence from the ACT literature highlight the role of both constructs as key mechanisms of change in ACT interventions (e.g., S. C. Hayes, Strosahl, & Wilson, 2012). However, notwithstanding the centrality of values-based action to ACT, few studies have focused specifically on values-based action as a mechanism of change, and fewer still have examined the link between mindfulness and values-based action.

This thesis posits that if a relationship between mindfulness and wellbeing can be established through values-based action, this knowledge will not only provide additional empirical support for the connection between mindfulness and values-based action emphasised in ACT, but also support other therapeutic approaches advocating such a link (e.g. client-centred therapy). This research will also help to determine whether values-based action is simply a natural consequence of being mindful or

whether the relationship between mindfulness and values-based action is enhanced by interventions that specifically target such a connection. Evidence supporting values-based action as a mechanism of change linking mindfulness to wellbeing would also extend the existing body of knowledge regarding the mechanisms of mindfulness beyond the well-established psychological processes, into the realms of meaning and doing.

This thesis therefore examines the role of values-based action as a mechanism of change in the relationship between trait mindfulness and wellbeing (and psychological distress) and the relationship between MBIs and wellbeing (and psychological distress).

1.1 Research Questions

This thesis addresses four key research questions:

1. Can the relationship between mindfulness and both wellbeing and psychological distress be explained partly through values-based action?
2. Is a mindfulness-based intervention that integrates mindfulness and values (ACT) more effective than a mindfulness-only intervention (MBI) in improving wellbeing and reducing psychological distress?
3. Does values-based action mediate the relationship between ACT and MBI interventions and change in both wellbeing or distress outcomes? If so, does the size of these effects differ between MBI and ACT groups?
4. Is values-based action a mechanism of change in the relationship between mindfulness-based interventions and improved wellbeing and reduced psychological distress?

1.2 Summary of Chapters

Chapter 1 provided an overview and summary of the rationale for this thesis. Chapter 2 describes the construct of mindfulness, evidence for the effectiveness of MBIs in improving a range of outcomes and theory and evidence supporting the

relationship between both trait mindfulness and MBIs and wellbeing and psychological distress. It also reviews the proposed mechanisms by which change occurs in these relationships. Chapter 3 describes the concepts of mindfulness and values-based action from the perspective of ACT and reviews evidence for associations between ACT interventions and wellbeing and psychological distress through mindfulness and values-based action. Chapter 4 reviews theory and evidence concerning the specific link between mindfulness and values-based action and evidence supporting values-based action as a mediator of the relationship between mindfulness and wellbeing.

Chapter 5 contains the first empirical study of this thesis and addresses the first research question: “Can the relationship between mindfulness and both wellbeing and psychological distress be explained partly through values-based action?” This chapter contains a cross-sectional study examining the role of values-based action in the relationship between trait mindfulness and both eudemonic and hedonic wellbeing in two samples. This study has been peer-reviewed and was published in the journal *Mindfulness* in September 2016.

Chapter 6 outlines the method and results for a randomised controlled trial (RCT) designed and co-facilitated by the author to address the second research question: “Is a mindfulness-based intervention that integrates mindfulness and values (ACT) more effective than a mindfulness-only intervention in improving wellbeing and reducing psychological distress?” The RCT compares a mindfulness-based intervention (MBI) with an ACT-based intervention aimed at developing mindfulness and values-based action. Analyses compare rates of improvement in mindfulness, values-based action and wellbeing outcomes across the two interventions to assess if the addition of a values component adds incrementally to improvements facilitated by the MBI.

Chapters 7 and 8 outline theoretical, methodological and statistical considerations that inform the design and interpretation of the mediation analyses

employed in Chapters 9, 10 and 11. Chapters 9 and 10 use data from the RCT outlined in Chapter 6 to examine mediators of change in each intervention, addressing the third research question: “Does values-based action mediate the relationship between ACT and MBI interventions and change in wellbeing or distress outcomes? If so, does the size of these effects differ between MBI and ACT groups?” These studies examine the mediation effects through values-based action (Values Progress and Values Obstruction) and mindfulness (Acting with Awareness and Non-judging of inner experiences). Chapter 9 explores models in which the change in the mediator temporally precedes the change in the outcome variables and Chapter 10 explores models in which the change in the mediator and outcome variables are measured concurrently.

Chapter 11 contains the results of Study 4, an additional mediation analysis examining the relationship between ACT and MBI groups and changes in values-based action (as the outcome variable) mediated through changes in mindfulness variables.

Chapter 12 provides an overview and discussion of the findings of all empirical studies and how these findings relate to the research questions and existing literature. It also addressed the fourth research question: “Is values-based action a mechanism of change in the relationship between MBIs and improved wellbeing and reduced psychological distress?” The final chapter also outlines limitations, clinical applications and future directions for research.

Chapter 2

Mindfulness

...the aim of life is to live, and to live means to be aware, joyously, drunkenly, serenely, divinely aware.

–Henry Miller, *1959*

This chapter outlines definitions of mindfulness and evidence of its relationship to wellbeing and psychological distress. It then examines theory and evidence related to the mechanisms by which mindfulness-based interventions (exclusive of ACT and other behavioural mindfulness-based interventions) improve wellbeing and reduce psychological distress. The chapter also describes popular evidence-based mindfulness interventions (MBIs).

2.1 The Definition of Mindfulness

What is mindfulness? Mindfulness has been described variously as a trait, state, practice, intervention, outcome, skill and process, and like many concepts that are essentially experiential, it has proved difficult to define and therefore operationalise and measure for empirical research (e.g., Bishop et al., 2004; Brown & Ryan, 2003; Kabat-Zinn, 1990; Langer, 2014; Phang & Oei, 2012; Wallace & Bodhi, 2006). Although the modern mindfulness movement has its roots in Buddhism, similar concepts have been noted in a variety of religious and contemplative traditions, including ancient Greek philosophy, existentialism, Christianity, Islam and Hinduism. One of the most commonly cited definitions of mindfulness comes from Jon Kabat-Zinn, credited with bringing mindfulness to clinical psychology with the development of the MBSR program. Drawing on Buddhist definitions, Kabat-Zinn (1994) defined mindfulness as “paying attention in a particular way: on purpose, in the present moment, and non-judgmentally” (p. 4).

In an attempt to define both the process and practice of mindfulness, Carlson and Shapiro (2009) defined mindfulness as “the awareness that arises through intentionally attending in an open, caring and nonjudgmental way” (p. 4). Others have come up with divergent definitions. For example, prominent mindfulness researcher Ellen Langer defined mindfulness as “a state in which individuals continually make novel distinctions about objects of their attention” (Djikic, Langer, & Stapleton, 2008, p. 106). In an attempt to reach a consensus on a definition of mindfulness, leading mindfulness researchers produced a two-component definition of mindfulness as: (i) a metacognitive skill of regulated, present moment attention; and (ii) the adoption of a particular orientation or attitude to the experience, characterised by curiosity, openness, and acceptance (Bishop et al., 2004). These components have been described as the “what” (present moment attention and awareness) and “how” (curiosity, openness and acceptance) of mindfulness (Eisenlohr-Moul, Walsh, Charnigo, Lynam, & Baer, 2012).

2.1.1 Operationalisation of mindfulness.

One of the key areas of debate concerning the definition of mindfulness emerged during attempts to create self-report measures of mindfulness. This debate centred on whether the “what” and “how” of mindfulness should be measured as separate components. Brown and Ryan (2004) disputed the need for a separate “how” or attitudinal component of mindfulness arguing that present moment awareness in itself implies acceptance. Accordingly, their Mindful Attention and Awareness Scale (MAAS; Brown & Ryan, 2004) was uni-dimensional and focused on attention to, or the capacity to notice, present moment internal and common everyday external experiences, without reference to the “how”.

The MAAS: A uni-dimensional measure of mindfulness.

The MAAS has undergone extensive psychometric validation across a wide range of populations and languages. It has demonstrated good internal reliability (e.g.

Cronbach alphas ranging from 0.82 to 0.88), good test-retest reliability (e.g. correlations of $r = 0.79$ to 0.81) and a single factor structure with an acceptable fit (e.g., Brown & Ryan, 2003; Brown, West, Loverich, & Biegel, 2011; Johnson, Wiebe, & Morera, 2014).

Although the MAAS is one of the most highly utilised measures of mindfulness for research (e.g., Blanke & Brose, 2017), it has been criticised for measuring only a superficial aspect of the construct because it does not measure the attitude with which one attends (Grossman, 2011). In arguing for the need for an attitudinal component of mindfulness, the developers of the Philadelphia Mindfulness Scale (PHMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008) contended that present-focused awareness does not necessarily imply acceptance. They cited the example of person with panic disorder who is highly aware and focused on internal experiences while being non-accepting of, and non-receptive to, the experience.

The FFMQ: A multi-dimensional measure of mindfulness.

The other most commonly used measure of mindfulness for research is the Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). The FFMQ was specifically developed to address the question of dimensionality and measure both the “what” and “how” components of mindfulness. In developing the FFMQ, authors pooled the items of five mindfulness questionnaires to identify and test a factor structure for mindfulness. The five mindfulness questionnaires included were: the MAAS; the Kentucky Mindfulness Scale (KIMS; Baer, Smith, & Allen, 2004), which includes items measuring the four types of mindfulness skills highlighted in Dialectical Behaviour Therapy (DBT; Linehan, 1993) – observing, describing, acting with awareness and accepting without judgment; the Freiburg Mindfulness Inventory (FMI; Walach, Buchheld, Buittenmueller, Kleinknecht, & Schmidt, 2006), designed to measure mindfulness in

experienced meditators; the Cognitive and Affective Mindfulness Scale (CAMS; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2006), a uni-dimensional scale designed to measure mindfulness in general daily experience; and The Mindfulness Questionnaire (Chadwick, Hember, Mead, Lilley, & Dagnan, 2005), later published as the Southampton Mindfulness Questionnaire (SMQ; Chadwick et al., 2008), designed to assess mindful acceptance of distressing experiences.

In developing the FFMQ, Baer et al. (2006) identified five facets of mindfulness through factor analysis. They were: (i) Observing (noticing or attending to internal and external experience), (ii) Acting with Awareness (attending to current activity, as opposed to acting on autopilot), (iii) Describing (mentally labeling experience with words), (iv) Non-judging of Inner Experience (taking a non-evaluation stance toward thoughts and feelings), and (v) Non-reactivity to Inner Experience (allowing experience to come and go, without getting caught up in it). Observing and Acting with Awareness can be linked to the “what” component of mindfulness, while Non-judging and Non-reactivity can be linked to the “how” component of mindfulness.

While many studies have supported discriminant validity for each of these facets across various populations (Baer et al., 2008, 2006; Bohlmeijer, ten Klooster, Fledderus, Veehof, & Baer, 2011; Desrosiers, Klemanski, & Nolen-Hoeksema, 2013), the reliability of the five facet model is inconsistent (Tran, Glück, & Nader, 2013; Veehof, ten Klooster, Taal, Westerhof, & Bohlmeijer, 2011). The Observing and Non-reactivity subscales emerge as particularly problematic in terms of model fit and have been found to be unrelated, or even inversely related, to wellbeing outcomes (Baer et al., 2006; Tran et al., 2013; Veehof et al., 2011). This finding has proved interesting as the Observing scale is most readily associated with the “what” component of mindfulness. This finding supports a contention that components of

attitude (e.g. Non-judging) may moderate, or interact with, the components of attention to improve wellbeing (see: Eisenlohr-Moul et al., 2012).

Other self-report measures mindfulness.

The other popular self-report measures of mindfulness focus on the measurement of *state* mindfulness, rather than overall *trait* mindfulness. These measures include: the Toronto Mindfulness Scale (TMS; Lau et al., 2006), which is a two-component measure of mindfulness during meditation; the Daily Mindful Responding Scale (Lacaille, Sadikaj, & Nishioka, 2015), which measures four facets of mindfulness with a single scale; and the five-item version of the MAAS (Brown & Ryan, 2003), which conceives mindfulness as a single dimension construct in line with the full version of the MAAS. Further information and comparisons of mindfulness measures can be found in recent reviews (e.g., Bergomi, Tschacher, & Kupper, 2013; Brown & Ryan, 2003; Pallozzi, 2017; Park, Reilly-Spong, & Gross, 2013; Sauer, Walach, Sauer, Walach, & Schmidt, 2012).

Other measures of mindfulness.

In acknowledgement of the issues related to measuring an experiential concept such as mindfulness purely by self report (e.g., Grossman, 2011), attempts to measure mindfulness with alternative means have been documented or proposed. These approaches include language-based measures, for example the measurement of numbers of utterances related to mindfulness in interviews (e.g., Collins et al., 2009), and the analyses of qualitative interview data (e.g., Sauer et al., 2013). The measurement of mindfulness with biological, neurological and cognitive measures has also been proposed (e.g., Sauer et al., 2013).

2.2 Evidence for the Relationship Between Mindfulness and Wellbeing

The frequency or likelihood of mindful attending in daily life has been empirically linked to a wide variety of benefits to individual wellbeing. A systematic review of the associations between mindfulness and psychological health identified positive correlations between mindfulness and eudemonic and hedonic wellbeing, positive personality traits (agreeableness and conscientiousness), self-esteem, empathy, autonomy, competence, optimism and pleasant affect, and negative associations with depression, neuroticism, absent mindedness, rumination, cognitive reactivity, social anxiety, difficulties in emotional regulation, experiential avoidance and general psychological symptoms (Keng et al., 2011).

The various facets of the FFMQ have also been found to be differentially associated with wellbeing and distress outcomes. While the strength and reliability of the relationships between various facets of mindfulness differ according to population and specific outcome, Acting with Awareness and Non-judging of Inner Experiences (Non-judging) have been found to have the strongest (inverse) relationship with distress related variables, such as psychological symptoms, depression, anxiety and stress (e.g., Baer et al., 2008, 2006; Bohlmeijer, ten Klooster, et al., 2011; Cash & Whittingham, 2010; Labelle, Campbell, Faris, & Carlson, 2015; Tran et al., 2013; Veehof et al., 2011). The few studies identified that examined the association between specific subscales of the FFMQ and positive outcomes also indicated that Non-judging (Cash & Whittingham, 2010) and Acting with Awareness (Hollis-Walker & Colosimo, 2011; Veehof et al., 2011) have the strongest positive relationships with measures of wellbeing.

The MAAS has also been related to both well-being and distress outcomes across various samples. For example, the MAAS was found to be negatively associated with worry (Labelle et al., 2015), perceived stress, exhaustion and negative affect

(Nyklicek & Kuijpers, 2008) and neuroticism, depression, anxiety, social anxiety, rumination and negative affect (Brown & Ryan, 2003). The MASS has also been found to be positively associated with emotional intelligence, openness to experience, self esteem, positive affect, life satisfaction (Brown & Ryan, 2003), agreeableness, conscientiousness (Thompson & Waltz, 2007) and physical and psychological wellbeing and overall quality of life (Nyklicek & Kuijpers, 2008).

Given that the MAAS and the Acting with Awareness scale of the FFMQ relate to the “what” of mindfulness (e.g. attending to current activity, as opposed to acting on autopilot) and Non-judging relates more to the “how” of mindfulness (taking a *non-evaluation* stance toward thoughts and feelings), these patterns indicate that both elements have been found to be related to reduced distress and greater wellbeing.

2.3 Evidence for the Relationship Between MBIs and Wellbeing

Interventions aimed at improving mindfulness have been found to be efficacious for a wide range of wellbeing and distress outcomes. The majority of studies on the effects of MBIs on wellbeing have centred on the effects of MBSR (Kabat-Zinn, 1990, 1982) and mindfulness-based cognitive therapy (MBCT; Segal, Williams, & Teasdale, 2002).

2.3.1 Summary of MBSR as an intervention.

MBSR is a group-based program that was designed to reduce the distress associated with chronic pain and other illness (Kabat-Zinn, 1990) but is now frequently used to address a wide variety of clinical disorders and problems. The program consists of an 8-10 week course in which participants meet for 2 to 2.5 hours a week for intensive training in mindfulness practices, including formal practice (e.g. sitting with the intention of mindfully observing the breath or body) and informal practices (e.g. bringing mindfulness to the performance of a usual daily activity such as eating or showering). Participants are also expected to engage in formal mindfulness practice for

45 minutes per day, six days per week, practice informal mindfulness, and attend an intensive all day retreat.

2.3.2 Summary of MBCT as an intervention.

MBCT is an 8-week program adapted from MBSR which aims to relieve emotional distress associated with depression and prevent depressive relapse (Segal et al., 2002). Like MBSR, it includes formal and informal mindfulness practice in session and at home, group discussions and psycho-education. It combines mindfulness meditation and elements of cognitive therapy (CT; Beck, Rush, Shaw, & Emery, 1979) but aims to improve the awareness of, and relationship to, thoughts and emotions, rather than to evaluate, challenge and change thoughts like in a traditional CT intervention.

2.3.3 Evidence for MBI outcomes.

Since the development of the MBSR program in 1979, there have been over 300 published clinical trials of MBIs (Rau & Williams, 2016). MBIs have been found to be effective for a wide variety of physical, medical and psychological disorders and non-clinical applications. Reviews and meta-analyses have found MBIs to be efficacious in reducing anxiety and depression (Evans, 2010; Fjorback, Arendt, Ornbol, Fink, & Walach, 2011; Hofmann, Sawyer, Witt, & Oh, 2010; Lenz, Hall, & Bailey Smith, 2015), stress among health care workers (Burton, Burgess, Dean, Koutsopoulou, & Hugh-Jones, 2016), obesity-related eating behaviours (O'Reilly, Cook, Spruijt-Metz, & Black, 2014), PTSD symptoms (Banks, Newman, & Saleem, 2015), social anxiety (Norton, Abbott, Norberg, & Hunt, 2015), self-esteem (Randal, Pratt, & Bucci, 2015), and stress management (Chiesa & Serretti, 2009). Reviews have also centred on the role of MBIs to improve cognitive capacities, including working memory, meta-awareness and cognitive flexibility (Lao, Kissane, & Meadows, 2016), address work-related issues, such as job burnout (Luken & Sammons, 2016), and manage a broad range of physical and mental health conditions, including chronic disease and immune

system functioning (Black & Slavich, 2016; Grossman, Niemann, Schmidt, & Walach, 2004; Mars & Abbey, 2010). Other reviews of studies examining the effect of mindfulness on psychological wellbeing found mindfulness resulted in increased subjective wellbeing, positive affect, quality of life and behavioural regulation (Carmody et al., 2009; Keng et al., 2011). Note, none of the above reviews included ACT-based studies with the exception of Keng (2011), O'Reilly et al. (2014) and Randal et al. (2015). Reviews of ACT-based studies are summarised in Chapter 3.

A meta-analysis of 209 studies ($n = 12,145$) investigating the effect of MBIs on a variety of medical conditions, psychological disorders and non-clinical populations found moderate effect sizes in pre-post changes in all outcomes (Hedge's $g = 0.55$), comparisons with waitlist controls (Hedge's $g = 0.53$) and comparisons with active treatments, such as relaxation, art therapy, psycho-education (Hedge's $g = 0.33$), but effect sizes did not differ from CBT or BT (Hedge's $g = -.07$) (Khouri et al., 2013).¹ A meta-analysis of 29 studies ($n = 2,668$) of the effects of MBSR on anxiety and stress for a non-clinical population found similar moderate effect sizes for pre-post change (Hedge's $g = 0.55$) and moderate to large effect sizes when compared with controls (Hedge's $g = 0.53$), but nonsignificant differences between MBIs and active treatments (Hedge's $g = 0.15$) (Khouri et al., 2015).²

While evidence for the effectiveness of MBIs is overwhelming, it is in no way a panacea for all psychological and health problems. Other reviews found only weak evidence that MBIs reduce pain and secondary outcomes associated with fibromyalgia syndrome and improve the management of chronic disease, attention and executive functioning (Lao et al., 2016; Lauche, Cramer, Dobos, Langhorst, & Schmidt, 2013; Victorson et al., 2015). However, MBIs have been found to affect a wide range of

¹ This meta-analysis does not include ACT-based studies.

² This meta-analysis does not include ACT-based studies.

outcomes in a large variety of contexts, including educational, occupational, healthcare and psychological settings, in a range of populations (e.g., Chiesa & Serretti, 2009; Keng et al., 2011; Sedlmeier et al., 2012).

Because of this compelling evidence, research has recently shifted from asking whether mindfulness improves wellbeing to how and why it does so (Chiesa, Anselmi, & Serretti, 2014; Gu et al., 2015; Hölzel et al., 2011). The next section focuses on theory and evidence for proposed mechanisms of change in MBIs, with a particular, although non-exclusive, focus on MBSR and MCBT interventions.

2.4 How does Mindfulness Improve Wellbeing?

There is an emerging consensus in the literature that MBIs improve wellbeing through: (1) improving mindfulness or cultivating a more objective, flexible, and non-reactive stance toward inner experience; which then (2) improves internal regulation, flexibility and insight; and then (3) facilitates the application of appropriate coping skills and responses in daily life (e.g., Baer, 2010; Carmody et al., 2009; Hölzel et al., 2011; Shapiro, Carlson, Astin, & Freedman, 2006). A number of authors have described theoretical frameworks consistent with this conceptualisation as a means to guide future research into mechanisms of change. One of the earliest models was that of Shapiro et al. (2006) who suggested MBIs lead to improved mindfulness (attention, intention and attitude), which facilitates re-perceiving (or a shift in perspective), which in turn affects self-regulation, values clarification, psychological flexibility and exposure (see Figure 2.1).

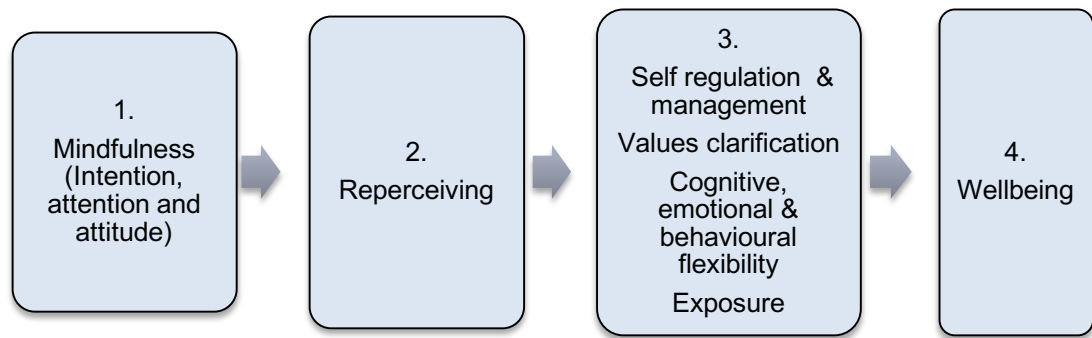


Figure 2.1. Shapiro et al.'s (2006) model of the mechanisms of mindfulness.

In a similar model, Brown, Ryan and Creswell (2007) held that mindfulness enhances wellbeing and reduces distress through the processes of insight, exposure, non-attachment, enhanced mind-body functioning and integrated functioning (improvements in more choiceful and flexible behaviour). Here mind-body functioning includes the effect of mindfulness on the body through lowering stress and enhancing immunological resistance, promoting relaxation and improving pain tolerance.

In the third model examined in this chapter, Hölzel et al. (2011) drew on past research, Buddhist philosophy, and functional and structural neuroimaging studies to argue that mindfulness interventions improve self-regulation through a synergy of attention regulation, body awareness, change in perspective on self and emotion regulation (which is defined as reappraisal, exposure, extinction, and reconsolidation). They also mentioned mind-body functioning and goal-orientated behaviour. A summary of these models is presented in Table 2.1 which groups the potential mechanisms of change discussed in each framework into four key areas related to: (i) mindfulness and changes in perspective, (ii) internal regulation and processes, (iii) values, and (iv) behavioural regulation.

Table 2.1

Mechanisms of Change Identified in Shapiro, Brown and Hölzel Models

	Shapiro et al. (2006) model	Brown et al. (2007) model	Hölzel et al. (2011) model
1a. Mindfulness elements	<i>Intention, attention and attitude</i>	<i>Receptive and flexible attention to and awareness</i> Non-attachment	<i>Attention and attitude</i> Attention regulation body awareness
1b. Change in perspective	Reperceiving	Insight (resulting in <i>decentering and reduction of worry, rumination and cognitive inflexibility</i>)	Change in perspective on the self
2. Internal processes and regulation	Self-regulation Cognitive and emotional flexibility Exposure	Enhanced Mind-body functioning Exposure Insight	Emotion regulation (including reappraisal, exposure and extinction) <i>Mind-body functioning</i>
3. Values	Values clarification	<i>Contact with values</i>	<i>Goal clarity</i>
4. Behavioural regulation	Self-management Behavioural flexibility	Integrated functioning (<i>choiceful and flexible behaviour</i>)	Enhanced self-regulation (<i>including goal-directed activity</i>)

Note. Processes mentioned in models, but not specified as distinct processes, are italicised.

2.4.1 Mindfulness elements.

Each of the three models begins with a definition of mindfulness, which is summarised in italics in Table 2.1 under ‘Mindfulness elements’. Shapiro et al. (2006) and Hölzel et al. (2011)’s definitions of mindfulness were consistent with the two component definition of mindfulness described in Chapter 2. That is mindfulness as attention (“what”) with an open and accepting attitude (“how”). Brown et al. (2007) defined mindfulness in terms of a single dimension of attention and awareness, but their

first mechanism, non-attachment, was commensurate with the “how” or quality component of the two component definition of mindfulness. The concept of attachment is drawn from Buddhism and refers to the process of craving for what is not present and trying to avoid or remove what is present (e.g., Thera, 1962; Wallace & Bodhi, 2006). In Buddhism, attachment is identified as central to human suffering. Brown et al. (2007) described non-attachment as “acceptance of, or willingness, to be with what is” (Brown et al., 2007, p. 225) which is considered the antithesis of attempting to avoid and control experience.

The Hölzel et al. (2011) model, which is specifically concerned with the mechanisms of mindfulness *meditation*, rather than mindful awareness, identified two aspects of mindfulness practice as potential mechanisms of change. They are: (i) attention regulation, which specifically identifies the purposeful, conscious or intentional aspect of attention, and (ii) body awareness (focus on sensory and emotional experience). They argued that mindfulness practices focused on awareness and acceptance of emotional states and body sensations provide the foundation skills for emotional regulation.

There is consistent evidence supporting the role of mindfulness as a mediator of the effect of MBIs on psychological outcomes. A number of meta-analyses and reviews provide strong evidence that MBIs increase self-reported mindfulness (e.g., Eberth & Sedlmeier, 2012; Gu et al., 2015; Hölzel et al., 2011; Keng et al., 2012; Visted, Vøllestad, Nielsen, & Nielsen, 2015), and as previously reported in Section 2.2, mindfulness is in turn strongly linked to a wide variety of wellbeing outcomes. A systematic review and meta-analysis of the cumulative evidence for various psychological mechanisms as mediators of the effects of MBIs on psychological outcomes found moderate, but consistent, support for mindfulness as a mediator of the effects of MBIs on mental health outcomes (Gu et al., 2015).

The MAAS and all five components of the FFMQ have been identified as mediators of the effects of MBIs on a range of mental health outcomes (see: Visted et al., 2015). For example, in a population presenting with stress issues, illness, anxiety and chronic pain, the Describing and Non-reactivity to Inner Experiences (Non-reactivity) subscales of the FFMQ were identified as mediators of the effects of an MBI on changes in psychological distress, and the Observing and Non-reactivity subscales were found to mediate the effect of an MBI on changes in depression (Heeren et al., 2015). Also, in a study measuring the effects of an MBI on cancer patients, changes in Describing, Non-judging, Non-reactivity and Acting with Awareness, mediated change of an MBI on depression, anxiety and perceived stress (Bränström, Kvillemo, Brandberg, & Moskowitz, 2010). Note that the mediators and outcomes for these studies were measured simultaneously and therefore did not provide evidence that the mediator preceded the outcome. Changes in mindfulness (FFMQ total score) however, were found to precede changes in perceived stress (Baer, Carmody, & Hunsinger, 2012) and positive and negative affect (Snippe, Nyklíček, Schroevers, & Bos, 2015) over MBSR programs, and prior changes in mindfulness (measured with the KIMS total score) were found to mediate the relationship between an MBSR-type intervention and later changes in trait anxiety and self-compassion (Bergen-Cico & Cheon, 2014). Further, a RCT comparing an MBI with a control group found that change in mindfulness (KIMS total) and self-compassion mediated the relationship between the MBI and reduced depressive symptoms 15 months after the intervention (Kuyken et al., 2010).

2.4.2 Change in perspective.

As outlined in Table 2.1, all three identified models included change in self-perspective as a potential mechanism through which mindfulness and MBIs improve psychological outcomes. In the identified models, change in self-perspective is

associated with the improvement of metacognitive awareness, that is the development of the ability to observe one's own experience more objectively. In the Shapiro et al. (2006) model, this is called *reperceiving*, defined as the capacity to observe thoughts as temporary and view them objectively rather than true reflections of the self (Shapiro et al, 2006). MBCT describes a similar process called *decentering*, which is referenced in the Brown et al. (2007) model. Decentering refers to the capacity to view both thoughts and feelings as merely temporary mental constructs (Segal et al., 2002). Hölzel et al. (2011) linked *reperceiving* to the Buddhist concept of an *impermanent self*, or self as an ever-changing product of mental processes. They argued that meditators are able to observe mental processes with increasing clarity or meta-awareness which in turn results in a new perspective of self as an event and the identification of an experiencing self (Olendzki, 2006). This experience of self as an observer of experience is sometimes called the "observer self" (Fletcher, Schoendorff, & Hayes, 2010, p.43).

Brown et al (2007) also link *decentering* to the Buddhist concept of *insight* or a deepening understanding of self, others, reality and suffering. Brown et al. (2007) describe this recognition that thoughts and feelings are fleeting and impermanent mental phenomena as 'insight' that emerges from metacognitive awareness. According to their model, this facilitates internal regulation (and reductions in rumination and worry), increased psychological and behavioural regulation and flexibility. Brown et al. (2007) also link insight to an improved recognition and understanding of one's own needs and values which in turn facilitates more "choiceful" (Brown et al., 2007, p. 218) or self-determined behaviour.

A number of studies support the role of *reperceiving* or *decentering* in the relationship between mindfulness and psychological wellbeing. For example, changes in *decentering* were found to mediate the relationship between change in mindfulness and change in psychological wellbeing over the course of a short-term MBI (Josefsson,

Lindwall, & Broberg, 2014), and in another study, changes in decentering mediated the effects of an MBSR intervention on generalised anxiety disorder symptoms (Hoge et al., 2015).

2.4.3 Exposure.

The second group of potential mechanisms in Table 2.1 are categorised under the sub-heading of internal processes and self-regulation. All three models identify exposure as a mechanism by which mindfulness and MBIs improve psychological outcomes. The concept of exposure is most often associated with the therapeutic treatment of anxiety disorders. Repeated exposure to a feared stimulus eventually leads to extinction of conditioned fear responses or desensitisation to fear associated with the stimulus (e.g., Öst, 1997). Exposure to feared stimuli has been found to be effective for treating a variety of anxiety disorders such as simple phobias, social phobia, OCD and panic disorder (Norton & Price, 2007; Sripada, Rauch, & Liberzon, 2016). Mindfulness practice provides a vehicle for regular exposure to aversive internal experience (feelings, thoughts and sensations) and opportunities to practice acceptance of experience with openness, curiosity and non-judgment. It also aims to teach that emotions and sensations are not overwhelming or frightening (e.g., Segal et al., 2002).

Hölzel et al. (2011) link the process of exposure to the construct measured by the Non-reactivity scale of the FFMQ which has been found to increase with a large effect size over an MBSR intervention (Carmody & Baer, 2008) and mediate the effects of an MBI on reductions in psychological distress and depression (Heeren et al., 2015). Further, regular meditation has been demonstrated to result in structural changes to parts of the brain associated with fear extinction (Hölzel et al., 2008, 2011). In contrast, experiential avoidance, which is considered the antithesis of acceptance and non-reactivity (e.g., Kashdan, Barrios, Forsyth, & Steger, 2006), has been found to be positively correlated with a host of maladaptive coping techniques, distress indicators

and negative psychological experiences (e.g., Kashdan et al., 2006; Machell, Goodman, & Kashdan, 2014).

Although ACT interventions are examined separately in Chapter 4, it is worth noting that ACT researchers and practitioners have held that ACT is an exposure-based therapy due to its focus on developing willingness to experience all internal sensations (e.g., S.C. Hayes, 1987).

2.4.4 Internal processes and emotional regulation.

This section outlines potential mechanisms of mindfulness identified in the three models that are linked to internal functioning or emotional regulation.

Emotional regulation.

Hölzel et al. (2011) define emotional regulation as “the alteration of ongoing emotional responses through the action of regulatory processes” (p.543). In identifying emotional regulation as a mechanism of change between mindfulness practice and wellbeing, they refer to evidence linking mindfulness practice to decreased emotional and physiological reactivity, a faster return to baseline after reactivity, decreased negative mood states, increased positive mood states, and reduced rumination and reactivity to negative thoughts. Hölzel et al. (2011) specifically identify reappraisal and extinction as key processes of emotional regulation that impact change.

Internal regulation.

In the Shapiro et al. (2006) model, mechanisms associated with internal regulation are encompassed and interconnected with behavioural regulation. For example, re-perceiving is posited to impact wellbeing through a number of processes, including both self-regulation and self-management and cognitive, emotional and behavioural flexibility. Self-regulation and self-management, in the Shapiro et al. (2006) model, refers to “the process whereby systems maintain stability of functioning and adaptability to change” (p. 380), while cognitive, emotional and behavioural flexibility are defined

as “adaptive and flexible responding to the environment in contrast to the more rigid, reflexive patterns of reactivity that result from being overly identified with one’s current experience” (p. 381). Thus, re-perceiving facilitates a reduction in experiential avoidance and therefore reduces the likelihood of being controlled by emotions (internal regulation), thereby reducing habitual maladaptive reactivity and facilitating greater consciousness and flexible responses to the environment. Similarly, in the Brown et al. (2007) model, decentering facilitates reductions in worry, rumination and cognitive inflexibility, and a reduction in rigid and reflexive patterns of reactivity.

Evidence generally supports that constructs related to internal regulation are mechanisms of change between both mindfulness and MBIs and wellbeing. In Gu et al.’s (2015) meta-analysis of the mediators of change in MBIs, mediators associated with reductions in cognitive and emotional reactivity (specifically reductions in repetitive negative thinking) were identified as having the strongest evidence base. Further, a cross-sectional mediation analysis identified a number of internal regulation processes as mediators of the relationship between mindfulness and both psychological distress and flourishing, including clarity about one’s internal life or states, levels of rumination and the management of negative emotions (Coffey, Hartman, & Fredrickson, 2010).

Enhanced mind-body functioning.

Brown et al. (2007) identified *enhanced mind-body functioning*, or the effects of mindfulness on physical health, as a potential mechanism of mindfulness. They cite evidence of immunological buffering and improvements in relaxation and pain tolerance as examples of these benefits and speculate that this effect may be mediated through stress reduction. Enhanced mind-body functioning is also mentioned as important as a mechanism of change in the relationship between mindfulness meditation and wellbeing by Hölzel et al. (2011). They refer to studies supporting the positive associations

between meditation and physiological measures of relaxation, for example increased parasympathetic tone and decreased sympathetic activity, as evidence supporting this link.

2.4.5 Valuing mechanisms.

Central to this thesis is the association between mindfulness and personal sources of meaning, particularly personal values. This connection between mindfulness and personal values is central to the theory and application of acceptance and commitment therapy (e.g., Dahl, Plumb, Stewart, & Lundgren, 2009; S. C. Hayes et al., 2012; Plumb, Stewart, Dahl, & Lundgren, 2009; Wilson & Murrell, 2004) and is explored in detail in Chapter 3. However, the link between mindfulness and values is also referenced in both the Shapiro and Brown models.

Shapiro et al. (2006) posits that mindfulness facilitates values clarification, or the process of observing, reflecting on, and rediscovering personal values (Shapiro & Carlson, 2009), and the ability to make more conscious choices based on values. This is consistent with evidence that mindfulness strengthens executive functioning (Siegel, 2007). Although values are not an identified mechanism in the Brown et al. (2007) model, they make an explicit link between mindfulness and the development of insight into desires, needs and values, and the influences of this on behavioural regulation, as described below.

Direct evidence for this association in the MBI literature is sparse. However, increases in values-based action in an MBSR intervention, compared to a control group, were found to partially mediate the relationship between change in mindfulness and change in satisfaction with life (Guadagno, 2012). Although values related to, yet distinct from, goals (e.g., Chase et al., 2013; Eccles & Wigfield, 2002), there is some evidence linking MBIs to improved ability to identify life goals. An MBCT intervention resulted in depressed participants being able to identify more specific goals

at post treatment, compared to a waitlist control (Crane, Winder, Hargus, Amarasinghe, & Barnhofer, 2012). As the increase in life goals was not mediated by change in mood, the authors suggested results could be due to an MBCT-produced shift in processing mode from abstract to concrete or the influence of the self-compassion focus of the intervention, which may have resulted in reflection on lifestyle elements. However, much of the evidence connecting mindfulness and values outside of ACT can be found in the literature related to self determination theory, outlined in the next section.

2.4.6 Behavioural regulation.

All three theories highlight the connection between mindfulness and behavioural regulation. As previously stated, in the Shapiro et al. (2006) model, the broad processes of self-management, regulation and flexibility cover both internal or cognitive processes and related overt behaviour, particularly the ability to respond more flexibly and adaptively to situations in daily life. Similarly, in the Hölzel et al. (2011) model, mindfulness, insight and change in self-perspective leads to self-regulation. Self-regulation is defined in Hölzel et al. (2011) after Karoly (1993) as “a process that enables individuals to guide their goal-directed activities by modulation of thought, affect, behaviour, or attention via deliberate or automated use of specific mechanism” (p. 549). Thus, one of the outcomes of mindfulness in this model is goal-directed activity and overt behaviour. Consistent with this approach, Levin, Luoma and Haeger (2015) proposed that mindfulness results in behavioural change through decoupling or “reducing or eliminating the relationship between internal experience and other internal/overt behavior” (p.1). Thus the introduction of new learning through mindfulness (for example, the acceptance of aversive emotions), changes the relationship between strong emotion and *avoidance* to strong emotion and both *noticing* and *accepting*. To support their decoupling theory, Levin et al. (2015) reviewed 41 experimental and correlational studies which demonstrated the relationship between

mindfulness and decoupling effects, including relationships between urges to smoke and smoking behaviour, pain intensity and persistence with a painful task and experiences of hunger and unhealthy food choices.

Behavioural regulation and self-determination theory.

Of the three reviewed models, the Brown et al. (2007) model makes the most explicit link between mindfulness, values and behaviour change. Their approach to linking mindfulness, values and behaviour is the most consistent to that of ACT, which is outlined in detail in Chapter 3. Brown et al. (2007) identified *integrated functioning* as both a process through which mindfulness exerts its effects on optimal functioning and wellbeing, but also as a goal in itself. They state that mindful awareness facilitates sensitivity to what is occurring in the present moment which results in more self-endorsed or choiceful behaviour. Further, they posit that behaviour and choices resulting from mindfulness are more likely to be based on needs and values and commensurate with the unique context of the particular situation (Brown & Ryan, 2003; Rigby, Schultz, & Ryan, 2014).

The Brown et al. (2007) model is rooted in self-determination theory (SDT; Deci & Ryan, 1985; Deci & Ryan, 2008), a macro theory of human motivation, self-regulation and optimal functioning. In SDT, values are defined as guiding life principles that emerge from the self, are intrinsically motivated and facilitate behaviour related to, or satisfying, basic needs of autonomy, competence and relatedness (Kasser, 2002). A central component of the theory is autonomous motivation and behaviour, or motivation and behaviour in line with personal values and goals. This is considered key to self-regulated and optimal functioning. The theory differentiates between autonomous and controlled motivation, which is conceptualised along a continuum (Ryan & Deci, 2002; Ryan, Huta, & Deci, 2006) as illustrated in Figure 2.2. The continuum extends from extrinsically motivated behaviour (motivated for an

external reward or to escape punishment), which is classed as *controlled*, to intrinsically motivated behaviour (pursued for the pleasure of the activity itself), which is classed as autonomous. One step prior to intrinsic motivation on the continuum, but still classified as autonomous, is *integrated* motivation (activity motivated by personal values).

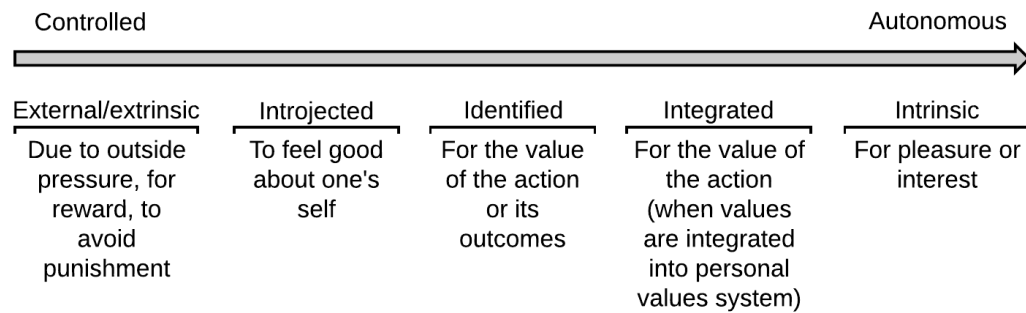


Figure 2.2. SDT motivation continuum.

Autonomous functioning has been found to be related to greater wellbeing (Brown & Ryan, 2003) and daily satisfaction of basic psychological needs (Weinstein, Przybylski, & Ryan, 2012). An integrated motivation (that is motivation based on values and goals) has also been found to be a better predictor of positive life outcomes and reduced psychological distress in academic and political domains than either explicit or intrinsic motivations (Koestner & Losier, 2002). Koestner and Losier (2002) proposed that integrated motivation was a better long-term predictor of positive outcomes than intrinsic motivation because the values-focus to behaviour provided more incentive to persist through uninteresting or difficult times to reach goals than motivation based purely on immediate pleasure. For example, a value such as “love” applied to the family domain may result in some behaviour based on intrinsic motivation (playing with a baby to enjoy her smile) or integrated motivation (continuing to play the baby for its stimulation, despite a lack of immediate enjoyment and positive feedback from the baby). In SDT, mindfulness is also posited to reduce ego

involvement which increases the ability to identify when behaviour is value-based and make connections between this functioning and greater satisfaction (Rigby et al., 2014).

Consistent with SDT, trait and state mindfulness have been empirically linked with state autonomous functioning and reduced state negative affect (Brown & Ryan, 2003). As previously mentioned, increases in values-based action over an MBSR intervention, compared to a control group, have been found to partially mediate the relationship between change in mindfulness and change in satisfaction with life (Guadagno, 2012). Values clarity has also been found to mediate the relationship between change in mindfulness and change in psychological distress over the course of an MBSR intervention as discussed below (Carmody et al., 2009).

2.4.7 Evidence for models.

The only one of three models identified in Table 2.1 to be tested empirically is the Shapiro et al. (2006) model. In testing this model, Carmody et al. (2009) found values clarity and emotional and behaviour regulation, but not self-regulation and exposure, to be unique mediators of the relationship between changes in mindfulness and changes in psychological distress, over the course of an MBSR intervention. However, a number of key methodological issues cloud interpretation of the results. For example, there was no control group included in the design and values clarity was measured by Ryff's psychological well-being (PWB) Purpose in Life scale (a measure of clarity of future goals and plans, rather than values) and psychological and behavioural flexibility was measured by PWB Environmental Mastery scale (a measure of the ability to organise and plan). However, this study does provide some evidence of a relationship between change in mindfulness and changes in clarity of goals, plans and the ability to organise them.

2.4.8 Evidence for other mediators.

An overview of evidence for mediators of change in the relationship between MBIs and wellbeing outcomes is perhaps best summarised by the previously mentioned meta-analysis of the literature by Gu et al. (2015). They identified: (i) cognitive and emotional reactivity as having the strongest and most consistent evidence base as a mediator of change; (ii) mindfulness and reductions in repetitive negative thinking (e.g. rumination and worry) as having moderate and consistent evidence; and (iii) psychological flexibility (the construct linking mindfulness, acceptance and valued action discussed in Chapter 3) and self-compassion as having inconsistent evidence.

2.5 Analyses of MBI Components

Given that one of the motivations for mechanisms of change research is to assist therapists design more targeted therapeutic interventions, a brief examination of the evidence for the influence of the various components and elements of MBI treatment packages is also important. Evidence highlighted thus far assumes that: i) MBIs are effective in improving mindfulness; and ii) effects of MBIs are predominantly due to changes in mindfulness, rather than other elements of an intervention. However, there is some evidence to suggest the contrary.

2.5.1 The contribution of mindfulness to change in MBIs.

As previously stated, the majority of evidence in reviews and meta-analyses of MBIs support the first assumption that MBIs result in improvements in mindfulness (e.g. Keng et al., 2011). However, it should also be noted that one review and meta-analysis pointed out that although collective evidence supported that MBIs result in significant changes in mindfulness, about half of the studies reviewed did not result in significant changes in mindfulness (Visted et al., 2015). Further, effect sizes were found to be non-significant when compared to many active control treatments including CBT, relaxation training and health education programs.

Lambert (2013a) observed that the identification of small and non-significant differences between active treatments was a common issue in RCTs. He proposed that the small differences could be due to either different, yet equally effective, mechanisms of change in each intervention or due to the high shared variance of common factors. Common factors have been estimated to be responsible for between 30-49% of change in clinical interventions (Cuijpers, van Straten, Andersson, & van Oppen, 2008; Lambert, 2013b).

At least one author has suggested that mindfulness itself is a common factor for all therapeutic change (Martin, 1997). However, Martin's conception of mindfulness is broader than definitions previously discussed and appears to be consistent with Brown et al.'s (2007) concept of 'integrative awareness'. This is described as "...an open explorative attention and awareness for gathering information, developing insight, and thereby facilitating wellbeing and adaption" (Brown et al., 2007, p. 217), which is perhaps a definition which encompasses all proposed mechanisms of mindfulness outline in Table 2.1. Consistent with Martin's argument, Brown et al. (2007) propose that integrative awareness is common to many psychotherapies including psychodynamic, humanistic, Gestalt, CBT, and motivational interviewing. Given the possibility that changes in mindfulness, and the mechanisms associated with mindfulness, are common to many therapies, consideration must also be given to the influence of other elements of treatment packages, such as group support, psycho-education and group discussions, as components responsible for change.

2.5.2 The contribution of types of mindfulness practice to change in MBIs.

There is some evidence to suggest that the various types of mindfulness practices found within MBIs contribute differentially to outcomes. For example, in a comparison between sitting meditation, body scan and mindful yoga, those in the sitting meditation group improved more in Non-judgement than the other two groups, while

the mindful yoga group improved more in psychological wellbeing than the other two groups and both sitting meditation and mindful yoga reduced more in difficulties with emotion regulation than the body scan group (Sauer-Zavala, Walsh, Eisenlohr-Moul, & Lykins, 2013).

2.5.3 The contribution of other MBI elements to change.

There is also some evidence to suggest that other elements of MBSR treatment packages, apart from mindfulness practices, contribute to positive outcomes. A meta-analysis of mindfulness trials found that MBSR treatment packages produced larger effect sizes in change in psychological variables than interventions that focussed only on mindfulness meditation (Sedlmeier et al., 2012). However, the pure mindfulness interventions produced larger effect sizes in change in mindfulness than in the MBSR studies. The authors suggested that elements of MBSR beyond mindfulness meditation were partly responsible for change in MBSR.

Although there have been no known quantitative component studies of MBSR and MBCT, a recent meta-analysis of qualitative studies examined how various components of MBCT contributed to therapeutic change. Five major themes were highlighted: i) taking control through understanding, awareness and acceptance; ii) the impact of the group; (iii) taking skills into everyday life; (iv) feelings towards the self; and (v) the role of expectations” (Cairns & Murray, 2013, p.347). This evidence highlights the possibility that the influence of MBIs on outcomes is not restricted to the effects of mindfulness.

Other studies have indicated that theme two, the impact of the group, does not influence outcomes in group-based MBIs. When comparing a 12 week online MBI with a group-based MBI, Wolever et al. (2012) found both interventions showed similar improvements in outcomes including perceived stress, mindfulness and sleep quality. Therefore, while there is some consistent evidence for the

influence of elements of MBSR and MBCT beyond mindfulness instruction and practice, it is not conclusive.

2.5.4 The contribution of mindfulness practice to outcomes.

Other aspects of MBI treatment packages identified as possible moderators of effects on outcomes include time in mindfulness practice – e.g. session-specific mindfulness practice and time spent in mindfulness practice between sessions. Outcomes of studies examining the effect of these elements are inconsistent. A review of the effects of formal mindfulness practice found nearly half of the studies failed to demonstrate a significant association between formal practice and outcomes (Vettese, Toneatto, Stea, Nguyen, & Wang, 2009) and other reviews failed to identify a significant relationship between practice or class contact and outcomes (Carmody & Baer, 2009; Eberth & Sedlmeier, 2012). However, a more recent study identified a relationship between formal practice, but not informal practice, and outcomes (Crane et al., 2014), while a RCT comparing MBCT and MBCT with enhanced focus on the application of mindfulness to daily life found that informal mindfulness practice frequency, rather than formal practice frequency, had a significant association with improvements in mindfulness, habit strength of depressive rumination and depression outcomes (Leung, 2015). Similarly, in an acceptance-based behaviour therapy (ABBT), informal, but not formal, practice was related to 6-12 month follow-up levels of worry, anxiety and quality of life for participants with generalised anxiety disorder (Morgan, Graham, Hayes-Skelton, Orsillo, & Roemer, 2014).

Eberth and Sedlmeier (2012) examined the relationship between mindfulness practice and outcomes and found that the relationships that did exist were not linear. For example some studies found no relationship between meditation practice and outcomes (e.g., Eberth & Sedlmeier, 2012; Vettese et al., 2009) and others found that the

relationship tended to increase for about one month of practice and then tended to decrease. They suggested the rapid change at the beginning of the interventions could be linked to the introduction of new concepts and world view (e.g. concepts such as autopilot and acceptance or experiential avoidance), which are both experienced and discussed in sessions. Conversely, Pradhan et al. (2007) found that meditation practice only begun to affect outcomes after a stable practice was established and Dobkin and Zhao (2011) concluded that more than eight weeks of practice may be required for mindfulness to impact longer term wellbeing. More research appears to be needed to ascertain which elements of mindfulness interventions are effective in producing outcomes.

2.6 Chapter Summary

This chapter defined the concept of mindfulness and examined correlational evidence for its association with wellbeing, as well as evidence and theory associated with the effect of mindfulness interventions on wellbeing. In line with the aims of this thesis, it was particularly concerned with theory and evidence related to the mechanisms which link mindfulness and MBIs to improved wellbeing and reduced psychological distress. Based on the review of three models of potential mechanisms of change, this chapter grouped potential mechanisms into four key areas: (i). Mindfulness-based mechanisms (including change of perspective facilitated by awareness); (ii) Internal process (including constructs related to internal regulation, psychological flexibility, exposure, insight and mind-body functioning); (iii) Valuing processes; and (iv). Behavioural regulation (self-management, behavioural flexibility, aspects of self-regulation and values-based behaviour). This chapter also reviewed theory and evidence for the link between mindfulness, values and behavioural regulation from the field of SDT. Finally, it outlined existing research on the utility of elements of mindfulness

treatment packages, concluding that there was some evidence for the role of non-practice elements of MBIs in facilitating outcomes, but evidence related to the role of the type and duration of mindfulness practice was inconsistent. The next chapter examines the definition of mindfulness and links between mindfulness and values-based action from an ACT perspective.

Chapter 3

Acceptance and Commitment Therapy: Linking Mindfulness and Values with Behaviour

Perception without conception is blind. Conception without perception is empty.

–Kant, Critique of Pure Reason, 1789

A number of the proposed mechanisms of change linking mindfulness to wellbeing discussed in Chapter 2 were related to meaning (values clarification and values-based action) and doing (adaptive, flexible values and goal-based behaviour). These concepts of mindfulness, values and values-based action are also central to ACT. This chapter provides a summary of the theoretical underpinnings of ACT and the roles of mindfulness and values-based action in ACT interventions. It examines mindfulness and values-based action as potential mechanisms of change in ACT interventions and provides a conceptual and theoretical framework for the relationship between mindfulness and values-based action.

3.1 Acceptance and Commitment Therapy (ACT)

ACT is a mindfulness and acceptance-based therapy, with a behavioural theoretical foundation, which employs mindfulness, individual values and behavioural activation processes as a means to improve psychological flexibility (e.g., S. C. Hayes et al., 2012). Psychological flexibility has been defined as “consciously contacting the present moment without needless defense, while persisting or changing behavior in the service of chosen values” (S. C. Hayes, Villatte, Levin, & Hildebrandt, 2011, p. 155).

The conceptualisation of mindfulness in ACT is complementary to perspectives discussed in Chapter 2, with a number of key differences. In ACT, mindfulness is applied to, or used in, daily life as a means to facilitate flexible responding to

experience in the service of a more values-consistent and meaningful life (e.g., Fletcher & Hayes, 2005; Wilson & Dufrene, 2009). Thus mindfulness is explicitly related to, and useful as a facilitator of, meaningful doing. This emphasis on the importance of the function of mindfulness based on context is directed and informed by the principles and science underpinning ACT – functional contextualism and relational frame theory (RFT; Barnes-Holmes, Hayes, & Dymond, 2001). In order to expand on mindfulness and values processes in ACT, a brief description of these underpinning theories is outlined below.

3.2 Functional Contextualism and Relational Frame Theory

Functional contextualism is a pragmatic philosophy of science which “views psychological events as ongoing actions of the whole organism interacting in and with historically and situationally defined contexts” (S. C. Hayes, Luoma, Bond, Masuda, & Lillis, 2006, p. 4). Functional contextualism also aims to develop science in line with its stated goals which are to predict and influence behaviour with precision, scope and depth (e.g., Biglan & Hayes, 1996; S. C. Hayes et al., 2012). Thus within ACT, mindfulness is developed as a means to influence flexible, values-based behaviour, rather than as an end in itself. Further, individual values are inextricably related to individual actions and these actions are defined as values-based according to the specific context in which they are enacted (e.g., S. C. Hayes, Villatte, et al., 2011; M. Villatte, Villatte, & Hayes, 2016). In other words, they are unique to individuals, their learning history and context of enactment.

RFT is a behavioural theory of human language and cognition based on empirical research (Barnes-Holmes et al., 2001; Dymond, May, Munnelly, & Hoon, 2010). The key principle of RFT is that humans acquire language and thought by learning to relate events mutually and in combination. This process of relating extends

to every type of verbal relation including that of opposition, difference, hierarchy, temporal, deictic, evaluative and comparative (Barnes-Holmes et al., 2001; Dymond et al., 2010; S. C. Hayes et al., 2012; Torneke, 2010). Because these relationships can be mutually derived, the function of any stimulus can be transformed or applied arbitrarily (Blackledge, 2003). For example, even though an Australian child learns that a \$1 coin “is larger than” a \$2 coin (in formal properties, i.e. size), they can also learn that a \$2 is larger than a \$1 in value (that is in symbolic properties), thus *is larger than* can be learned to be applied arbitrarily. This theory of language is important to the discussion of how mindfulness and values relate to wellbeing, as it posits that language plays a key role in the perpetuation of human suffering and mindfulness plays a key role in reducing suffering.

ACT theory is based on the assumption that human suffering or pain is normal and inevitable in all human experience (S. C. Hayes et al., 2012) and this view is underpinned by RFT principles. RFT connects much of human suffering, or psychopathology, to the human ability to relate stimuli or events arbitrarily to one another, based not on present stimuli, or experience, but social conventions or prior learning (Blackledge, 2003; S. C. Hayes, Barnes-Holmes, & Roche, 2001). For example, humans can not only be afraid of spiders when one is close by and could potentially bite, but can also become anxious at the mere thought of a spider. Therefore, this anxiety is based on a derived relation, for example, a past experience of another’s fear of a spider. Studies have found that any event can acquire an aversive function through association with another event (Dymond et al., 2010; Healy, Barnes-Holmes, & Smeets, 2000). While this human ability to derive relations is adaptive and puts humans at an evolutionary advantage in terms of verbal problem solving, it also serves as a major source of suffering through its creation of a complex inner verbal network of

arbitrarily related events and inflexible verbal rules (Barnes-Holmes et al., 2001; Fletcher et al., 2010; Snyder, Lambert, & Twohig, 2011). Entanglement with this inner complexity can result in a loss of touch with, and insensitivity to, direct knowledge of present experience and reality. This in turn strengthens the influence of the inner verbal world and the propensity for individuals to respond to thoughts as truths, rather than representation of reality. Mindfulness in ACT is conceptualised as processes or behaviours that facilitate disentanglement from inflexible verbal relations and increase direct contact, and therefore knowledge, of the world and experience (S. C. Hayes et al., 2012).

3.3 ACT as a Psychological Intervention

Informed by RFT and functional contextualism, ACT is an intervention that aims to improve psychological flexibility and values-based action through the development of six key processes (S. C. Hayes et al., 2012; M. Villatte et al., 2016). These processes are: (i) present moment awareness or a “focused, voluntary attending to what is present” (Hayes, Levin, Plumb-Villardaga, & Villatte, 2011, p. 6), (ii) acceptance (an acceptance, embracing or willingness to experience private events), (iii) cognitive defusion (recognising thoughts as temporary and viewing them objectively), and (iv) self-as-context (the experience of the self as an observer of experience); and valuing processes: (v) values clarification (clarifying or constructing personal values based on personal choice) and (vi) committed action (development of behaviour based on values). These processes are explained in more depth in Section 3.5.

Although various protocols have been published to guide therapists through the application of ACT skills for various presentations (Flaxman, Bond, & Livheim, 2013; Harris, 2009; Twohig, Meuret, Rosenfield, Hayes, & Craske, 2012), the set of

techniques used in ACT are flexible and guided by the application of the six processes and the goals of functional contextualism. As stated in Fletcher et al. (2010):

... all psychological processes, practices, and interventions that promote contact with the present moment and with the totality of experience rather than just the verbal dimensions of it, and acceptance rather than efforts to control the content or frequency of private experience, are seen as central to the ACT therapeutic model. (pp. 42-43)

Although formal mindfulness practices are often used in ACT as a means to develop mindfulness skills, the choice of techniques used by the therapist to develop mindfulness skills is determined by workability of the technique for the individual client. For example, mindfulness is developed in ACT by formal and informal mindfulness practices as practiced in MBSR, but also through perspective taking exercises and metaphors, the tracking of personal behaviour in and out of sessions (S. C. Hayes et al., 2012) and through the reinforcement of the flexible use of relational frames or perspective taking during therapeutic conversations (Villate, Villate, & Hayes, 2016).

3.4 Empirical Evidence for ACT Interventions

Since the publication of the first ACT manual in 1999 (S. C. Hayes, Strosahl, & Wilson, 1999), there have been over 140 published RCTs of ACT interventions (Maero, 2016) supporting the efficacy of ACT for a wide variety of issues. While distress and symptom reduction is not the primary aim or target of ACT, there is an acknowledgement in ACT that reductions of experiential avoidance and increases in values-based action are likely to result in symptom reduction in the longer term (e.g., Blackledge & Hayes, 2001). Further, as symptom-based measures have been required to compare the effects of ACT with more established treatments and advance ACT's

empirical status (Gaudiano, 2011), a considerable body of literature exists that measures the effect of ACT on distress and symptom reduction (e.g., Smout, Hayes, Atkins, Klausen, & Duguid, 2012).

Systematic reviews have found ACT to be effective in improving a variety of outcomes including depression, anxiety, obsessive-compulsive disorder (OCD), social anxiety, generalised anxiety disorder (Bluett, Homan, Morrison, Levin, & Twohig, 2014; Hacker, Stone, & Macbeth, 2016), binge eating (Godfrey, Gallo, & Afari, 2015), chronic pain (Veehof, Trompetter, Bohlmeijer, & Schreurs, 2016), substance abuse (Lee, An, Levin, & Twohig, 2015), psychotic symptoms, smoking, diabetes management, sport performance, stigma reduction, work places stress and weight control (Powers, Zum Vorde Sive Vording, & Emmelkamp, 2009; Ruiz, 2010).

A recent meta-analysis (A-Tjak et al., 2015), consisting of 39 RCTs targeting patients with a range of mental disorders or somatic health problems ($n = 1,821$), indicated ACT was more efficacious than control conditions (Hedge's $g = 0.57$), psychological placebo (Hedge's $g = 0.51$) and treatment as usual (TAU) (Hedge's $g = 0.64$). It also found ACT improved more than control conditions on secondary outcomes, quality of life and process measures (Hedge's $g = 0.30 - 0.56$). However, like evidence outlined earlier for MBIs in Section 2.2, ACT has not been found to be significantly more effective than other established treatments, including CBT (Hedge's $g = 0.32$). The latest meta-analysis of ACT trials, consisting of 46 RCTs focussing specifically on outcomes associated with anxiety and depression, found ACT demonstrated at least moderate effect sizes ($d = 0.45 - 0.95$) for pre-post effects, however, like other meta-analyses, it was not more efficacious than active comparison conditions (Hacker et al., 2016). Overall, the effect sizes from ACT interventions were comparable with those of MBIs targeting anxiety and stress from previously discussed meta-analyses (e.g. Khoury et al., 2015).

3.5 Mindfulness in ACT

Mindfulness has been defined in ACT as “the defused, accepting, open contact with the present moment and the private events it contains as a conscious human being experientially distinct from the content being noticed” (Fletcher and Hayes, 2005, p. 322). In ACT, mindfulness is conceptualised as a higher order factor comprised of four of the six processes required to develop psychological flexibility represented in the ACT hexaflex model (Hayes et al., 2006, p. 8). As illustrated in Figure 3.1, the six processes are grouped together under two higher order factors: mindfulness and acceptance-based processes: (i) present moment awareness, (ii) acceptance, (iii) cognitive defusion, and (iv) self-as-context; and valuing processes: (v) values clarification, and (vi) committed action (Fletcher & Hayes, 2005; S. C. Hayes et al., 2006). What follows is a summary of the four mindfulness-based processes in ACT and associations with similar constructs in the broader mindfulness literature.

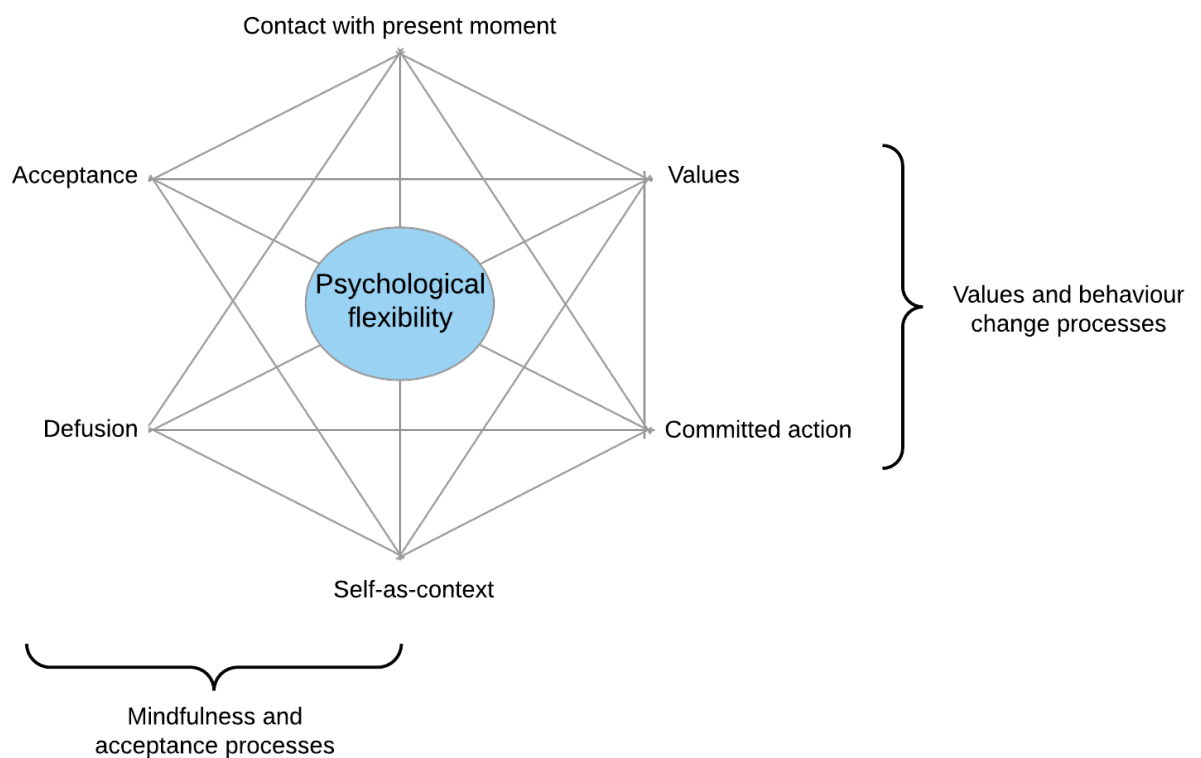


Figure 3.1. The ACT hexaflex model.

3.5.1 Present moment awareness.

Present moment awareness in ACT is the intentional attention to the present moment and involves the intentional shifting of attention to the here and now (Hayes, Levin, Plumb-Villardaga, & Villatte, 2011). This definition of mindfulness is consistent with Brown and Ryan's (2003) definition of mindfulness as "present-centred attention-awareness" (p. 824) or the first component of the dual-component definition of mindfulness in the Bishop et al. (2004) – self-regulated attention. In ACT, present moment awareness is developed with a variety of techniques, including formal and informal mindfulness practices and the encouragement of observance of ongoing experience in and out of therapy (e.g., M. Villatte et al., 2016).

The MAAS and the Observing and Acting with Awareness scales of the FFMQ are among the validated mindfulness scales that aim to measure present moment awareness and have been used for this purpose in ACT-based studies. For example, within-group change in Observing, but not Acting with Awareness, was identified in an ACT interventions for improving trainee clinical psychologist skills (Pakenham, 2015). Observing and Acting with Awareness (along with Non-reactivity) were found to change more in an ACT group than a control group in an intervention aimed at improving initiative eating behaviour (Sairanen et al., 2017). The MAAS showed significant within-group gains in an ACT intervention for psychiatric patients (Pinto et al., 2017) and improved significantly more than a control group in an ACT intervention for generalised anxiety disorder (Roemer, Orsillo, & Salters-Pedneault, 2005).

3.5.2 Self-as-context.

In ACT, the "observer self" describes "... the experience of self as an observer of one's experiences, rather than becoming identified with them" (Fletcher et al., 2010, p. 43). It is also described as the aspect of self that is always present and remains

unchanged, despite changing experience. In ACT, the process of evoking this experience is called self-as-context and named as such to differentiate it from self-as-content, which is the experience of the self through verbal descriptors or ongoing evaluation (S. C. Hayes et al., 2001). From an RFT perspective, self-as-context can be explained in terms of the basic deictic relational frames of I (as opposed to you), here (as opposed to there), and now (as opposed to then). Exercises and metaphors in ACT interventions which help clients contact self-as-context aim to facilitate a shift from identification with a conceptualised self (I am a depressed) to becoming an observer of experience (S. C. Hayes et al., 2012).

Self-as-context, or the experience of self as an observer, is very difficult to measure. Few attempts have been made to operationalise or measure self-as-context outside of the use measures of observing or noticing the present moment (e.g. Swain, Hancock, Hainsworth, & Bowman, 2014). However, the construct has some overlap with the construct to ‘decentering’, as described in Section 2.4.2, which is often measured with the Experiences Questionnaire (Fresco, Moore, & Dulmen, 2007). In a study comparing acceptance-based behaviour therapy (ABBT) and applied relaxation (AR) for individuals with GAD, the ABBT group improved more in decentering than AR and the improvement was associated with a decrease in worry (Hayes-Skelton, Calloway, Roemer, & Orsillo, 2015).

3.5.3 Acceptance.

Acceptance in ACT is defined as “a moment by moment process of actively embracing the private events evoked in the moment without unnecessary attempts to change their frequency or form” (Fletcher & Hayes, 2005). Attempts to avoid or control internal experience or struggle with experience are antagonistic to acceptance (Fletcher et al., 2010). This is similar to the “how” component of mindfulness in the Bishop et

al. (2004) dual-component definition – attention characterised by an orientation or attitude of openness, acceptance and non-judgment. In ACT, present moment awareness and acceptance unite to facilitate a fuller contact with the present moment, which can be particularly difficult when the present moment is difficult or aversive (e.g. in the presence of rumination, anxiety or negative affect). Thus, awareness and acceptance together provide an antidote to experiential avoidance, or the attempts to avoid or escape from inner experience, which have been consistently linked with psychological distress (Kashdan, Barrios, Forsyth, Steger, et al., 2006). Due to its roots in functional contextualism, the function of acceptance within a particular context is also stressed in ACT. Thus, acceptance is activated when it is helpful or functional which is usually when attempts to control or avoid experience are a barrier to moving in valued directions (Fletcher et al., 2010).

The construct of acceptance is most frequently measured in ACT-based research with the Acceptance and Action Questionnaire - II (AAQ-II: Bond et al., 2011) or its earlier longer version, the AAQ (S. C. Hayes et al., 2004). The AAQ is widely accepted as both a measure of ‘psychological flexibility’ and ‘experiential avoidance’ (non-acceptance or willingness to experience internal experiences) (e.g., Fledderus, Bohlmeijer, & Pieterse, 2010; S C Hayes, Wilson, Gifford, Follette, & Strosahl, 1996; Wolgast, 2014). The AAQ and AAQ-II have been found to be a consistent mediator of the effects of ACT interventions on a range of outcomes in RCTs (e.g., Bluett et al., 2014; Ruiz, 2010).

However, a few studies have identified acceptance measures that are more specifically related to moment-by-moment acceptance. For example, the Non-judging (acceptance without judgment) and Non-reactivity to Inner Experiences scales of the FFMQ have been found to change significantly over time in a non-controlled trial of ACT for panic disorder (Twohig et al., 2012). In an ACT RCT to improve adaptive

eating behaviour, Non-reactivity, but not Non-judging, changed significantly compared to the control group (Sairanen et al., 2017). A study of session-by-session change in CT and ACT interventions found that affective and cognitive acceptance was positively associated with reductions in symptom intensity and goal progress in ACT compared with CT (Forman et al., 2012).

3.5.4 Cognitive defusion.

Cognitive fusion refers to the “domination of verbal events over other sources of behavioural regulation” (Fletcher et al., 2010, p.56) or when the “I” is “fused with” or “caught up with” the literal content of one’s thoughts. In contrast, cognitive defusion involves the process of recognising internal experiences as temporary and viewing them more objectively (e.g., Blackledge, 2007). This is a similar concept to decentering and re-perceiving in that all three concepts concern the cultivation of an objective stance toward experience. Defusion is a key concept in ACT because of the acknowledged complexity and influence of human relational language-based networks and the propensity of language to act as “a filter between us and our internal and external experiences” (M. Villatte, Villatte, & Hayes, 2016, p. 122). Thus, when fused with language, or the content of thoughts, awareness of experience is reduced (S. Hayes & Shenk, 2004).

Defusion techniques in ACT, such as metaphors and exercises, aim to transform the function of unhelpful thoughts (Blackledge, 2007; Masuda, Hayes, Sackett, & Twohig, 2004). For example, a common exercise is to ask a fused client to rapidly repeat a word until it loses its meaning (Masuda et al., 2004) or precede an unhelpful thought with “I notice I’m having the thought that ...” to help them recognising the thought and to view it more objectively. Other metaphors and exercises are aimed at developing a more accepting perspective on thoughts (e.g. “passengers on the bus”) or at helping clients to view thoughts as impermanent (e.g. “leaves on a stream”) (Harris,

2009; S. C. Hayes et al., 2012).

Empirical evidence for the effect of ACT interventions on increasing cognitive defusion is relatively strong (e.g. Hayes et al., 2006). For example, in an RCT of ACT versus progressive muscle relaxation (PMR) for OCD, cognitive fusion was observed to reduce significantly in the ACT group compared with the PMR group (Twohig et al., 2010). Significant pre-post changes in cognitive defusion were identified in a non-controlled study to improve mental health outcomes in a psychiatric population (Pinto et al., 2017). Pakenham (2015) found that ‘thought suppression’, an indirect measure of cognitive fusion, reduced significantly in an ACT intervention for clinical psychology students. Further, reductions in thought suppression were significantly correlated with reductions in stress and improvements counselling self-efficacy, client-therapist alliance and self compassion.

3.6 Evidence for Mindfulness Processes as Mechanisms of Change in ACT

An estimated half of the all published RCTs of ACT include measures of ACT-based processes (individual or combined) (S. C. Hayes et al., 2006; S. C. Hayes, Villatte, et al., 2011). Evidence from RCTs support change in all six ACT processes (individually or combined) over ACT interventions, if “decentering” is acknowledged as a measure of self-as-context (Section 3.5.2) or measures of psychological flexibility are acknowledged to include the process of self-as-context. However, most mediation studies based on ACT interventions examine change in mindfulness and values processes combined as the single construct of psychological flexibility, rather than measuring the influence of processes individually (see Ruiz, 2010 for a summary).

As outlined in Section 3.5.3, psychological inflexibility is most often measured with the AAQ-II (Bond et al., 2011) or the AAQ (S. C. Hayes et al., 2004) which include items pertaining to mindfulness, acceptance and values-based action.

Psychological inflexibility is also been measured with the Psychological Inflexibility in

Pain Scale (PIPS; Wicksell, Ahlqvist, Bring, Melin, & Olsson, 2008) and versions of the AAQ for specific populations or presentations. These include the Acceptance and Action in Diabetes Questionnaire (AADQ; Gregg, Callaghan, Hayes, & Glenn-Lawson, 2007) and the AAQ for Weight (AAQ-W; Lillis & Hayes, 2008) and the Chronic Pain Acceptance Questionnaire (CPAQ; McCracken, Vowles, & Eccleston, 2004)

In a review of ACT interventions, Ruiz (2010) identifies 21 studies that include ACT processes as mediators of the effects of ACT interventions on outcomes and 10 of these studies identify the AAQ as a mediator. More recently, the AAQ has been found to mediate the relationship between ACT interventions and outcomes such as psychological health for Japanese students (Muto, Hayes, & Jeffcoat, 2011), smoking cessation outcomes (Gifford et al., 2011), pain management in fibromyalgia sufferers (Wicksell et al., 2013) and anxiety symptoms (S. A. Hayes, Orsillo, & Roemer, 2010). The AAQ-II has been found to mediate the effect of ACT on symptoms of anxiety disorders (e.g., Bluett et al., 2014), mental health in the workplace (e.g., Ciarrochi, Bilich, & Godsell, 2010; Flaxman & Bond, 2010b), depressive symptoms (e.g., Bohlmeijer, Fledderus, Rokx, & Pieterse, 2011) and psychological distress in a self-help intervention (Fledderus, Bohlmeijer, Fox, Schreurs, & Spinhoven, 2013).

Psychological flexibility measured by the PIPS has been found to mediate the relationship between ACT interventions and pain outcomes (Wicksell et al., 2013) and mediate effects of ACT on pain interference, in comparison to applied relaxation (Kemani, Hesser, Olsson, Lekander, & Wicksell, 2016). The AAQ-W has been identified as a mediator of ACT intervention on weight-related and quality of life outcomes (Weineland & Hayes, 2012), pain acceptance (CPAQ) was identified as a mediator of the effect of ACT on physical functioning, and the AAQD identified as a mediator of ACT on diabetes management (Gregg et al., 2007).

3.6.1 Mindfulness as a process of change in ACT interventions.

Studies identifying specific mindfulness processes as mediators of change in ACT interventions are limited. However, this section outlines some examples. Mindfulness, measured with a total score of all FFMQ factors, was identified as a mediator of ACT on the reduction of symptoms of borderline personality disorder, compared with TAU (Morton, Snowden, Gopold, & Guymmer, 2012). Non-judging was identified as a mediator of the effectiveness of an ACT bibliotherapy intervention on improving the psychological health of Japanese college students living abroad (Muto et al., 2011). A RCT comparing CT and ACT found that changes in Acting with Awareness and Acceptance from the KIMS scale, along with the AAQ, were found to mediate the effects of ACT on anxiety, depression and quality of life, while Observing and Describing mediated outcomes in the CT group (Forman, Herbert, Yeomans, & Geller, 2007). This result suggested different elements of mindfulness facilitate outcomes in different interventions.

In a RCT to identify mediators of change in adaptive eating behaviour, mindfulness, as measured by the Observe, Acting with Awareness, and Non-reactivity scales of the FFMQ changed compared to the control, but the Describe and Non-judge scales did not (Sairanen et al., 2017). Further weight-related psychological flexibility was found to mediate change in outcomes, but mindfulness, as measured by all individual scales of the FFMQ, did not. This suggests that other elements of psychological flexibility, apart from mindfulness were responsible for change.

Cognitive defusion as a mediator of change in ACT interventions

Perhaps the most common identified mediator of change in ACT interventions, apart from psychological flexibility, is cognitive defusion. For example, defusion has been identified as a mediator of the effects of an ACT intervention, compared with a CT intervention, on depression (Zettle, Rains, & Hayes, 2011). Cognitive defusion was also

identified as a mediator of change in the relationship between ACT and seizure frequency, quality of life in epilepsy sufferers (Lundgren, Dahl, & Hayes, 2008) and in the effect of ACT on stigmatizing attitudes (S. Hayes et al., 2004).

However, there is also some evidence to suggest defusion is not exclusive to ACT. In a RCT comparing ACT and CBT for mixed anxiety disorders, defusion mediated the effects of both ACT and CBT interventions on quality of life and depression (Arch, Wolitzky-Taylor, Eifert, & Craske, 2012). Further in a session-by-session analysis of mediators in CBT and ACT for mixed anxiety disorders, cognitive defusion was found to mediate post-treatment worry and quality of life and behavioural avoidance in both CBT and ACT groups (Forman et al., 2012).

No RCTs were found which measured self-as-context or present moment awareness as unique mediators of change in ACT interventions.

3.6.2 Laboratory-based studies of ACT processes.

A meta-analysis of controlled laboratory-based studies examining the effects of ACT processes as individual components of change identified all ACT processes (with the exception of self-as-context) as distinct components responsible for change (Levin, Hildebrandt, Lillis, & Hayes, 2012). Levin et al. (2012) found medium effect sizes for interventions based on defusion techniques (Hedge's $g = 0.74$), and small (yet significant) effect sizes for present moment awareness (Hedge's $g = 0.22$) and mixed mindfulness components (including present moment awareness, acceptance, defusion and self-as-context) (Hedge's $g = 0.27$). They found only a small non-significant effect size for acceptance alone (Hedge's $g = 0.32$), although the effect size for acceptance when it was a targeted outcome was large (Hedge's $g = 0.81$). No studies were identified examining self-as-context alone. Together this evidence indicates that defusion and acceptance are likely to be the strongest mindfulness-based mediators of change in psychological outcomes in ACT interventions.

3.7 Valuing Processes in ACT

From an ACT perspective, the development of mindfulness and its application to daily life is important primarily due to its function in facilitating behaviour in line with values, or values-based action (e.g., S. C. Hayes et al., 1999). The remaining two processes of the hexaflex model, values and committed action (or the meaning and doing of mindfulness in ACT), are now explored and evidence for their roles in mediating the effects of ACT interventions is outlined.

3.7.1 Defining values.

The concept of values is by no means unique to ACT. As noted in Sections 2.4.5 and 2.4.6, mindfulness has been linked to values clarity and values-based behaviour in the broader mindfulness literature and self determination theory. The study of human values also has a long research pedigree in social psychology. Research in this area has largely focused on the classification of value schemas and identifying how universal values relate to human behaviour (for reviews see: Braithwaite & Scott, 1991; Eccles & Wigfield, 2002), as well the relationship between living in accordance with values and positive affect (e.g., Feather, 1988).

In the social psychology literature, values have been defined as guiding principles that give meaning to, motivate and guide behaviour (e.g., Rokeach, 1973; Schwartz & Bilsky, 1987). However, the literature that is perhaps most closely linked with ACT-based interventions is that concerned with the association between values affirmation and positive outcomes. For example, studies from this literature links values affirmation exercises to reduced defensiveness in response to threat (Crocker, Niiya, & Mischkowski, 2008) and reduced insecurity and improved social behaviour in insecure individuals (Stinson, Logel, Shepherd, & Zanna, 2011). The literature is discussed further in Section 3.11.

The ACT definition of values is broadly consistent with definitions from social

psychology as it links values to meaning, motivation and behaviour. In lay terms, values in ACT has been defined as “our heart’s deepest desires; how we want to be, what we want to stand for and how we want to relate to the world around us” (Harris, 2007, p. 198). This definition emphasises the focus in ACT on construction, or identification, of idiosyncratic or personal values (e.g., Wilson & Dufrene, 2009), rather than the identification or alignment with common or shared values outlined in social psychology (e.g. Schwartz, 2012). Ciarrochi, Kashdan and Harris (2013) provided a short definition of values as “desired qualities of ongoing action” (p. 12), emphasising the inextricable link between values and behaviour. To capture the definition of values from an RFT perspective, M. Villatte et al. (2016) defined values as constructed or discovered “abstract symbolic purposes of action” (p. 209), emphasising the relationship between values and language.

One of the original definitions of values in ACT, encapsulating both RFT and behavioural principles was: “freely chosen, verbally constructed consequences of ongoing, dynamic, evolving patterns of activity, which establish predominant reinforcers for the activity that are intrinsic in engagement in the valued behavioral pattern itself” (Wilson & Dufrene, 2009, p.66). This definition emphasises that values are constructed by the individual and therefore can both change and evolve over time, and importantly are not the product of coercion or pliance, defined as “rules to avoid social criticism or achieve social approval” (S. C. Hayes, Levin, et al., 2011, p. 7). Actions performed in line with values provide meaning, reinforcement and vitality due to the symbolic connection of the action with the value, rather than from external reinforcement or reward. For example, if compassion is a core value for an individual, just acting compassionately in a variety of contexts provides its own reward, either immediately or in the longer term, through the behaviour and its symbolic link to meaning, irrespective of external acknowledgement (e.g., Dahl et al., 2009). Acting

compassionately purely for the reward of being admired by others would not be considered a values-based action. This is consistent with the SDT concept of identified, rather than extrinsic, motivation (Koestner & Losier, 2002) outlined in Chapter 2.

As values are patterns of activity and qualities of purposeful action, they are neither contingent on goals nor can they be completed like goals, but are actualised from moment to moment (e.g., S. C. Hayes et al., 2012). As they are neither linked to one specific goal, and reinforcement from values can include a variety of actions, values provide an inexhaustible supply of possible reinforcing behaviours or actions (e.g., M. Villate, Villatte, et al., 2016).

3.8 Values in ACT Interventions

In ACT, specific exercises to improve values clarification or construction include values card sorts (identifying important values from a list of values), writing, or talking, about important values, and perspective taking exercises evoking values (e.g. what you would like to see written on your tombstone or “who would you like to be in this particular context?”) (e.g., Harris, 2009; Sandoz & Hebert, 2015). Values are also identified and reinforced by ACT clinicians in clinical conversations in which clinicians encourage clients to remember the experience of values-based action in the past, set goals for values-based action in the future and mindfully connect with values in real-time, as the values-based actions are being executed (e.g., M. Villate, Villatte, et al., 2016).

A recent study evaluated four methods for evoking and working with values in ACT interventions (Sandoz & Hebert, 2015). Participants ranked writing about values and discussing word selections from the writing sample as the most meaningful, evocative and reminiscent of something important, with this method outranking other methods such as selection of words from a values lexicon, exposure to a list of valued domains followed by word generation, and picture selection representing common value

domains. Authors concluded that this task provided the most opportunity for participants to make connections, or elaborate relations, between values and specific events or actions. Therefore was most evocative or reinforcing of past values-based actions.

3.9 Values-based Action in ACT

The remaining process of the hexaflex model is committed action, often called values-based action or valued living. Although action is implied in earlier ACT definitions of values (e.g. abstract symbolic purposes of action), values-based action has been defined as the real-time commitment of translating values into actions (S. C. Hayes et al., 2012). In making the pragmatic link between values and values-based action, M. Villatte et al. (2016), described values as both overarching goals for behaviour and qualities of behaviour, or more simply put, the “what” and “how” of meaningful behaviour. Overarching goals describe what is important from a broad, on-going perspective. Qualities of behaviour refer to the quality with which, or how, actions in line with these overarching goals are enacted. Thus values-based action refers to overt behaviour that flows from, or is based on these values. For example, an overarching goal might be to be a good (meaning attentive and playful) mother and values-based action in line with this value might be taking the child for an outing and bringing a quality of attention and playfulness to this activity.

Behaviour linked with values is important because often purposeful, or goal-driven behaviour (e.g. going to the gym or to class) that is also in line with values is not necessarily immediately reinforced. That is it does not always provide immediate reward for the action (e.g. the class might be tiring or exercise difficult or painful). However, if it is consciously linked to values (e.g. being fit so I can apply energy to life or I can keep up with my kids), the psychological barriers to these actions (tiredness, thoughts of giving up) are easier to overcome. Accordingly, within an ACT

intervention, values identification, clarification or construction, are key foci of therapy because values are “intrinsic and inexhaustible sources of satisfaction” (M. Villatte et al., 2016, p. 213) and also act as flexible and contextual guides to behavioural change. Clients are encouraged either to improve the frequency of values-based behaviours (e.g. doing more compassionate acts in daily life), breadth of values-based behaviours (e.g. being compassionate in more domains or situations), bring the quality of their values to an existing behaviour (e.g. work or other duties) and also be mindful of these connections during the action (e.g., M. Villatte et al., 2016).

Values-based action in ACT is also proposed as an alternative to mindless or avoidant behaviour. The connection between mindfulness, values-based action and behaviour towards or away from values is formulated in the choice point model (Ciarrochi, Bailey, & Harris, 2014) used in the RCT in Study 2 (see Figure 6.2). For example, connecting with a value of learning or contribution as a means to motivate writing of a thesis, despite the presence of unhelpful thoughts of “imposter syndrome” and the accompanying aversive affect, is an example of how avoidant behaviour can be overcome through connection with values.

3.10 Measuring Values Processes

Instruments to measure levels of values processes in the ACT literature have been primarily self report and most have focused on measuring values importance, success in living values and values-based action, rather values clarity. Although attempts were made to identify a “values clarity” factor in the validation of the Valuing Questionnaire (VQ: Smout et al., 2014), items did not load reliably on to a single factor. Values clarity is generally studied as an intervention, rather than a dependent variable, from within and outside the ACT literature (e.g., Czech, Katz, & Orsillo, 2011; Vowles, Wetherell, & Sorrell, 2009).

The most popular measure of values-based action for research to date has been

the Valued Living Questionnaire (VLQ; Wilson, Sandoz, Kitchens, & Roberts, 2010). The VLQ asks participants to rate the importance of values in various life domains (e.g. work, family, work, health, intimate relationships) and then rate their success in living their values in each of the domains. These two scores are used to create a composite score for each domain to measure congruence in valued living. This score is based on the product of importance and success in each domain in the VLQ, and in similar measure, the Chronic Pain Values Inventory (CPVI; McCracken & Yang, 2006), the composite score is based on the difference between importance and success in each domain.

The VLQ and the CPVI's two primary indices – importance and success - have exhibited adequate to good reliability (e.g., McCracken & Velleman, 2010; McCracken & Yang, 2006; Wilson, Sandoz, Flynn, Slater, & DuFrene, 2010). However, psychometric issues with the composite score (see: Christie, 2012; Smout, Davies, Burns, & Christie, 2014, for a review) have resulted in many researchers using just the 'success' score, which reduces the scale to a single item measure of values success. As such, the reliability of the VLQ as a measure of values-based action has been questioned by some (Christie, 2012; Smout et al., 2014).

Other measures of values-based action involve both writing about values in various domains, and therefore clarifying or affirming values, while at the same time rating success of living values. These include The Bull Eye Values Survey (BEVS; Lundgren, Luoma, Dahl, Strosahl, & Melin, 2012) and the Personal Values Questionnaire II (PVQ-II; Ciarrochi, Blackledge, & Heaven, 2006). Both the BEVS and the PVQ-II ask users to write about their values in particular domains (e.g. relationships, work, fun or self care). The BEVS then asks users to rate their current level of success in living the values by placing a mark at a relevant distance from the "bull's-eye" in a target image consisting of seven concentric circles. The PVQ requires

users to rate their value on importance, success in living, commitment to living the value and the extent the individual would like to make changes.

The Valuing Questionnaire (VQ: Smout et al., 2014) was developed as a brief measure of values-based action that was not specific to particular life domain and did not require previous knowledge of the definition or concept of values. The 10-item VQ measures the extent of values-based action (Values-progress) and obstruction to values based action (Values-obstruction) in the past two weeks by rating items such as “I made progress in areas of life I care most about” or “difficult thoughts, feelings or memories got in the way of what I really wanted to do” on a seven point scale.

3.11 Empirical Evidence for Values Affirmation Interventions

The link between values articulation, clarification or affirmation is well documented in and outside of the ACT literature. Short-term values affirmation interventions, such as writing about important values, have been found to predict positive outcomes including long-term academic achievement and perceptions of academic adequacy (G. L. Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009), lower neuroendocrine and psychological responses to a stressful activity (Creswell et al., 2005), increased pain tolerance and lower pain believability (Páez-Blarrina et al., 2008) and reduced defensiveness (Crocker et al., 2008). Further, just imagining that pain was in the service of a core value has been found to increase pain tolerance over and above increases attributed to mindfulness strategies (Branstetter-Rost, Cushing, & Douleh, 2009).

Although values clarification was linked to positive affect and insight in their study, Katz et al. (2013) also found evidence that the connection between values articulation and anxiety was moderated by levels of psychological flexibility. This may speak to the experience of clinicians who have noted values clarification exercises to be painful in the short-term to clients whose current behaviour is incongruent with values

(Wilson & Murrell, 2004b). This is consistent with one study that found that experience of pain discomfort was reduced in a laboratory experiment by framing the discomfort as something that can be present while pursuing values-based action (transforming the avoidance function of pain) compared to something that had to be reduced before pursuing values-based action (Páez-Blarrina et al., 2008). Therefore, evidence suggests the influence of values clarification exercises may be moderated by other processes of the hexaflex model, including the extent an individual is engaged in value based action.

This evidence supports the practice in ACT of making values explicit in interventions and the role of values-based action as an intentional process guiding behaviour (e.g., Dahl et al., 2009). It also supports the SDT perspective that individuals move along the continuum from extrinsic to intrinsic motivation and behaviour by connecting with values and being able to “synthesise the meaning with others parts of their psychic makeup” (Ryan and Deci, 2000, p. 20). This is in contrast to, although not mutually exclusive from, the perspective outlined in the Chapter 2 in which values-based action flows from mindfulness and mindfulness practice as an implicit process (a process that is indirect, automatic, intuitive or unconscious).

3.12 Empirical Evidence for Values-based Action

3.12.1 Correlational evidence.

Values-based action has been associated with lower psychological distress (Ciarrochi, Fisher, & Lane, 2010; Wilson, Sandoz, Kitchens, et al., 2010), depression (Plumb et al., 2009), OCD symptoms (Wetterneck, Lee, Smith, & Hart, 2013), experiential avoidance, distress about emotions, anxiety severity (Michelson, Lee, Orsillo, & Roemer, 2011), burnout among addiction counsellors (Villardaga et al., 2011), pain intensity and disability and pain-related anxiety (McCracken & Yang, 2006; Vowles & McCracken, 2008) and greater emotional, social and physical functioning, vitality and general health (Vowles & McCracken, 2008), quality of life (Michelson et

al., 2011), workplace accomplishment (Vilardaga et al., 2011), satisfaction with life and positive affect (Ferssizidis et al., 2010; Smout, Davies, Burns, & Christie, 2014; Veage et al., 2014) and self compassion, self-efficacy and work-related stress (Pakenham, 2015).

3.12.2 Change in values-based action in ACT interventions.

A number of studies have measured change in values-based action over ACT interventions. For example, a study examining the effects of an ACT intervention on clinical psychology trainees found that the intervention improved within-group values-based action, as measured by the composite VLQ score (Pakenham, 2015). Valued living was found to significantly correlate with counselling self-efficacy and work related stress after, but not prior to, the intervention, indicating that the intervention improved the association. In another study, the effectiveness of an ACT intervention for a trans-diagnostic psychiatric population found the intervention resulted in changes in valued living (measured with VLQ composite), along with cognitive defusion, psychological flexibility and mindfulness (Pinto et al., 2017). In another ACT intervention to improve wellbeing and outcomes following bariatric surgery for obesity, values accomplishment, as measured with the BEVS, improved significantly compared to a control group (Weineland & Hayes, 2012). However, in an ACT vs CT intervention for anxiety and depression, goal progress and committed action changed over time for both treatments, but change did not differ between the two interventions (Forman et al., 2007). This result indicates that it may not be the values component of ACT that is solely responsible for change in ACT interventions.

3.12.3 Values-based action as a mediator in ACT interventions.

Despite the evidence for change in values-based action in ACT interventions and the centrality of values-based action to ACT, few studies have isolated values-based action as a mediator of change in ACT interventions. In an evaluation of mediators of

change in an ACT epilepsy treatment intervention, changes in values attainment and persistence in valued action in the face of barriers (measured with BEVS) were found to mediate effect of the intervention on seizures, quality of life and personal well-being (Lundgren et al., 2008). In another study, values-based action, as measured by the PVQ, was found to mediate the effect of an ACT bibliotherapy-based intervention on general health outcomes, compared with a waitlist control (Muto et al., 2011). Values-based action (measured with the VLQ) was found to mediate within-group change in anxiety symptoms for individuals diagnosed with generalised anxiety disorder in a non-controlled ABBT intervention (S. A. Hayes et al., 2010).

Although not a measure specifically of values, activity engagement, along with symptom acceptance, were found to mediate the relationship between ACT intervention and outcomes for tinnitus (compared with CBT) (Hesser, Westin, & Andersson, 2014). However, in another RCT comparing ACT and CBT for anxious adolescents, valued living (measured with the VLQ) did not mediate the relationship between interventions and anxiety symptoms, in fact no significant within- or between-group differences were found in the valued living in either group (Swain et al., 2014).

As previously stated, the majority of mediation studies in ACT interventions have measured change and mediation effects with the AAQ-II which contains items related to both values-based action and mindfulness processes. The AAQ-II has been found to correlate with the most popular measures of values-based action, however, not so highly that the construct is non-discriminate from values-based action (Smout et al., 2014). For example, the AAQ-II and the VLQ correlated at $r = .63, p < .001$ (Guadagno, 2012), the AAQ-II and a version of the PVQ, the Work Values Questionnaire, correlated at $r = .27, p < .010$ (Vilardaga et al., 2011), while the AAQ-II and the two subscales of the Valuing Questionnaire (VQ: Smout et al., 2014) correlated at $r = .40, p < .001$ (Values Progress) and at $r = .65, p < .001$ (Values Obstruction). This latter result

suggests that the AAQ-II is more closely related to Values Obstruction, or the disruption of values-based action due to psychological barriers (Smout et al., 2014), than Values Progress (behaviour in line with values).

A small body of evidence has examined the effects of targeting values components of ACT protocols in community and laboratory settings. For example, direct care staff of clients with disabilities participating in values-focused workshops improved in engagement with clients compared to baseline levels (Castro, Rehfeldt, & Root, 2016). The previously mentioned meta-analysis of laboratory-based studies (Levin et al., 2012) found medium effect sizes for values components (Hedge's $g = 0.61$). This effect size was smaller than the effect size for defusion (Hedge's $g = 0.74$), but larger than the effect size for present moment awareness, acceptance and mindfulness combinations (Hedge's $g = 0.22 - 0.32$).

3.13 Component Study of ACT Processes

While evidence previously discussed supports that both mindfulness and values components of ACT facilitate improved wellbeing and reduced distress, a study that compared the mindfulness and values processes of ACT found some differences in the unique efficacy of these processes. J. L. Villatte et al. (2015) compared an ACT treatment targeting defusion and acceptance components (ACT-Open) with one targeting values-based action (ACT-Engaged). Both protocols included awareness and non-reactivity components. Both groups improved in symptom reduction, quality of life, values-based action, awareness and non-reactivity compared with the control group, but only the ACT-Open group improved more in defusion and acceptance. ACT-Engaged improved more in quality of life, valued action and acting with awareness than ACT-Open, and ACT-Open improved more in symptom reduction, acceptance and non-reactivity. Therefore overall, the valuing processes of an ACT intervention were found to be more efficacious for improving positive outcomes than

mindfulness processes, while the mindfulness processes were more effective in reducing symptoms than values processes. Another key finding from this study was that values-based action improved in ACT-Open, even though a values focus was not included in the intervention. This result supports previous evidence that improvements in mindfulness flow-on naturally to improvements in values-based action, even when values are not targeted in the intervention.

3.14 Chapter Summary

This chapter defined mindfulness and values-based action from an ACT perspective, drawing on functional contextualism and RFT. It outlined theory and evidence supporting the influence of ACT interventions on improving wellbeing and reducing distress, through both mindfulness and values processes. It also highlighted the central role of values clarification exercises in improving wellbeing and evidence that other processes, for example, values-based action, may moderate the influence of values clarification exercises. It also outlined some evidence that values components of ACT may be better at improving wellbeing, while mindfulness components of ACT may be better at reducing symptoms. The next chapter summarises evidence for the relationship between mindfulness and values-based action with a particular focus on mediation studies examining the link between mindfulness or mindfulness interventions and wellbeing through values-based action.

Chapter 4

Theoretical and Empirical Connections between Mindfulness and Values-based Action

As outlined in Chapter 2, values clarity and change in values and goal-based behaviour are theorised to be among the variables that mediate the effects of MBIs on psychological well-being. However, these relationships have received little empirical attention. Chapter 3 outlined the relationship between mindfulness, values and behavioural change from an ACT perspective, elucidating a more central and explicit focus on the connection between mindfulness and values-based action. This chapter outlines further connections between mindfulness, values-based action and wellbeing from the perspectives of ACT, other MBIs, SDT and other therapeutic approaches. It also introduces the first empirical study, which examines the role of values-based action as a mediator between trait mindfulness and wellbeing.

4.1 Theoretical Links Between Mindfulness and Valuing

4.1.1 Theoretical foundations in Buddhism.

The interconnection between mindfulness and values-based action as a means to improve wellbeing and reduce suffering in ACT interventions has some parallels to the concept of mindfulness and action in other religious and contemplative traditions. For example, in Buddhism, mindfulness is cultivated within the context of seven other practices that comprise the Eightfold Path (Williams & Tribe, 2000). The practices of the Eightfold Path are right speech, action, livelihood, effort (in cultivating wholesome mental states), concentration (meditative absorption), mindfulness, thought and view (insight). “Right” can be interpreted as perfect, fitting or appropriate based on other Buddhist teachings (Williams & Tribe, 2000). Although there are numerous differences between the Buddhist conception of mindfulness and overt behaviour and that of ACT,

both the Eightfold Path and personal values in ACT provide guidance on *how* to live mindfully in daily life and explicitly link mindfulness with meaning and doing.

4.1.2 Theoretical links in client-centred therapy.

ACT is by no means the first therapy to make the explicit connection between mindfulness, values and behavioural change. A key foundation of client-centred therapy (later person-centred therapy) was to create an atmosphere to facilitate increased awareness and acceptance of experience and values-based behaviour (Rogers, 1961). Rogers (1964) contends that one's degree of trust in experience, or openness to experience (an aspect of mindfulness), is highly influential in facilitating values-based behaviour. Openness to experience facilitates the ability to adjust behaviour based on feedback from environment, which results in the growth of behaviour congruent with values. Consistent with ACT, client-centred therapy regards values as self-directed, rather than approval seeking, and links incongruence between stated values (called conceived values) and values-based behaviour (called operative values) as the source of much of human suffering (Rogers, 1964).

4.1.3 Theoretical links Between Mindfulness and Valuing Processes

The specific or pragmatic ways in which mindfulness and values processes are posited to interact to improve wellbeing are rich and varied. In ACT, for example, contact with the present moment is claimed to facilitate defusion, which undermines attachment to a conceptualised self (e.g. "I am hopeless"), which makes choices based on values more likely or possible. Present moment awareness is also proposed to facilitate acceptance of internal experience, which reduces the likelihood of automatic behaviour that is purely in service of avoiding or escaping aversive experience. Acceptance of what 'is' also enhances present moment awareness, improving defusion and connection with values, which in turn improves likelihood of values-directed action (Fletcher and Hayes, 2005).

These connections are broadly consistent with theoretical perspectives on the link between mindfulness and values in the broader mindfulness literature. For example, Shapiro et al. (2006) proposed that mindfulness minimises habitual, automatic and impulsive processing and reactions, allowing one to recognise and choose one's true values. In SDT, the quality of awareness in daily life is viewed as essential to self-regulation and the facilitation of choices of behaviour consistent with personal needs and values (Brown & Ryan, 2003; Brown et al., 2007; Rigby et al., 2014). Mindfulness is also posited to reduce ego involvement which increases one's ability to identify when behaviour is values-based (Rigby et al., 2014). Awareness of this process, including thoughts, feelings, reactions, and the satisfaction related to values-based action, leads to more autonomous functioning due to greater awareness of its positive effects. Other theoretical perspectives on mindfulness also connect mindfulness with actions in line with values. Langer (2014) connects *mindlessness* with preoccupation with outcomes, and mindfulness (which she defines as a creative cognitive process, drawing on perspective taking and openness to information) with the ability to make "real choices" (p.77) and connect with the process and values behind making the choice.

4.2 Empirical Connections Between Mindfulness and Values

4.2.1 Correlational research.

Research examining the relationship between mindfulness and values-based action is limited. As previously noted, mindfulness and values-based action are generally measured in the ACT literature as a single construct, psychological flexibility. However, when mindfulness and values-based action constructs are measured separately, the strength of the correlations between the two constructs are highly variable. This is possibly due to the wide variety of measures of both mindfulness and values-based action.

Values-based action, measured by the Valuing Questionnaire (VQ) has been

found to be significantly correlated with the MAAS (Values Progress: $r = .46, p < .001$; Values Obstruction $r = -.49, p < .001$) (Smout et al., 2014), the FFMQ total ($r = .54, p < .001$), Describing ($r = .27, p < .010$), Acting with Awareness ($r = .68, p < .001$), Non-judging ($r = .49, p < .001$) and self-compassion ($r = .51, p < .001$), but not significantly related to Non-reacting ($r = .16, ns$), Observing ($r = -.12, ns$) or decentering ($r = .02, ns$) (Guadagno, 2012). Values-based action measured by the Chronic Pain Values Inventory (CPVI; McCracken, Vowles, & Eccleston, 2004) has been found to be consistently correlated with the MAAS ($r = .27$ to $.32, p < .001$) and decentering ($r = .41, p < .001$) (McCracken, Gutiérrez-Martínez, & Smyth, 2013; McCracken & Keogh, 2009; McCracken & Velleman, 2010).

In SDT, Congruence, a subscale of the Autonomous Functioning Scale (AFS; Weinstein et al., 2012) related to values-based action, has also been found to be significantly correlated with the MAAS ($r = .17, p < .050$) and self-awareness ($r = .43, p < .013$). However, other measures of values-based action have been inconsistently associated with mindfulness. For example, J. L. Villatte et al. (2015) reported non-significant correlations between values-based action, measured with the Bulls-Eye Values Survey (Lundgren et al., 2012), and defusion ($r = -.27, ns$), Non-judging ($r = -.30, ns$) and Acting with Awareness ($r = .10, ns$), but significant correlations with Non-reactivity ($r = .57, p < .010$). The Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014) was found to be negatively related to the VLQ ($r = -.21, p = .032$). Other studies that include measures of values-based action have not tabled the correlations between mindfulness and values-based action.

In terms of patterns of correlations between the “what” and “how” of mindfulness and values-based action, overall evidence suggests that both components are significantly correlated with values-based action.

4.2.2 Values-based action as a mediator.

Few studies have focused on valuing variables as mediators of change between mindfulness and wellbeing. The relationship between mindfulness and both depression and alcohol-related symptoms was found to be mediated by values clarity in a cross-sectional study (Pearson, Brown, Bravo, & Witkiewitz, 2014). In this study, values clarity was operationalised with the Life Engagement Test (LET; Scheier et al., 2006). In another cross-sectional analysis, Guadagno (2012) found values-based action, measured with an early version of the VQ, partially mediated the relationship between dispositional mindfulness and Satisfaction with Life, while psychological flexibility and self-compassion were found to partially mediate the relationship between dispositional mindfulness and values-based action.

The previously mentioned study of session-by-session change in processes, goal progress and committed action in CT and ACT groups found that prior committed action mediated later change in symptom intensity and goal progress in both ACT and CT groups (Forman et al., 2012). Further, a moderated mediation analysis in the same study found that both cognitive acceptance and affective acceptance mediated the effect of group on change in goal progress (committed action) and symptom severity, but only in the ACT group (Forman et al., 2012).

Similar constructs to values-based action, for example Purpose in Life and autonomous behaviour in SDT, have been identified as potential mediators of the relationship between mindfulness and wellbeing. For example, Pearson et al. (2014) identified a significant serial mediation from mindfulness to health-related outcomes through decentering and then Purpose in Life, measured with Ryff's PWB subscale. Although highly correlated with values-based action (e.g. $r = .59$ in Study 1 of this research), both the Purpose in Life and the Life Engagement Test measures used in the above studies differ from the values-based action because they refer to trait-like

behaviour (e.g. I value my activities a lot”). In contrast, the items of the VQ, used to measure values-based action in the studies of this thesis, refer to values-based behaviour from the past two weeks (e.g. “I made progress in areas of my life I care most about”). Values-based action differs from these conceptions as it “occurs at a particular moment in time and that is deliberately linked to creating a pattern of action that serves the value” (Hayes et al., 2012, p. 328).

Although not a mediation study, a daily diary study found that trait mindfulness predicted day-to-day state mindfulness, state autonomous behaviour, and state negative affect (Brown & Ryan, 2003). Autonomy was operationalised with PWB Autonomy scale which measures self-determining and independent behaviour and the extent an individual resists social pressures and regulates behaviour internally (Ryff, 1989). Therefore, the natural relationship between mindfulness and wellbeing through values-based action (and similar constructs) has a reasonable foundation based on cross-sectional evidence.

Chapter 3 (Section 3.12.3) outlined the limited evidence for the mediating role of values-based action between ACT interventions and wellbeing (e.g. S. A. Hayes et al., 2010; Lundgren et al., 2008), and as outlined in Chapter 2, changes in values clarity were found to mediate the relationship between change in mindfulness and changes in psychological distress over an MBSR intervention (Carmody et al., 2009). Only one study has been identified that measured and identified values-based action as a mediator of change in an MBI intervention. In her unpublished doctoral thesis, Guadagno (2012) found that changes in values-based action (VQ) partially mediated the effect of an MBSR intervention (compared to a control group) on satisfaction with life.

4.3 Chapter Summary and Introduction to Research

This chapter summarised the theoretical and empirical connections between mindfulness and values-based action and evidence supporting values-based action as a

mediator of the link between mindfulness and wellbeing. Correlational evidence supports a relationship between measures of mindfulness and values-based action, indicating a natural relationship between the constructs. Chapters 2–4 also outlined some limited evidence that both ACT interventions (which target mindfulness and values-based action) and MBIs (which target only mindfulness for change) improve wellbeing, partially through change in values-based action.

The current research aims to better understand these relationships and inform how mindfulness components and exercises are best used in clinical interventions. To do this, Study 1, outlined in the next chapter, examines the cross-sectional relationships between a number of measures of mindfulness and wellbeing through values-based action. These results are then intended to inform hypotheses for Studies 2 and 3, a comparison between the effects of MBI and ACT interventions on wellbeing and distress, and role of values-based action as a process of change in these interventions.

Chapter 5

Empirical Study 1: Cross-sectional Relationship Between Mindfulness and Wellbeing Through Values-based Action

This chapter contains details of Study 1 and addresses the first research question: “Can the relationship between mindfulness and both wellbeing and psychological distress be explained partly through values-based action?” Specifically, this cross-sectional study investigates if values-based action mediates the relationship between trait mindfulness and wellbeing.

5.1 Details for Published Paper

Study 1 was published online in the peer-reviewed journal, *Mindfulness*, on 19th September 2016 (Christie, Atkins, & Donald, 2016) under the title “The Meaning and Doing of Mindfulness’. The roles of the second and third authors were minimal. Specifically, the second author (the primary supervisor at that time), contributed to the paper through advice and editing. The third author was listed due to his shared involvement in the data collection for Study 1b in this paper. As this paper was extensively peer-reviewed, and has already been published, corrections cannot be made to this chapter. The published version of manuscript comprises the remainder of this chapter. While the manuscript has been reformatted to comply with dissertation formatting guidelines, American spelling and other text references (e.g. “we” not “I”) have been preserve to protect fidelity to the published paper. The published manuscript is included as Appendix A.

5.2 Abstract

The role of values-based action in facilitating change is central to Acceptance and commitment therapy but more peripheral in more traditional mindfulness-based interventions. This paper examined the role of values-based action in the relationship between mindfulness and both eudemonic and hedonic wellbeing in two samples—an undergraduate sample ($n = 630$) and a post-graduate sample ($n = 199$). It was hypothesized that mindfulness would be related to wellbeing indirectly through values-based action, measured as decreases in psychological barriers to values-based action and increases in values-congruent behavior. In both samples, significant indirect effects were identified from mindfulness to hedonic and eudemonic wellbeing through values-based action. These studies provide initial evidence that mindfulness effects wellbeing partly through facilitating meaningful behavioral change. The implication of this finding is that mindfulness interventions may be enhanced with an explicit focus on values clarification and the application of mindfulness to values-based behavior.

Keywords

Values; Mindfulness; Wellbeing; Acceptance and commitment therapy;
Mechanisms of change;

5.3 Introduction

Mindfulness has been consistently associated with hedonic and eudemonic wellbeing through cross-sectional studies, which conceptualise mindfulness as a naturally occurring trait (Brown & Ryan, 2003; Keng et al., 2011), and experimental studies which focus on strengthening mindfulness through training (Khoury et al., 2013). Because of the vast literature supporting the positive effects of mindfulness, research has recently shifted focus from asking *if* mindfulness improves wellbeing to *how* and *why* it results in change (Chiesa et al., 2014; Gu et al., 2015; Hölzel et al., 2011). This focus on the identification of mechanisms by which mindfulness affects change has become increasingly important with the exponential growth of mindfulness-based interventions and use of mindfulness tools in clinical settings. As argued by Kazdin (2007), the successful application of research findings to clinical application depends on understanding how a treatment works, which in turn enables clinicians more creative, strategic and flexible in designing and individualizing their interventions.

Most theoretical and empirical studies examining the relationship between mindfulness and wellbeing posit that greater mindfulness results in improved wellbeing by cultivating a more objective, flexible, and non-reactive stance toward inner experience. This in turn improves emotional regulation which facilitates the application of appropriate coping skills and responses in daily life (Baer, 2010; Carmody et al., 2009; Hölzel et al., 2011; Shapiro et al., 2006). Most mechanisms of change researched to date have been cognitive in nature and related to either processes directly associated with the construct of mindfulness, such as present moment awareness, decentering, body awareness, and acceptance (Hölzel et al., 2011; Keng et al., 2011; Shapiro, Oman, Thoresen, Plante, & Flinders, 2008; Vago & Silbersweig, 2012), or other cognitive processes linked to wellbeing or distress, such as worry, psychological flexibility,

emotional regulation, or self-compassion (Desrosiers, Vine, Klemanski, & Nolen-Hoeksema, 2013; Van Dam, Hobkirk, Sheppard, & Aviles-Andrews, 2014). A systematic review and meta-analysis of the literature examining these potential mechanisms identified cognitive and emotional reactivity, mindfulness, rumination and worry as having the strongest evidence base (Gu et al., 2015).

However, these literatures have generally focused upon distress reduction and cognitive mechanisms. The application of mindfulness to daily life may go well beyond reducing symptoms and avoidant and unproductive behaviors to improving contact with meaning and purpose and increasing behavior motivated and based on these attributes. Meaningful and purposeful behavior has not only been linked to better life outcomes, but more motivation to persist toward goals, especially in the face of psychological obstacles (Koestner & Losier, 2002). This emphasis on the application of mindfulness to meaningful behavioral change is conceptualised in acceptance and commitment therapy (ACT) as values-based action.

Values have been broadly defined in the sociological and psychological literature as guiding principles that give meaning to and guide behavior (Rokeach, 1973; Schwartz & Bilsky, 1987), with the majority of research focused on the classification of value schemas and identifying how these relate to human behavior (for reviews see: Braithwaite & Scott, 1991; Eccles & Wigfield, 2002). The ACT approach to values centres on the identification of idiosyncratic or personal values (Wilson & Dufrene, 2009). The practice of living according to one's values has been called valued living or values-based action. ACT defines values as "freely chosen, verbally constructed consequences of ongoing, dynamic, evolving patterns of activity, which establish predominant reinforcers for the activity that are intrinsic in engagement in the valued behavioral pattern itself" (Wilson & Dufrene, 2009, p.66). This implies that values are constructed by the individual, not forced upon them, and motivated by the meaning

inherent in the action itself, rather than external reward or a sense of obligation. For example, if compassion is a personal value, just acting compassionately in a variety of contexts would provide its own reward through the behavior, irrespective of external acknowledgement, either immediately or in the longer term (Dahl et al., 2009). From an ACT perspective, values identification and clarification are key focuses of therapy because values provide a flexible and contextual framework to guide both goals and ongoing behaviour and to increase perseverance through difficult times..

Values-based action has been identified as a key component of psychological flexibility, the desired outcome of an ACT intervention (S. C. Hayes et al., 2012). Values-based action has been associated with lower psychological distress (Wilson, Sandoz, Kitchens, et al., 2010), depression (Plumb et al., 2009), and anxiety (Emmons, 1986) and greater quality of life (Michelson et al., 2011). Values-based action has also been found to predict lower distress and greater hedonic and eudemonic wellbeing (Christie, 2012; Ciarrochi, Fisher, et al., 2010; Ferssizidis et al., 2010; Smout et al., 2014). The research literature which is most consistent with the ACT conceptualization of values-based action can be found in the field of self-determination theory (SDT: Deci & Ryan, 1985). Autonomous functioning (a similar construct to values-based action) has been found to be related to greater wellbeing (Brown & Ryan, 2003) and daily satisfaction of basic psychological needs (Weinstein et al., 2012). Koestner and Losier (2002) found that an identified motivation (e.g. based on values and goals) emerged as a better predictor of positive life outcomes and reduced psychological distress in academic and political domains than either explicit motivations (based on punishment or external reward) or intrinsic motivations (e.g. based on the pleasure experienced by engaging in the activity). They theorized that a values focus to behavior provided more motivation to persist through uninteresting or difficult times to reach goals than a purely intrinsic motivation. For example, a value such as love applied to the family domain

may result in some behavior based on intrinsic motivation (playing with a baby to enjoy her smiles) or identified motivation (continuing to play the baby for its stimulation or development, despite a lack of positive feedback).

There is also evidence to suggest that just affirming one's values predicts positive outcomes and improved wellbeing. Short-term values affirmation interventions, such as writing about important values, have been found to predict diverse positive outcomes including long-term academic achievement and perceptions of academic adequacy (G. L. Cohen et al., 2009), lower neuroendocrine and psychological responses to a stressful activity (Creswell et al., 2005), increased pain tolerance and lower pain believability (Páez-Blarrina et al., 2008), and reduced defensiveness (Crocker et al., 2008). Further, just imagining that pain was in the service of a core value has been found to increase pain tolerance (Branstetter-Rost et al., 2009) over and above increases attributed to mindfulness strategies.

ACT theory links mindfulness explicitly with values-based action through its model of psychological flexibility which is comprised of six interconnected processes (S. C. Hayes et al., 2012). Four of these are mindfulness-based processes (present moment awareness, acceptance, defusion and self-as-context) and two are related to values-based action (values clarity and committed action) (Fletcher et al., 2010). ACT theory posits that mindfulness improves wellbeing by enabling individuals to view internal verbal behavior (thoughts and feelings or interpretations of experience) more objectively, facilitating a more flexible response to experience (S. C. Hayes et al., 2012). This flexible response includes the ability to connect with positive verbal repertoires, such as values, and consciously choose values-congruent behavior (Steger, Sheline, Merriman, & Kashdan, 2013). Other approaches have emphasised the role of mindfulness in minimizing habitual, automatic and impulsive processing and reactions, allowing one to recognize and choose one's true values (Shapiro et al., 2006) and

choose behavior most congruent with those values and needs (Brown & Ryan, 2003; Deci & Ryan, 1980).

Research on the relationship between mindfulness and values-based action is sparse. Mindfulness has been found to be moderately correlated with values-based behavior (Christie, 2012; Guadagno, 2012; Trompetter et al., 2013) in the ACT literature. Similarly, few studies have focused on valuing variables as mediators of change between mindfulness and wellbeing. State and trait mindfulness has been found to predict higher autonomous behavior which in turn predicted less Negative Affect in a daily diary study (Brown & Ryan, 2003). The authors concluded that those with higher mindfulness tended to be more aware of inner experience and more mindful of their behavior. Shapiro et al., (2006) theorized a causal model in which present moment awareness facilitated *reperceiving* (an objective stance toward conscious or internal experience) which in turn cultivated values clarification, along with self-regulation, cognitive, emotional and behavioral flexibility and exposure (or acceptance) and therefore wellbeing. When the model was tested, it was found that changes in mindfulness *and* *reperceiving* following an mindfulness intervention predicted lower perceived stress and psychological distress and this change was mediated through changes in values clarity (operationalised as Ryff's Purpose in Life subscale (Ryff, 1989)), and cognitive, emotional and behavioral flexibility (operationalised as Ryff's Environmental Mastery subscale), but not exposure or self-regulation (Carmody et al., 2009). Similarly, the relationship between trait mindfulness and depression and alcohol-related symptoms were found to be mediated by *decentering* (or *reperceiving*) and values clarity (Pearson et al., 2014), operationalised by the Life Engagement Test (LET: Scheier et al., 2006). Although Purpose in Life is highly correlated with values-based action (e.g. $r = .59$ in the Study 1a sample), the purpose and engagement in life measures differ from the values-based action because they refer to trait-like behavior

(e.g. I value my activities a lot”), while the items of the Valuing Questionnaire (Smout et al., 2014) refer to cognitions and related behavior in the past two weeks (e.g. “I made progress in areas of my life I care most about”). Values-based action differs from these conceptions as it “occurs at a particular moment in time and that is deliberately linked to creating a pattern of action that serves the value” (Hayes et al., 2012, p. 328).

We found only one study in which the role of values-based action was examined as a potential mechanism of change between mindfulness and wellbeing. Guadagno (2012) found values-based action partially mediated the relationship between dispositional mindfulness and Satisfaction with Life, while psychological flexibility, self-compassion and self-concept clarity were found to partially mediate the relationship between dispositional mindfulness and values-based action. Following a mindfulness intervention, changes in mindfulness were related to changes in Satisfaction with Life, indirectly through changes in valued living.

The purpose of the present studies was to gain further evidence for the role of values-based action in linking mindfulness to wellbeing. Because key mechanisms linking mindfulness and wellbeing to date have been psychological (a flexible, regulated and non-reactive stance toward experience), we also included a measure of “Values Obstruction” in our model. While this construct measures psychological processes similar to established mechanisms of change (e.g. being caught up with difficult thoughts and feelings and being on autopilot), it also links these processes to the absence or retardation of values-based action in the past two weeks (e.g. “I spent a lot of time thinking about the past or future, rather than being engaged in activities that mattered to me”). Thus we hypothesized that mindfulness would be related to eudemonic and hedonic wellbeing indirectly through both Values Progress and Values Obstruction. We replicated our model on two separate samples, using various measures of hedonic and eudemonic wellbeing and mindfulness. Given the difference in mean age

between the two samples (Study 1a: $M = 20$; Study 1b: $M = 34$), and the potential confounding effects of associations between age and gender and values-based action and wellbeing (Ferssizidis et al., 2010), we included age and gender as covariates in both studies (Wunsch, 2007) .

5.4 Study 1a

5.5 Method

5.5.1 Participants.

Participants were $n = 630$ undergraduate students enrolled in psychology courses at the University of Adelaide recruited for the validation study of the Valuing Questionnaire (Smout et al., 2014) in 2011. Participants were primarily female (68.5%), young ($M = 20.4$, $SD = 4.5$) and Caucasian (68%) or Asian (21.6%).

5.5.2 Procedure.

Participants were recruited via the School website and received course credit for their participation and completed the survey online.

5.5.3 Measures.

Cronbach's alphas for all measures are displayed in Table 5.1.

Mediators: Values-based action was measured using the Valuing Questionnaire (VQ; Smout et al., 2014), a 10-item scale measuring two factors of values-based action, Values Progress (the extent to which people felt they lived their values) and Values Obstruction (extent to which psychological barriers interfered with enacting values). Items of Values Progress tap into behavior in the past two weeks, e.g. "I made progress in areas of life I care most about", and beliefs about behavior, e.g. "I felt like I had a purpose in life". Values Obstruction measures both psychological barriers to values-based action, e.g. "difficult thoughts, feelings or memories got in the way of what I really wanted to do" and "I spent a lot of time thinking about the past or future, rather

than being engaged in activities that mattered to me ”. The VQ scales have been found to be stronger predictors of wellbeing and mindfulness than similar measures including the Personal Values Questionnaire (PVQ; Ciarrochi, Blackledge, & Heaven, 2006) and Valued Living Questionnaire (VLQ; Wilson et al., 2010). Values Obstruction correlated at $r = -.65$ with the Acceptance and Action Questionnaire II (AAQ-II; Bond et al., 2011), which also measures the inability to pursue valued behavior in the face of psychological barriers.

Predictors. Mindfulness was measured with the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003), a 15-item instrument that measures attention to and awareness of present moment experience and Acting with Awareness in daily life using a 6- point scale. The MAAS has strong psychometric properties has been used extensively as a measure of mindfulness (Khoury et al., 2013).

Outcome variables. Eudemonic wellbeing was measured with the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) which measures subjective wellbeing with five statements rated on a 7-point scale. Hedonic wellbeing was measured using the Positive and Negative Affect Scales (PANAS; Watson, Clark, & Tellegen, 1988) which consist of 10 positive and 10 negative statements forming two subscales. Participants were asked to rate the extent to which they had experienced each affect in the last week on a 5-point scale.

Covariates. As both age and gender have been found to predict values-based action and wellbeing (Ferssizidis et al., 2010), we included age and gender as covariates.

5.5.4 Data analysis.

Path analysis was conducted with Mplus 7.4 (Muthen & Muthen, 2012) using maximum likelihood (MLM) estimation. MLM estimation was chosen because it corrects for non-normality in the data, indicated by a scaling correction factors for

models > 1.00 (Byrne, 2012). All models were ‘just identified’, meaning there were no degrees of freedom to assess fit. R^2 squared values were reported as a means to compare the variance explained by the model in each variable. As we were primarily interested in the role of values-based action in the link between mindfulness and wellbeing, we also report the indirect effects of mindfulness on wellbeing through Values Progress and Values Obstruction (Hayes, 2009).

5.6 Results

Seven multivariate outliers ($z > 2.58$) were removed, however some deviations from normality remained as indicated by a scaling correction factor > 1.00 for the model. Missing data were less than 5% for any one variable and missing completely at random (MCAR) according to Little’s MCAR test ($p = .934$). ML estimation allows participants to be included in the analysis even if data are missing. Table 5.1 contains descriptive statistics, correlations between key variables and Cronbach’s alphas of scales. Age was significantly correlated with MAAS ($r = .09, p = .037$) and gender (being female) was significantly associated with greater Values Progress ($r = .08, p = .052$) and Satisfaction with Life ($r = .17, p < .001$), and less Values Obstruction ($r = -.08, p = .045$).

Model 1, outlined in Fig 5.1, tested the relationship between mindfulness (MAAS) and wellbeing through Values Progress and Values Obstruction. We adjusted for the effects of gender (0 = males; 1 = females) and age on the mediators and outcome variables to allow more accurate replication in Study 1b, which was based on an older sample. The R^2 statistics indicated that the model explained 50% of variance in Positive Affect, 32 % in Negative Affect, 46% in Satisfaction with Life, 21 % in Values Progress and 26 % in Values Obstruction. As outlined in Fig. 5.1, model parameters were in expected directions. As outlined in Table 5.2, significant indirect paths were estimated from mindfulness to Satisfaction with Life and Positive Affect

through Values Obstruction and Values Progress, and through Values Obstruction to Negative Affect. Direct effects were non-significant. Indirect paths indicated that as mindfulness increases by 1 SD, Values Progress increases by .45 SD and Positive affect and Satisfaction with Life increase by .20 and .25 SD respectively, *through* Values Progress (adjusting for the influence of age and gender). Similarly when mindfulness increases by 1 SD, Values Obstruction decreases by .50 SD, and Negative Affect decreases by .27 SD, and Satisfaction with Life and Positive affect increase by .13 and .09 SD respectively, *through* Values Obstruction (adjusting for the influence of age and gender).

Age negatively predicted Values Obstruction but unexpectedly it also negatively predicted Satisfaction with Life. Non-standardized betas also indicated that being female was associated with *less* Values Obstruction ($B = -1.58, p < .01$), and *more* Values Progress ($B = 1.35, p < .01$), Satisfaction with Life ($B = 1.84, p < .001$) and Negative Affect ($B = 1.35, p < .05$), compared with males.

As a path analysis assumes no measurement error, the results were compared with a structural equation model (SEM) which included fully latent variables. The full SEM model resulted in effects which were consistent with the path analysis model, although indirect effect sizes were generally slightly larger in the latent model. We chose to present a path analysis model, rather than a full SEM model, because of issues with the latent Model 2 in Study 1b (outlined in Study 1b). Thus to keep a consistent approach across Study 1a and Study 1b, and enhance comparability, we used a path analysis approach. Direct and indirect effects for the latent SEM version of Model 1 can be found in the Supplementary Materials (Appendix B).³

³ Details of the latent models were published as Supplementary Materials online but appear in Appendix B in this thesis.

Table 5.1

Descriptive Statistics and Zero Order Correlations Between Predictor and Outcome Variables and Cronbach's Alphas of All Measures in Study 1a

	N	M	SD	α	1.	2.	3.
1. MAAS	597	56.71	11.85	0.88	-		
2. Values Progress	623	17.18	6.32	0.87	.44	-	
3. Values Obstruction	623	12.00	6.73	0.88	-.50	-.55	-
Satisfaction with Life	602	22.52	6.83	0.89	.36	.62	-.53
Positive Affect	602	31.36	8.22	0.91	.40	.68	-.51
Negative Affect	602	22.32	7.98	0.89	-.34	-.28	-.58

Note. All correlations are significant to $p < .001$.

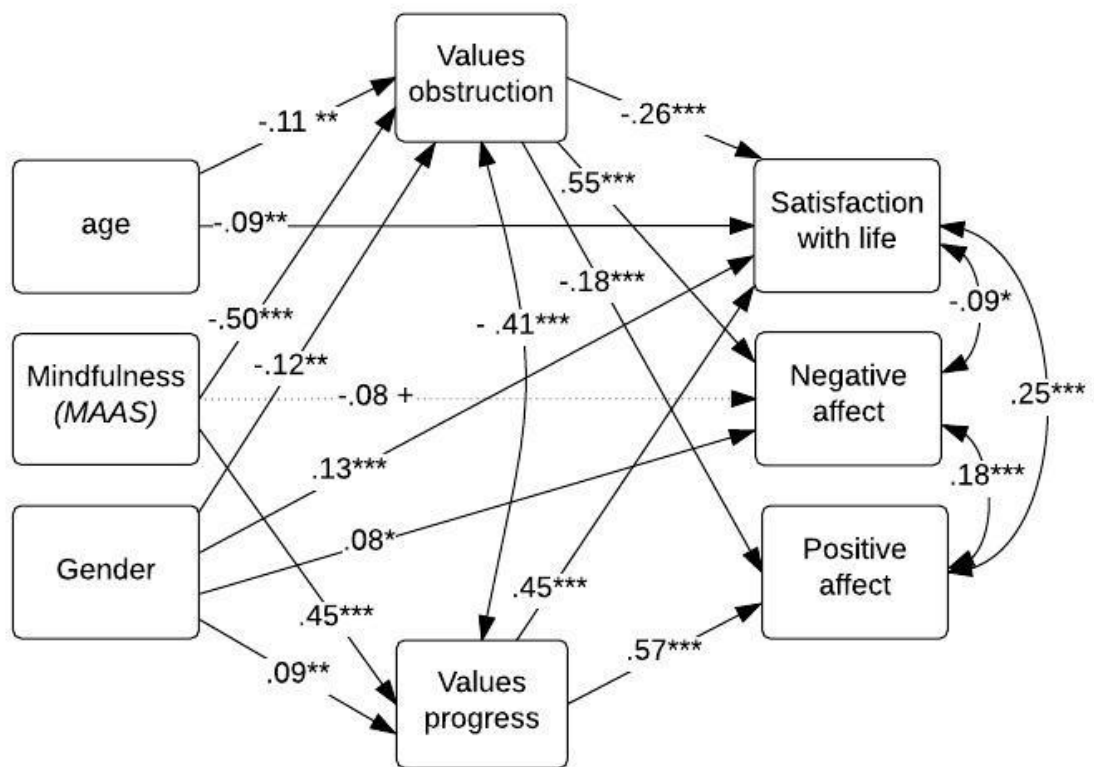


Figure 5.1. Standardized (XY) direct effects of Model 1 in Study 1a. Only significant paths are included and paths that are significant to $p < .10$ are represented with light broken lines. *** $p < .001$, ** $p < .01$, * $p < .05$, + $p < .10$.

Table 5.2

Standardized (XY) Direct and Indirect Effects, Standard errors and Probability Values for Model 1 in Study 1a

	SWLS		Negative Affect		Positive Affect	
	β (SE)	<i>p</i>	β (SE)	<i>p</i>	β (SE)	<i>p</i>
From MAAS						
via Values Progress	.20 (.02)***	<.001	.02 (.20)	.319	.25 (.03)***	<.001
via Values Obstruct.	.13 (.03)***	<.001	-.27 (.03)***	<.001	.09 (.02)*	<.001
Direct effects	.05 (.04)	.251	-.08 (.04)	.070	.05 (.05)	.138

Note. β = standardized beta, SE = Standard error and SWLS = Satisfaction with Life scale.

*** p < .001, ** p < .01, * p < .05.

5.7 Discussion

The results supported the hypothesis that mindfulness would be related to wellbeing partly through values-based action. Together Values Progress and Values Obstruction accounted for most of the relationship between mindfulness and wellbeing. An indirect relationship between mindfulness and the positive outcome variables (Positive Affect and Satisfaction with Life) was identified through both Values Progress and Values Obstruction, while the indirect relationship from mindfulness to Negative Affect was identified through Values Obstruction only.

5.8 Study 1b: Model Replication

To validate results from Study 1a, the path analysis model was replicated using a second sample and alternate measures of mindfulness and wellbeing. In this study, mindfulness was operationalised by two subscales from the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006), Acting with Awareness (a measure of attention/awareness) and Non-judging of Inner Experiences (Non-judging). We used only two of the five FFMQ scales to reduce participant burden. Acting with Awareness

was selected as it is a similar measure to the MAAS used in Study 1a, sharing five of its eight items with the 15-item MAAS scale. Both Acting with Awareness and Non-judging were selected because they have been found to be the most reliable of the FFMQ scales in predicting wellbeing and negative psychological distress (Baer et al., 2008, 2006; Bohlmeijer, ten Klooster, et al., 2011; Cash & Whittingham, 2010; Hollis-Walker & Colosimo, 2011; Tran et al., 2013). Based on the above, it was further hypothesized that both Acting with Awareness and Non-judging would predict wellbeing and this relationship would be partly explained through lower Values Obstruction and higher Values-based action.

5.9 Method

5.9.1 Participants.

Participants were 199 post-graduate (coursework and research) students (73% female) aged 18-60 years ($M = 34$, $SD = 11$, Mode = 23), and 71% Caucasian and 29% Asian.

5.9.2 Procedure.

Participants were enrolled in a mindfulness and resilience course at three Australian universities and completed an online survey which included all measures 1-3 weeks prior to the commencement of their course.

5.9.3 Measures.

All measures were reworded to past tense, where relevant, and participants asked to rate agreement in the past month. Cronbach's alphas for each scale are in Table 5.3.

Predictor, mediator and covariates. Mindfulness was measured using two subscales of the FFMQ (Baer et al., 2006) - Acting with Awareness (e.g. "When I did things, my mind wandered off and I was easily distracted" and "I found it difficult to stay focused on what was happening in the present") and Non-judging of inner

experience (e.g. “I made judgments about whether my thoughts were good or bad” and “I disapproved of myself when I had irrational ideas”). Consistent with Study 1a, the Values Progress and Values Obstruction subscales of the VQ (Smout et al., 2014) were used to measure values-based action and age and gender were included as covariates.

Outcome variables. Eudemonic wellbeing was measured using the Flourishing scale (Diener et al., 2009), an 8-item measure measuring self-reported success in important areas predicting wellbeing including relationships, competence, self-esteem, purpose, and optimism. Hedonic wellbeing was measured with the Scale of Positive and Negative Experience (SPANE; Diener et al., 2009), which uses six items to produce a score for positive feelings and experiences (Positive Experiences) and six items for negative feelings and experiences (Negative Experiences). It measures positive and negative emotions (e.g. joy and anger), but it also measures more general feelings (e.g. pleasant and unpleasant) and positive and negative states (e.g. engagement, flow and interest).

5.9.4 Data analyses.

The approach replicated that of Study 1a using Mplus 6.12 (Muthen & Muthen, 2011) and robust MLM estimation to test path analysis models. The main difference from Study 1a was that two mindfulness variables were modeled – Non-judging and Acting with Awareness. Because the purpose of the second study was a comparison with Study 1a, we also ran a model with only Acting with Awareness as a predicting variable (Model 3).

5.10 Results

There were no missing data, severe violations of assumptions or extreme outliers. All correlations significant in expected directions (see Table 5.3). Age was significantly correlated with Values Obstruction ($r = -.22, p < .001$), Acting with Awareness ($r = .17, p = .04$), and Non-judging ($r = .29, p < .001$). Gender (being female)

was not associated with any variables in this sample.

Table 5.3

Descriptive Statistics, Cronbach's Alphas and Correlations Between Predictor and Outcome Variables for Study 1b

Variables	M	SD	α	Pearson's Correlations			
				1	2	3	4
1. Values Progress	18.71	5.22	0.81	1			
2. Values Obst.	15.51	5.62	0.75	-.49***	1		
3. Act-Aware	22.10	5.89	0.92	.37***	-.67***	1	
4. Non-judging	23.40	7.65	0.94	.30***	-.52***	.53***	1
Flourishing	41.09	7.92	0.89	.72***	-.55***	.34***	.34***
Positive Experiences	20.38	3.99	0.89	.52***	-.42***	.20**	.20**
Negative Experiences	17.83	3.81	0.79	-.39***	.51***	-.43***	-.45***

Note. α = Cronbach's alpha, Positive Experiences = Positive subscale of SPANE, Negative Experiences = Negative subscale of SPANE, Act-Aware = Acting with Awareness scale and Values Obst.= Values Obstruction.

*** $p < .001$. ** $p < .01$.

Model 2, outlined in Fig 5.2, tested the relationships between mindfulness variables (Acting with Awareness and Non-judging) and wellbeing variables (Positive Experiences and Negative Experiences and Flourishing) through Values Obstruction and Values Progress. We once again adjusted for gender and age by regressing these variables on exogenous variables in the model. The R^2 statistics indicated that the model explained 35% of variance in Positive Experiences, 35% in Negative Experiences, 56% in Flourishing, 15% in Values Progress and 49% in Values Obstruction. As indicated in Fig 5.2, all paths were in expected directions.

As outlined in Table 5.4, all indirect effects from mindfulness to outcome variables through mediators were significant except for the two indirect paths from Acting with Awareness and Non-judging through Values Progress to Negative Experiences ($p = .06$ and $p = .120$ respectively). Direct effects were all non-significant, except the direct effect from Non-judging to Negative Experiences.

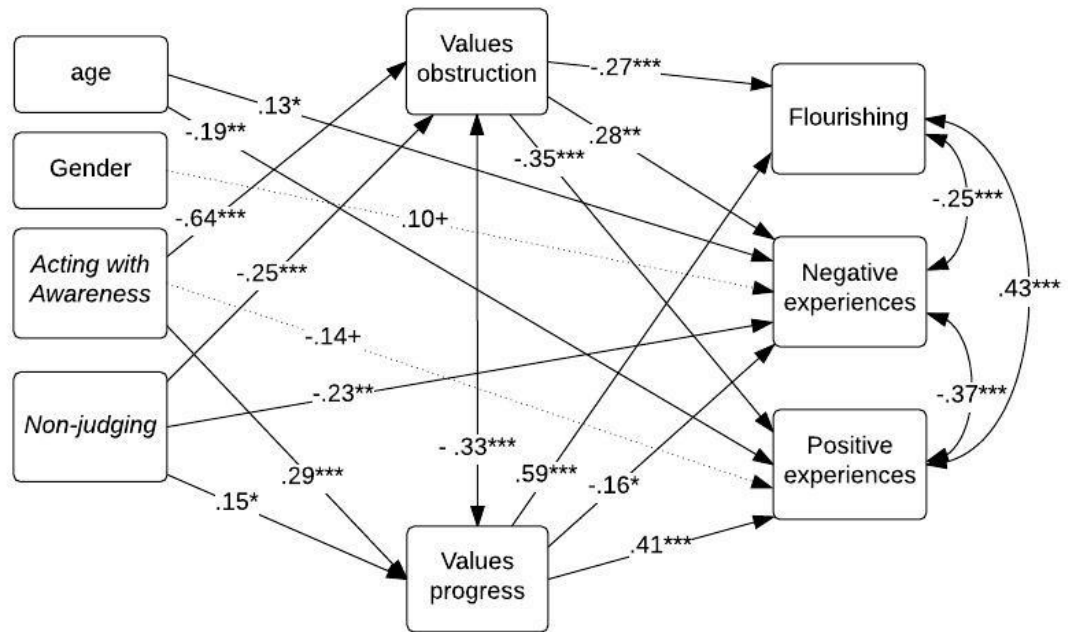


Figure 5.2. Standardized (XY) direct effects of Model 2 in Study 1b. Only significant paths are included. Paths that are significant to $p < .10$ are shown in light broken lines. *** $p < .001$, ** $p < .01$, * $p < .05$, + $p < .10$.

Table 5.4

Standardized (XY) Direct and Indirect Effects, Standard Errors and Probability Values for Model 2 in Study 1b

	Flourishing		Negative Experiences		Positive Experiences	
	β (SE)	p	β (SE)	p	β (SE)	p
From Act-aware						
Via Values Progress	.17 (.05)***	<.001	-.05 (.03)	.060	.12 (.03)**	.002
Via Values Obstruct.	.14 (.04)***	<.001	-.15 (.05)**	.003	.18 (.05)***	<.001
Direct effects	-.03 (.06)	.597	-.08 (.09)	.347	-.14 (.09)	.093
From Non-judging						
Via Values Progress	.09 (.04)*	.043	-.02 (.02)	.120	.06 (.03)*	.049
Via Values Obstruct.	.07 (.02)**	.002	-.07 (.03)*	.012	.09 (.03)**	.003
Direct effects	.02 (.06)	.734	-.23 (.08)*	.004	.02(.08)	.844

Note. β = standardized beta, SE = Standard error, Act-aware = FFMQ Acting with Awareness scale and Values Obstruct. = Values Obstruction.

*** $p < .001$, ** $p < .01$, * $p < .05$.

Once again results were checked against a full SEM model with latent variables (see Appendix C for details). The sizes of indirect effects were similar with two key exceptions. The indirect effect from Acting with Awareness through Values Obstruction to Positive Experiences was larger ($\beta = .45$, $SE = .21$, $p = .037$), compared with ($\beta = .18$, $SE = .05$, $p < .001$) in the path analysis model. Also the direct effect from Acting with Awareness to Positive Experiences was larger and significant ($\beta = .41$, $SE = .20$, $p = .040$) in the SEM model. The key difference, however, was that many indirect paths in the fully latent model were non-significant, though they had similar or larger effect sizes compared with the path analysis model. This was attributed to a combination of reduced power in the full SEM analysis due to a smaller sample size (compared with Study 1a), and the relatively low reliability of the Values Obstruction variable ($\alpha = .75$) in this sample. It was therefore decided to report the path analysis models and provide details of the fully latent models in the Supplementary materials.⁴

We also ran a model (Model 3) in which Acting with Awareness was the sole predicting variable to allow a more accurate comparison with Model 1 in Study 1a which included the MAAS scale as the sole predictor. As previously stated, Acting with Awareness contains 5 items from the MAAS. The R^2 statistics indicated that the model explained about the same, or slightly less, amounts of variance in each exogenous variable: 35% of variance in Positive Experiences, 31% in Negative Experiences, 56% in Flourishing, 13% in Values Progress and 45% in Values Obstruction. The only differences between the two models in terms of statistical significance of paths was that in Model 3, the indirect effect from *Acting with Awareness* to Negative Experiences was significant to $p = .03$ (while in Model 2, it was significant to $p = .06$). Consistent with

⁴ Details of the latent models were published as Supplementary Materials online but appear in Appendix C in this thesis.

Model 2, all direct effects in Model 3 were non-significant. See Appendix D for path estimates for Model 3.⁵

5.11 Discussion

The results of Study 1b support the hypotheses that mindfulness, operationalised as both Acting with Awareness and Non-judging, would be associated with both eudemonic and hedonic wellbeing, partly through the effects of values-based action (Values Progress and Values Obstruction). Providing evidence for replication, the indirect paths from Acting with Awareness to wellbeing variables were very similar in size and reliability to those from MAAS to wellbeing variables in Study 1a, despite the use of different measures of eudemonic and hedonic wellbeing. Like in Study 1a, an indirect relationship from mindfulness (operationalised as both Acting with Awareness and Non-judging) to Negative Experiences was identified through Values Obstruction, but not through Values Progress.

Compared with Model 2, Model 1 from Study 1a explained more variance in Positive Affect (50% compared with 35% in Positive Experiences in Model 2), in Values Progress (21% compared with 15%), but less in the measure of eudemonic wellbeing (46% in Satisfaction with Life compared with 56% of the variance in Flourishing in Model 2) and Values Obstruction (26% compared with 49%). The variance explained in Negative Affect/Experiences was about the same (32% compared with 35%) in both samples.

5.12 General Discussion

The aim of these studies was to explore the role of values-based action as a potential mechanism by which mindfulness is related to subjective and eudemonic wellbeing, given the importance of values-based action in the ACT model. Consistent with the hypothesis, mindfulness measures (MAAS, Acting with Awareness and Non-

⁵ Details of Model 3 were published as online Supplementary Materials in the published version.

judging) were related to eudemonic and subjective wellbeing partly through values-based action. For most paths, the indirect relationship from mindfulness and wellbeing through values-based action was stronger than the direct relationship and the direct relationship was non-significant. The exception to this was the direct path from Non-judging to Negative Experiences which was significant and stronger than the indirect effects through values-based action.

A key outcome replicated across both studies was that mindfulness influenced Negative Affect and experiences more strongly and reliably through Values Obstruction than through Values Progress. Conversely, Positive Affect/Experiences and eudemonic wellbeing was influenced through *both* Values Progress *and* Values Obstruction in concert. This finding suggests that there might be two distinct pathways through values-based action whereby mindfulness contributes to wellbeing. Mindfulness is more likely to contribute to reducing negative outcomes by helping people deal with the inevitable difficulties they encounter when seeking to act in valued directions (e.g. fear of failure or worry about potential loss). To the extent that mindfulness helps people manage these difficult experiences, they are *less* likely to experience Negative Affect. Correspondingly, mindfulness is likely to contribute to increasing positive affect and wellbeing by helping to both deal with psychological barriers to values-based action, as described above, *and* enhance a capacity to notice opportunities to act in the direction of one's values (Values Progress). And when one is able to act in accordance to what is meaningful to them, they are more likely to cultivate meaningful relationships, feel competent, optimistic, increase positive affect, and be more satisfied with life.

Another key outcome of the study was that values-based action emerged as a stronger predictor than mindfulness of most measures of wellbeing. This has implications for therapy because like other knowledge structures, values and therefore values-based action, are more likely to be enhanced through attention and reinforcement

(Verplanken & Holland, 2002). Thus values clarification exercises, such as those found in ACT protocols, may prove efficacious as an additional component to a wide range of therapeutic interventions, as well as being an adjunct to mindfulness-based therapy or instruction. Our findings suggest this approach may be particularly important for interventions aimed at optimizing wellbeing.

Further research should consider how these findings relate to other key measures of psychological distress. It should also consider models including more established cognitive-based mediators of change from mindfulness to wellbeing and distress, such as emotional regulation and self-compassion, alongside values-based action to determine their relative contributions to pathways to wellbeing.

5.12.1 Limitations.

This was a cross-sectional study and therefore we cannot therefore assume our results reflect causality. However, a vast literature suggests that a causal pathway from mindfulness to wellbeing is more likely than the reverse. For example, Guadagno (2012) found a mindfulness intervention resulted in improvements in values-based action, which partially mediated the relationship between improvements in mindfulness and increases in Satisfaction with Life. It is still unknown if increases in mindfulness cause increases in values-based action or the reverse, or if they develop simultaneously. Identifying causality is clearly a focus for future research and we are currently collecting longitudinal experimental data to test these associations over time. Results do, however, confirm that mindfulness is related to values-based action and much of the relationship between mindfulness and wellbeing can be accounted for by measures of values-based action.

5.12.2 Summary and conclusion.

Now that the positive relationship between mindfulness and wellbeing is well-established, there has been increasing attention paid to the active mechanisms whereby

mindfulness exerts its positive effects. Researchers have identified mediators including self-compassion and emotional regulation (Van Dam et al., 2014), cognitive and emotional non-reactivity (Gu et al., 2015), cognitive reappraisals and reduced rumination (Desrosiers, Vine, et al., 2013). Our research is the first to demonstrate that acting on, or making progress towards, one's values, and being able to manage obstacles to acting on values, explains a considerable portion of the relationship between mindfulness and wellbeing. This finding has both research and practical significance. For researchers, our findings support Brown and Ryan's (2003) perspective that mindfulness facilitates the ability to actively choose autonomous, values and needs-based behavior rather than to react in habitual ways. For clinicians working within an ACT framework, this evidence supports the positive association between ACT processes - present moment awareness, acceptance, and values-based behavioral change - and improvements in wellbeing. For those working primarily with other mindfulness-based therapies, our results suggest that integrating a focus on values clarification and acting in line with values may enhance the effects of mindfulness-based interventions upon wellbeing.

Compliance with Ethical Standards

Conflict of Interest: Authors declare that we have no conflicts of interest.

Chapter 6

Empirical Study 2: A Randomised Control Trial Comparing ACT and an MBI

The cross-sectional analysis of the relationships between mindfulness and wellbeing through values-based action in Chapter 5 provided initial evidence that some of the effects of mindfulness on wellbeing are mediated through values-based action. These results suggest that mindful people tend to have greater wellbeing, and much of this relationship can be explained by their propensity to act in line with their values (Values Progress), even when psychological barriers to values-based action are present (Values Obstruction). Mindful people were found to report fewer Negative Experiences and less Negative Affect and this relationship was mediated by acting in line with their values despite the presence of psychological barriers (Values Obstruction).

Study 2, outlined in this chapter, seeks to address the second research question: “Is a mindfulness-based intervention that integrates mindfulness and values (ACT) more effective than a mindfulness-only intervention (MBI) in improving wellbeing and reducing psychological distress?” To address this question, Study 2 compared an ACT intervention to a more traditional MBI and waitlist control to establish if an intervention focused on the integration of mindfulness and values (that is mindfulness developed as a means to improved values based action) differentially affects outcomes, compared with an MBI that does not include a values focus.

6.1 Summary of Relevant Literature

6.1.1 The effect of MBI’s and ACT on wellbeing.

The evidence-base supporting the efficacy of MBIs, such as MBSR and MBCT, has grown rapidly in the past decade (see: Khoury et al., 2013; Khoury, Sharma, Rush, & Fournier, 2015; for recent reviews). As outlined in Section 2.3, MBIs have been found to be effective in improving a wide range of clinical, general wellbeing and distress outcomes (Chiesa & Serretti, 2009; Fjorback et al., 2011; Keng et al., 2011;

Khoury et al., 2015; Lao et al., 2016) with medium effect sizes for both pre-post changes in outcomes (Hedge's $g = 0.55$) and comparisons with non-active controls (Hedge's $g = 0.53$) (Khouri et al., 2013).

ACT interventions have been found to be equally as effective in addressing a variety of clinic, health and wellbeing related outcomes (Hacker et al., 2016; Smout et al., 2012; Veehof et al., 2016). Meta-analyses of ACT interventions have found moderate to large within-group effect sizes ($d = 0.45 - 0.95$) (Hacker et al., 2016). They have also found ACT to be superior to control and TAU conditions for clinical and somatic outcomes (Hedge's $g = 0.57 - 0.64$) and superior to quality of life outcomes (Hedge's $g = 0.37$) and process measures (Hedge's $g = 0.56$) when compared with control conditions (A-Tjak et al., 2015).

To my knowledge, only one study has sought to establish the differential effects of ACT and MBIs by directly comparing the two interventions. A non-controlled study compared the effects of an ACT and an abbreviated MBCT intervention on changes in psychological distress, quality of life, mindfulness and psychological flexibility in $n = 136$ university students (Renner & Foley, 2013). The interventions comprised of six weekly two hour sessions. Both intervention groups reported a significant decrease in psychological distress, with effect sizes of $d = 0.48$ to 0.96 , and increases in mindfulness and acceptance ($d = 0.71$ to 1.49). However, the two groups did not differ significantly from each other in change in any outcome. This lead the authors to conclude that both were equally efficacious in improving wellbeing and increasing mindfulness. As full results of this study were not published, details are unavailable.

6.1.2 The effect of MBI's and ACT on mindfulness.

The literature provides strong and consistent evidence that mindfulness is one of the key processes of change in MBIs, along with reductions in cognitive and emotional reactivity and repetitive negative thinking (e.g. rumination and worry) (Gu et al., 2015;

Visted et al., 2015). Although the effect sizes of change in mindfulness vary greatly between interventions, populations, and the specific measures of mindfulness, a systematic review and meta-analysis of MBIs found self-reported mindfulness increased with a moderate effect size (Hedges' $g = 0.53$), compared with non-active controls (Khouri et al., 2013). No consensus regarding the effect of MBIs in changing specific components of mindfulness has emerged, although Acting with Awareness and Non-judging have been found to be the most reliable of the FFMQ scales in predicting wellbeing and negative psychological distress (e.g., Baer et al., 2008, 2006; Bohlmeijer, ten Klooster, et al., 2011; Cash & Whittingham, 2010; Hollis-Walker & Colosimo, 2011; Tran et al., 2013).

In ACT, mindfulness is measured by four of the six processes identified in the ACT hexaflex (see: Section 3.5). The four mindfulness-based processes are: (i) present moment awareness, (ii) acceptance, (iii) cognitive defusion (recognising internal experiences as temporary and viewing them objectively), and (iv) self-as-context or the experience as self as an observer of experiences (Fletcher & Hayes, 2005; S. C. Hayes et al., 2006). As outlined in Section 3.6, mindfulness is rarely measured as unique processes in ACT interventions. It is most frequently measured as a part of 'psychological flexibility', a construct that includes elements of mindfulness and values (e.g. AAQ, AAQ-II) (e.g., Bohlmeijer, Fledderus, et al., 2011; E Gifford et al., 2004; F. J. Ruiz, 2010), or with measures of cognitive defusion (e.g., Arch et al., 2012; Forman et al., 2012; Zettle et al., 2011). However, a number of ACT interventions have measured improvement in individual mindfulness processes as an outcome and mediator of change.

For example, mindfulness, measured with the MAAS, improved significantly more than a control group in an intervention targeting generalised anxiety disorder

(GAD) (Roemer et al., 2005). In an ACT intervention to improve intuitive eating, mindfulness (Observing, Acting with Awareness, and Non-reaction scales of the FFMQ) improved significantly compared to a control group, while the Describe and Non-judging scales did not change significantly (Sairanen et al., 2017). Further, in an ACT intervention to improve skills of clinical psychology trainees, all processes of the FFMQ changed over time, with the exception of Acting with Awareness (Pakenham, 2015), while in an ACT intervention for psychiatric patients, within-group gains in the MAAS were significant in the ACT group (Pinto et al., 2017).

Although few studies have isolated mindfulness as a process measure in RCTs, a meta-analysis of brief laboratory-based studies comparing components of ACT with controls found small to moderate effect sizes for change in combinations mindfulness components (Hedge's $g = 0.46$) and medium to large changes in present moment awareness, defusion and acceptance components (Hedge's $g = 0.64 - 0.81$) (Levin et al., 2015).

6.1.3 Contribution of values processes in ACT.

Both ACT and MBI interventions focus on the development of mindfulness in daily life. However, one of the key differences in the two interventions is the addition and centrality of the values component in an ACT intervention. This generally takes the form of specific exercises focused on the clarification of individual values and the focus on the application of mindfulness to daily life as a means to live in a more values-consistent manner (e.g., Wilson & Dufrene, 2009).

A limited body of evidence supports the theoretical stance of ACT that values-based action is a mechanism of change in ACT interventions. For example, in a single group ACT intervention for clinical psychology trainees, values-based action improved significantly and values-based action correlated with counselling self-efficacy and reductions in work-related stress, but only after, not before, the intervention (Pakenham,

2015). Values accomplishment changed more in ACT than TAU in an intervention to improve outcomes following bariatric surgery for obesity (Weineland & Hayes, 2012).

Only a few studies have isolated values-based action as a mediator of change in ACT interventions. Changes in ‘values attainment’ and ‘persistence in valued action in the face of barriers’ mediated the effect of ACT on seizures, quality of life and personal well-being in an intervention for the treatment of epilepsy (Lundgren et al., 2008).

Values-based action also mediated the effect of an ACT bibliotherapy-based intervention on general health outcomes for Japanese college students, compared with a waitlist control (Muto et al., 2011). Further, in a session-by-session analysis of mediators in CBT and ACT for mixed anxiety disorders in university students, committed action was found to mediate the effect of ACT on post-treatment worry and symptom intensity and goal progress (Forman et al., 2012).

6.1.4 Combined effect mindfulness and values in ACT.

While evidence supports that ACT interventions improve mindfulness and values-based living, there is some evidence that the combination of mindfulness and values components is more efficacious than either component alone. The meta-analysis of brief laboratory-based studies mentioned previously found small to moderate effect sizes for change in values components (Hedge’s $g = 0.41$) and combination mindfulness components (Hedge’s $g = 0.46$). However combinations of mindfulness and values components were found to have a stronger effect on targeted outcomes (Hedge’s $g = 1.37$) than any other single or combined process (Levin et al., 2015). For example, a laboratory-based study comparing the effects of a brief acceptance protocol, an acceptance and values protocol and a cognitive control-based protocol on pain tolerance found the values and acceptance protocol (a combination of mindfulness and values elements) resulted in the highest pain tolerance (Branstetter-Rost et al., 2009; Páez-Blarrina et al., 2008).

Further, some limited clinical evidence also suggests that adding values to mindfulness components improves outcomes. For example, using an AB type design, Hahs (2013) examined stress galvanic skin response (GSR) and self-reported depression outcomes for parents ($n = 3$) of children with autism over the course of a short mindfulness intervention and then again after the addition of valuing components (values and committed action). He found incremental improvements in GSR following the addition of valuing components and also that increases in psychological flexibility and decreases in experiential avoidance resulted only following the addition of the valuing elements.

However, the differences between the effects of mindfulness and values components are also likely to depend on the outcomes being targeted. As previously reviewed in Section 3.13, a study that compared the effects of defusion and acceptance elements of an ACT intervention with values elements of an ACT intervention found the values-based intervention resulted in stronger rates of improvement in quality of life, values-based action and Acting with Awareness (J. L. Villatte et al., 2015). However, the mindfulness elements were more efficacious for reducing symptoms and defusion and improving non-reactivity and acceptance.

6.1.5 Contribution of values processes to MBI interventions

MBIs exclusive of ACT rarely specifically target values processes. However, it has been suggested that values-related processes are key outcomes and processes of all mindfulness interventions, even when values are not particularly targeted in the intervention. For example, mindfulness theorists have suggested that constructs such as values clarification, observing, reflecting on and rediscovering values (Shapiro et al., 2006), contact with values and choiceful behaviour in line with values (Brown et al., 2007) and goal clarity and goal directed behaviour (Hölzel et al., 2011) result from mindfulness or mindfulness practice. The correlational evidence linking values-based

action and mindfulness highlighted in Section 4.2.1, supports a natural link between mindfulness and values but evidence that MBIs result in increased values clarity and values based action is limited.

For example, an increase in values-based action in an MBSR intervention was found to partially mediate the relationship between change in mindfulness and change in satisfaction with life (Guadagno, 2012). Values clarity has also been found to mediate the relationship between change in mindfulness and change in psychological distress in an MBSR intervention (Carmody et al., 2009). Although values processes were not measured in the previously mentioned unpublished trial comparing ACT and MBCT (Renner & Foley, 2013), the authors noted that students spontaneously spoke about life meaning during the course, despite an absence of explicit reference to values in the MBCT protocol.

6.2 Hypotheses

Based on reviewed evidence, and the results of Study 1, it was predicted that an intervention that targeted both mindfulness *and* values-based action (ACT) would result in incrementally more improvement in wellbeing than an intervention aimed at improving mindfulness alone. It was also anticipated that an intervention which focused more on mindfulness practice (MBI), would have a greater effect on reducing Negative Experiences, due to the strong negative relationship between Non-judging and Negative Experiences in Study 1 and previous evidence of the strong negative relationship between Non-judging and distress outcomes (Tran et al., 2013). This prediction was also based on the theory that a stronger focus on formal mindfulness practice would provide more exposure to aversive experience and therefore result in greater reductions in avoidance of aversive affect through desensitisation and extinction processes, as outlined in Section 2.4.3.

It was therefore hypothesised that:

1. Both the ACT and MBI groups would improve at significantly greater rates in all outcomes (Acting with Awareness, Non-judging, Values Progress, Values Obstruction, Negative Experiences, Positive Experiences, Flourishing and Perceived Stress), compared with the control group.
2. The ACT group would improve at a significantly greater rate in values-based action (Values Progress and Values Obstruction) and wellbeing outcomes (Positive Experiences and Flourishing), compared with the MBI group.
3. The MBI group would improve at a significantly greater rate than the ACT group in mindfulness (Non-judging and Acting with Awareness) and negative outcomes (Perceived Stress and Negative Experiences).

6.3 Method

Participants were randomly assigned to one of three conditions: MBI, ACT and a control group. Measures were taken at baseline (T1), post-intervention (T2) and at four weeks follow-up (T3). This trial was approved by The Australian National University Human Research Ethics Committee (Protocol 2013/352). The protocol for this trial is included as Appendix E. Supporting CONSORT checklist is available in Appendix F.

6.3.1 Participants and recruitment.

Participants ($n = 199$) were recruited through email lists, social media and research skills and training offices at three Australian universities. Recruitment targeted higher degree research and other post-graduate students ($n = 178$), however remaining places were allocated to other interested individuals connected with the universities, e.g. university staff and academics ($n = 21$).

Although a university sample was used as a convenient means to access the number of participants required to power a three condition RCT, there was some further

rationale further for this selection. University students have been found to report significantly higher levels of psychological distress compared to a normal population (Stallman, 2010). Between 48 and 67 per cent of students at Australian universities were found to have sub-syndromal mental health symptoms or elevated psychological distressed ($K10 > 21$) (Leahy et al., 2010; Stallman, 2010). Psychological distress experienced by medicine, law, psychology and mechanical engineering students was found to be 4.4 times greater than age-matched peers (Leahy et al., 2010). A Belgium study found that 51% of $n = 3659$ PhD students surveyed were found to have experienced at least two symptoms of poor mental health in the previous two weeks and 32% of PhD students were at risk of developing a psychiatric disorder, a figure that was significantly higher than other highly educated samples (Levecque, Anseel, De Beuckelaer, Van der Heyden, & Gisle, 2017). Given the high levels of distress in university populations, and post-graduate or PhD students in particular, and a high acceptability of ACT-based treatments for university students (e.g., Räsänen, Lappalainen, Muotka, Tolvanen, & Lappalainen, 2016; Renner & Foley, 2013), it was expected that participants might present with high enough levels of distress to both benefit from interventions and measure the effects of the interventions on broad measures of psychological distress and wellbeing.

The intervention was advertised as a course in “Mindfulness and Resilience” (see Appendix G for an example of an advertisement for the workshops). Participants paid an upfront fee of AU\$100 to attend the course but were aware they would be eligible for a refund of their fee on meeting specific conditions. To be eligible for a refund, participants were told they would need to attend all three workshops, complete the three main surveys and complete 75% (or at least 15/20) of SMS-based daily surveys (these data is not included in this study). Those allocated to the control group were offered the same workshops later in the year after the study was completed. Those

in the control group were only required to pay for their course if they did not complete the three surveys prior to attending their workshops (however, all participants in the control group who attended later workshops had completed the three surveys). These details were included in the informed consent forms completed by participants included as Appendix H.

Participants' ages ranged from 18 to 60 years ($M = 34.53$ years, $SD = 11.17$) and 73% were female. Ethnicities included Caucasian (70.9 %), Asian (14.6%), Aboriginal or Torres Strait Islanders (1%) and other (13%).

6.3.2 Randomisation and participant flow.

The participant flow for the trial is shown in Figure 6.1. After registering online for the course, $n = 334$ participants were randomly allocated to MBI, ACT, or waitlist control group, within their particular location. Randomisation was carried out using an automated simple, non-stratified randomisation process powered by the online survey tool, Qualtrics. Sixty participants opted out of the study after allocation to their condition. As participants were blind to their condition, withdrawal was most likely based on the payment of an upfront fee or on the inability of participants to attend their workshops on their allocated dates and days. For example, the MBI groups were run on Saturday mornings at location 1 and 3, and the ACT groups on Saturday afternoons at location 1 and 3. The workshops at location 2 were either held on a Thursday (MBI) or Friday (ACT). The waitlist control groups were scheduled for October and November (closer to end of year exams), while the active conditions were held in August to September. Of the $n = 290$ that accepted their allocation, 199 completed payment, informed consent and online baseline measures and were eligible for the study.

Although fewer participants were randomly assigned to the control group (ratio of 0.9:1:1 control, MBI and ACT groups respectively), the control group had the highest number of participants at baseline (1.4:1:1), due to lower initial drop-out. The reduced

initial drop-out in the control group for the baseline measurement was presumably due to the absence of upfront financial commitment for the control group. As outlined in Figure 6.1, over the course of the intervention, five withdrew from the MBI group, 10 from the ACT group and 25 from the control group. Reasons given for withdrawal from intervention groups included sickness, scheduling and workload issues and dislike of the course. The number of participants that completed the post-test measure was 168 and the follow-up measure was 159.

Screening was conducted based on baseline levels of psychological distress as measured by the Kessler Psychological Distress Scale (K10; Kessler et al., 2002). The K10 has a scoring range of 10 – 50, with levels of psychological distress estimated as ‘normal’ when rated 0 - 15, ‘moderate’ when rated 16 - 21, ‘high’ when rated 22 - 29, and ‘very high’ when rated from 30 - 50 (Australian Bureau of Statistics, 2007; Kessler et al., 2010). At baseline, K10 scores were $M = 22.41$, $SD = 6.49$; median = 22; Mode = 24, with 28 participants scoring $K10 > 29$ and therefore experiencing very high levels of psychological distress. The allocation of these participants to groups was MBI = 8, ACT = 7 and control = 13.

The participants scoring $K10 > 29$ were contacted to inquire about mental health by a registered psychologist (the author) and offered extra support during sessions if required. No participants were excluded due to K10 scores or mental health issues.,

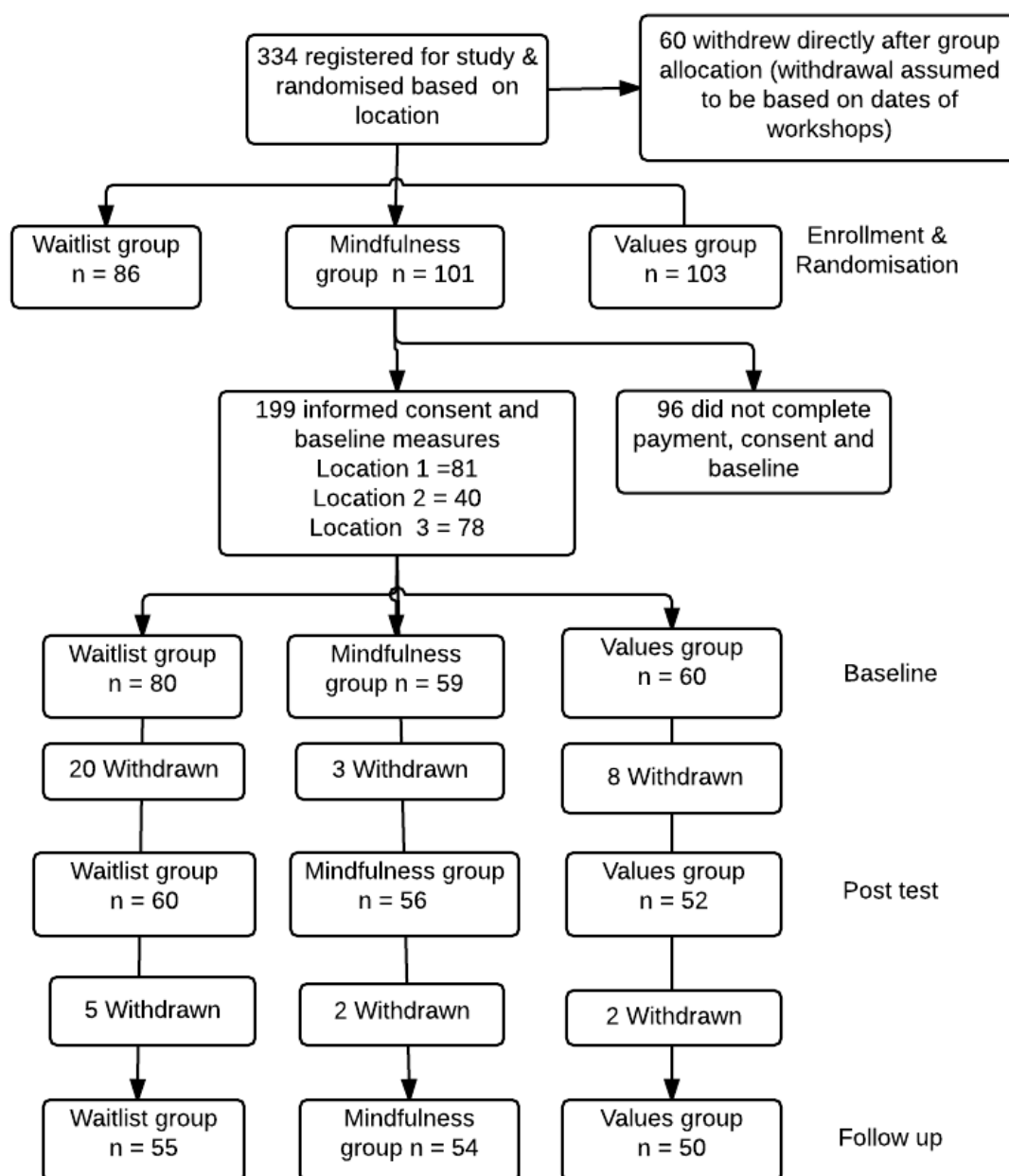


Figure 6.1. Participant flow diagram.

6.3.3 Interventions.

Each intervention consisted of 3 x 3 hour workshops delivered over a period of five weeks (two weeks between workshops 1 and 2 and the third workshop 3 weeks after workshop 2). The two interventions (ACT and MBI) were delivered at each of the three university locations. The workshops were co-facilitated by the author (a psychologist trained in advanced ACT with four years ACT-based group experience)

and another PhD student and mindfulness instructor with 10 years of experience conducting organisational and community workshops.

Protocols were adapted from previously published protocols so only brief outlines are included in the body of the thesis along with an account of adaptations. As outlined in Table 6.1, the MBI intervention was based on key and common elements of an MBSR intervention (Kabat-Zinn, 1992) and the ACT was based on elements of a previously published 3 x 3 hour ACT-based workplace protocol ((Flaxman & Bond, 2010a; Flaxman et al., 2013) with the addition of the choice point model (Ciarrochi et al., 2014; Harris, 2014). The nine hour intervention was selected as the number of contact hours was more realistically comparable to a typical clinical intervention in Australia (10 Medicare refunded sessions) and therefore likely to be more comparable to the levels of instruction typically received in one-on-one clinical interventions. The 3 x 3 ACT protocol had also been the subject of number of other RCTs resulting in positive outcomes (Bond & Bunce, 2003; Flaxman & Bond, 2010a). Therefore, an equivalent length MBI package was designed based on MBSR as a comparison condition.

Both interventions were delivered in the 3 x 3 hour format and included formal and informal mindfulness exercises, presentation of key concepts via Powerpoint, discussions in pairs and groups and homework tasks. However, the ACT intervention also included values clarification exercises and instruction on the integration of mindfulness and values-based action in daily life which reduced time given to mindfulness practice in the ACT condition to about half as long as that in the MBI condition. The choice point model (illustrated in Figure 6.2) was introduced in ACT workshop 2 as a means to conceptualise the application of mindfulness and values-based action in response to stressful or difficult life events. Participants were encouraged to identify specific stressful or difficult situations in their lives and use the

choice point tool as a framework to identify habitual “away” moves (that is behaviour that is away from or inconsistent with their values) and difficult internal experience showing up at those times. They were then encouraged to identify potential “toward” moves (behaviour consistent with values) and apply mindfulness and acceptance skills to barriers to toward moves. Their ability to *choose* to connect with, and act on values, despite the presence of difficult emotions and experiences was emphasised and this was practiced as homework. Full protocols are attached as Appendix E.

6.3.4 Treatment fidelity and facilitator competence.

All sessions were audio recorded with consent of participants. Protocol adherence and facilitator competence checks were conducted on six sessions in total - one from each of the three sessions in the MBI condition and one from each of the three sessions in the ACT condition. Therefore, checks were carried out on 30% of the workshops delivered (2 conditions x 3 locations x 3 workshops) consistent with the recommendations of Öst (2008). The checks were conducted by a third year doctoral student in clinical psychology, trained in MBSR and ACT. Checks consisted of three elements: (i) treatment fidelity or adherence to key points in group protocols; (ii) adherence to ACT/MBSR principles; and (iii) facilitator competence ratings. Scales were adapted from those used in other ACT-based RCTs (e.g. Twohig, Hayes, & Masuda, 2006).

Treatment fidelity.

To ensure adherence to treatment manuals, written protocols were compared with audio recordings. Only one deviation from the protocol was identified. In a group discussion in the MBSR group, a facilitator mentioned using mindfulness to make choices of behaviour (which was more consistent with the ACT protocol than the MBI protocol). However, overall adherence to the protocol manual was rated as 5/5 for both ACT and MBI workshops.

Adherence to ACT/MBI principles.

Adherence to core ACT principles and MBSR skills was then rated using adapted versions of the ACT Scale for Rating Therapist's Adherence to the ACT Treatment Protocol (Twohig et al., 2006). One key adaption was made to the ACT scale. The principle of "creative hopelessness and exploring previous efforts to control or avoid" was replaced with a focus on mindfulness as both a practice and an applied process. While 'creative hopelessness' is key to ACT interventions in clinical contexts, it was not included in the workplace-based 3 x 3 protocol on which this intervention was based (Flaxman et al., 2013). The rating scale for the MBI intervention was based on the ACT rating scale, it was adapted to reflect core mindfulness components drawn from MBCT-based rating scales (e.g. Segal, Teasdale, Williams, & Gemar, 2002). Both scales also included anti-ACT/mindfulness items to rate for exclusion. These included "challenging cognitions" and "experiential avoidance change strategies" in both ACT and MBI scales and "cognitive therapy rationale" and "thoughts and feelings cause action" in the ACT rating scale. Adherence to each of the principles was rated on a five point scale of 1 (not at all: the variable never explicitly occurred) to 5 (extensively: the variable occurred with great frequency and was address in an in-depth manner).

The MBI intervention was rated as 33/34 for adherence to MBI principles and the ACT intervention was rated as 43/45 for adherence to ACT principles. Items number 4 (e.g. thoughts/feelings do not lead to actions) and 9 (thoughts and feelings cause actions) were not rated 4/5 due to a reference in one of the groups to the connection between thoughts feelings and behaviour. However, it was stressed throughout the workshops that while there can be a connection between thoughts, feelings and behaviour, overt behaviour is under volitional control. See Appendix I1 and I2 for rating scales and scores.

Therapist competence.

Competence of trainer style and delivery was assessed by the same assessor using two scales adapted from Chawla et al. (2010). The first scale assesses therapist style/approach (e.g. rating the therapists' "ability to elicit and respond to both verbal and nonverbal feedback"). Both facilitators were rated 18/20. The second scale assessed overall therapist performance (e.g., "How would you rate the ability of the therapists to keep the session focused and on topic?"). Both facilitators were rated as 20/20. See Appendix I3 and I4 for feedback forms.

Table 6.1
Summary and Comparison of MBI and ACT Intervention Elements

<u>Workshop 1</u>	
Mindfulness	ACT
Stress response • Overview of the stress response • Stress audit	Two skills diagram • Introduction of relationship between mindfulness and values
Introduction to mindfulness • Definition of mindfulness • Raisin eating exercise	Introduction to mindfulness • Definition of mindfulness • Raisin eating exercise
Attitude and intention in mindfulness practice • Explanation of attitudes of mindfulness • Overview of mind wandering and directing attention • Mindful breathing exercise	Introduction to formal mindfulness practice • Formal body and breath awareness exercise • Discussion on types of mindfulness practice and different foci for practice • Overview of mind wandering and directing attention
Pleasant and unpleasant experiences • Exercise noting pleasant / unpleasant sensations in the body	Introduction to values • Definition of values • Values card sort
Home practice • Formal mindfulness practice: One guided meditation per day • Informal mindfulness practice: One routine activity to perform mindfully each day • Identifying one unpleasant experience / issue to infuse with mindfulness	Introduction to values-based actions • Definition of values-based action • Writing exercise values-consistent and inconsistent actions and identifying new actions for this week Home practice • Identifying three values-based actions to be performed over next two weeks • Formal mindfulness practice: At least three times over next two weeks • Informal mindfulness practice daily

Workshop 2

Mindfulness	ACT
Review of home practice • Peer-to-peer discussion and whole-of-group review • Identifying an additional routine activity to perform mindfully	Mindfulness practice • Mindfulness exercise (breath and body)
Attention and mind wandering • The STOP exercise • Overview and discussion of typical responses to unwanted thoughts • The body scan	Review of home practice • Peer-to-peer discussion and whole-of-group review • Identifying an additional routine activity to perform mindfully
Stress as bodily sensations and thoughts • Stress recall exercise • Exercises drawing bodily sensations and writing down thoughts associated with a stressful experience	Mindfulness of thoughts • The Leaves on a Stream exercise • Overview and discussion of the judgmental mind • “Passengers on the bus” metaphor
Moving mindfulness • Guided tai-chi exercises	Defusion • Writing exercise of hot thoughts • Defusion exercise “I notice I’m having the thought ...”
Perspective taking • Choiceless awareness meditation	Experiential avoidance • Overview of typical responses to strong emotions • Experiential exercise – physicalising strong emotions
Home practice • Formal mindfulness practice: One guided meditation per day (5-20 min meditations provided on a website) • Informal mindfulness practice: Nominating one routine activity to perform mindfully each day • Identifying one ongoing unpleasant experience / issue to bring bodily and thought-awareness to • Using the STOP exercise between activities to gain calm and focus	Choice point introduction • Introduction of choice point tool • Writing exercise identifying an ongoing stressful situation and application of choice point to this situation
	Home practice • Apply skills to stressful situation identified in Choice point exercise • Formal mindfulness practice: At least 10 minutes 2 x a week • Performing one routine activity mindfully each day.

Workshop 3	
Mindfulness	ACT
Review of home practice • Peer-to-peer discussion and whole-of-group review Stress audit • Stress audit exercise and peer discussion Mindfulness and self-compassion • Self-compassion meditation Goal setting Self-reflection and writing; peer discussion	Review of home practice • Peer-to-peer discussion and whole-of-group review Review of content • Summary of skills • Group discussion Observer self/Self-as-context • Chess board metaphor • Self-as-context experiential exercise and discussion Reflection and future commitment • Exercise: ‘Looking back from future’ at achievements and values • Goals and values writing exercise

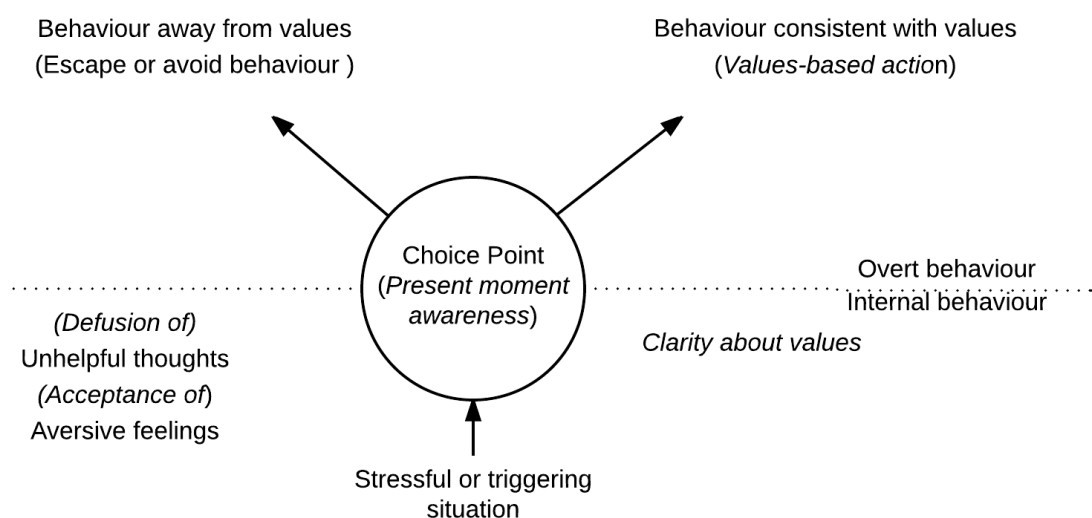


Figure 6.2. The Choice point model.

6.3.5 Measures.

All measures were completed online at baseline (T1), post-intervention (T2; at 5 weeks) and follow-up (T3; at 9 weeks) and were phrased in the past tense and referenced experiences in the past four weeks.

Primary outcome measures.

Consistent with Study 1b, eudemonic wellbeing was measured with the Flourishing Scale (Diener et al., 2009), an 8-item measure of self-reported success in areas of wellbeing including relationships, competence, self-esteem, purpose and optimism ($\alpha = .89$ in this study). Hedonic wellbeing was measured with the Scale of Positive and Negative Experience (SPANE; Diener et al., 2009), which comprises six items that measure positive feelings and experiences (SPANE-P) ($\alpha = .89$) and six items for negative feelings (SPANE-N) ($\alpha = .79$). Stress was measured with the Perceived Stress Scale (PSS; Cohen et al., 1983), a 10-item measure of the degree to which life situations are appraised as stressful (unpredictable, uncontrollable and overwhelming) over the past month ($\alpha = .83$).

Process measures.

Also consistent with Study 1b, the 10-item Valuing Questionnaire (VQ; Smout et al., 2014) measured values-based action in the four weeks. It comprised of two subscales – Values Progress, the extent to which people felt they lived in accordance with their values ($\alpha = .81$) and Values Obstruction – the extent to which psychological barriers interfered with enacting values ($\alpha = .75$).

Mindfulness was measured using two scales of the Five Factor Mindfulness Questionnaire (FFMQ; Baer et al., 2006), Acting with Awareness ($\alpha = .92$) and Non-judging ($\alpha = .94$). Only two subscales were selected to reduce burden on participants. These specific subscales were selected to measure the separate contributions of two key factors of mindfulness (Bishop et al., 2004) – attention (measured with Acting with Awareness) and acceptance (measured with Non-judging). These two subscales have also been found to be the strongest predictors of psychological distress and values-related variables of all the FFMQ scales (Baer et al., 2006; Bohlmeijer, ten Klooster, et

al., 2011; Cash & Whittingham, 2010; Tran et al., 2013) and amongst the strongest predictors of wellbeing of the FFMQ subscales (Baer et al., 2008; Cash & Whittingham, 2010; Hollis-Walker & Colosimo, 2011). Internal reliability for the Acting with Awareness and the Non-judging scale has been found to be good ($\alpha = 0.80 - 0.89$) and factor loadings vary from acceptable to high for the two scales (Bohlmeijer, ten Klooster, et al., 2011; Tran et al., 2013; Veehof et al., 2011).

6.3.6 Analysis approach.

Analysis was carried out using a mixed effects linear model consistent with other peer reviewed trials involving three or more conditions (e.g. Sauer-Zavala et al., 2013; Uliaszek, Rashid, Williams, & Gulamani, 2015; Westin et al., 2011). Analysis was carried out using SPSS version 23.0. A power analysis based on a multi-level repeated measures design following Twisk (2003) was conducted based on the assumption of an alpha of .05 and a medium effect size (0.40 to 0.5 SD between conditions) (see: Khoury et al., 2013; Öst, 2014)⁶ with three observations and an equal ratio of participants between intervention and control groups. To achieve a power of 80%, with a best case scenario of a within-person correlation (ρ) of .5 and effect size of $SD = 0.5$, it was calculated that a sample size of 47 would be required, while in a worst-case scenario with a ρ of .7 and effect size of $SD = 0.3$, a sample size of 148 was needed. Thus to allow for a 25% attrition rate, a sample size of 200 participants was targeted. The final sample of 199, which reduced to 159 by follow-up, was sufficient to meet the worst-case scenario.

Linear mixed effects models.

With an intent to treat approach, mixed effects linear models with random participant intercepts were used to examine change in dependent variables as a function

⁶ These metaanalyses report active vs waitlist effect sizes of $g / d = 0.4$ to 0.5 which is interpreted as a medium effect size (e.g. 0.5 is medium; 0.8 is large).

of group (control group as reference), time (baseline as reference) and the group x time interaction. Models were estimated with maximum likelihood, and a scaled identity as a repeated covariance type and a variance components covariance type. Unlike other standard sum-of-the-squares approaches, the mixed effects method retains all participant data despite subsequent drop-out. The intraclass correlation coefficients (ICCs) were calculated to assess the percentage of variance accounted for by between-person differences at baseline and to compare this with models with additional effects. Three separate models were then estimated to examine the impact of the intervention on the DVs. First an empty model incorporated just a random intercept. Model 1 incorporated the random intercept and main effects for time and group. Finally, Model 2, incorporated Model 1 and included an interaction between time and group. The main effects were reported first, then time by condition interactions were reported to compare the between group changes over time, compared with the control condition.

Tests for statistically significant differences between groups at post-intervention and follow-up were performed using t-tests. These were based on estimated marginal means (the mean response for each factor, adjusted for other variables in the model from the interaction models) from Model 2. Within-group effect sizes (from baseline to follow-up) were calculated with Cohen's *d* (J. Cohen, 1988), that is dividing the mean difference across time by the pooled standard deviation, and corrected for dependence of means using Morris and DeShon's (2002) correction for within-subject designs. A between group effect size was not calculated due to a lack of consensus regarding their suitability when calculating the different sources of variance (e.g. fixed and random effects) in a mixed effects model (Feingold, 2013; Selya, Rose, Dierker, Hedeker, & Mermelstein, 2012).

6.4 Results

Table 6.2 details baseline demographics and K10 (psychological distress) scores

via group. These were compared across groups with one-way ANOVAs and Pearson's chi-squared tests to check for difference between groups at baseline. No significant differences in age, gender, ethnicity or K10 were found between groups at baseline. Outcome variables were also compared across groups at baseline with one way ANOVAs. No significant differences were identified in any variable. However, as detailed in Section 6.4.1, there were some significant differences between estimated marginal means of interaction models at baseline. To ensure the equivalence of the three intervention locations, three way interactions were also tested between intervention, time and location for each outcome variable. None of these interactions were significant.

Table 6.2

Demographic and Clinical Characteristics of Participants at Baseline

	MBI (<i>n</i> = 59)		ACT (<i>n</i> = 60)		Control (<i>n</i> = 80)		Comparison test
	<i>M</i>	SD	<i>M</i>	SD	<i>M</i>	SD	<i>F</i> tests
Age	35.14	11.29	33.15	11.44	35.13	10.89	$f(2, 196) = .654, p = .521$
K10 score	21.56	6.30	22.63	6.26	22.8	6.84	$f(2, 194) = .661, p = .518$
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	Chi-squared test
Female	43	73	46	77	56	70	$\chi^2(2) = .77, p = .680$
Ethnicity							$\chi^2(6) = 5.25, p = .512$
Caucasian	41	70	45	75	55	69	
Asian	9	15	10	17	10	13	
Aboriginal	0	0	0	0	2	2	
Other	8	13.6	5	8	13	16	

6.4.1 Linear mixed analysis.

Examination of estimated marginal means of the interaction models, outlined in Table 6.5 and Table 6.6, indicated a number of significant differences at baseline, despite randomisation. The ACT group reported significantly higher Values Obstruction than the MBI group ($t(59) = 2.03, p = .02$) and significantly lower Flourishing than the MBI group ($t(58) = 2.04, p = .05$) and the control group ($t(59) = 2.00, p = .05$). This is most clearly illustrated in Figure 6.3. While no other variables were significantly different between groups at baseline, Figure 6.3 illustrates a pattern by which the MBI group tends to be lower in distress and higher in positive variables than the ACT and control groups and the ACT and control groups tends to be lower in distress and higher in positive variables than the MBI group.

The empty models with random intercepts indicated that only 42 – 58% percentage of the variance in the outcomes were accounted for between individuals suggesting substantial within-person change. When main effects were added in Model 1, the ICC range increased to a range from 43 – 62%, and when the interaction was added in Model 2, it increased to a range of 43 – 64%.

6.4.2 Main effects for time and group.

Main effects for time and group are reported in Tables 6.2 and 6.3. Main effects for time indicated that there were significant rates of improvement from T1 to T2 and T1 to T3 in Flourishing, Positive Experiences, Values Progress, Non-judging and Acting with Awareness (T3 only) and significant rates of decline in Negative Experiences and Values Obstruction, compared with the control group. There were no significant main effects for Perceived Stress. This was because the control group increased in Perceived Stress over time, while the intervention groups decreased, as indicated by the estimated marginal means in Table 6.5. Main effects for group

indicated that both experimental groups improved at a significantly greater rate than the control group in Perceived Stress, Negative Experiences and Acting with Awareness and Non-judging, and at a greater rate in the ACT group in Values Obstruction and the MBI group in Positive Experiences.

6.4.3 Time by condition interactions.

As reported in Table 6.3 and 6.4, the inclusion of a group x time interaction (Model 2) revealed significant associations between the ACT group and all outcomes variables at T2, except Negative Experiences. In the MBI group at T2, associations between MBI and all outcomes were significant, with the exception of Flourishing, Values Progress and Non-judging. However, by T3, all associations between both ACT and MBI and outcomes were significant for all variables, except for Negative Experiences in the ACT group and Values Progress in the MBI group.

Attenuation of the main effects, for most variables, indicated no significant change in the control group over time. The key exceptions were for Flourishing and Perceived Stress, both of which changed substantially in the control group from baseline to follow-up, and thus showed increases in main effects in the interaction model. These differences are detailed in Section 6.4.5.

Table 6.3

Differences in Outcomes Between Groups and Measurement Occasion for Model 1 (Main Effects) and Model 2 (Main and Interaction Effects)

	Flourishing		Perceived Stress		Negative Experiences		Positive Experiences	
	M1 B (SE)	M2 B (SE)	M1 B (SE)	M2 B (SE)	M1 B (SE)	M2 B (SE)	M1 B (SE)	M2 B (SE)
<i>Fixed Effects</i>								
Constant	40.35 (.78)	41.76 (.83)	20.36 (.53)	19.29 (.57)	18.50 (.36)	17.96	19.75 (.40)	20.50 (.42)
Time (ref baseline)								
Time 2	2.00 (.52)***	.19 (.82)	-.56 (.39)	1.24 (.62)*	-1.30 (.29)***	-.45 (.46)	1.06 (.28)***	-.21 (.44)
Time 3	1.45 (.53)**	4.78 (1.22)***	-.64 (.39)	1.47 (.63)*	-1.61 (.29)***	-.49 (.48)	.79 (.28)**	-.75 (.45)
Group (ref control)								
ACT	.52 (1.11)	-.50 (1.26)*	-1.85 (.76)*	.31 (.88)	-.67 (.50)***	.004 (.61)	.70 (.57)	-.71 (.65)
Mindfulne	1.98 (1.12)	.27 (1.27)	-2.20 (.76)**	-.78 (.88)	-1.30 (.29)***	-.48 (.61)	1.33 (.57)*	.25 (.64)
Group x time								
ACT T2		4.32 (.122)***		-3.87 (.92)***		-1.20 (.69)		2.52 (.66)***
MBI T2		1.58 (1.20)		-2.17 (.91)*		-1.53 (.69)*		1.55 (.64)*
ACT T3		6.50 (1.24)***		-3.78 (.93)***		-1.22 (.71)		2.52 (.67)***
MBI T3		4.78 (1.22)***		-2.92 (.92)**		-2.29 (.70)***		2.32 (.66)***
<i>Random Effects</i>								
Random	32.81 (4.34)	33.15 (4.28)	14.27 (2.01)	14.22 (1.96)	5.48 (.90)	5.52 (.98);	8.22 (1.12)	8.24 (1.10)
Residuals	23.42 (1.83)	21.41 (1.67)	13.00 (1.02)	12.18 (1.96)	7.32 (.58)	7.48 (.89)	6.57 (.51)	6.17 (.48)

Note. M1 = Model 1 (main effects only model), M2= Model 2 (main and interaction model), B = unstandardized coefficient, SE = Standard Error and Random Int. = Random intercept. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 6.4

Differences in Process Variables Between Groups and Measurement Occasion for Model 1 (Main Effects) and Model 2 (Main and Interaction Effects)

	Values Progress		Values Obstruction		Acting with Awareness		Non-judging	
	M1 B (SE)	M2 B (SE)	M1 B (SE)	M2 B (SE)	M1 B (SE)	M2 B (SE)	M1 B (SE)	M2 B (SE)
<i>Fixed Effects</i>								
Constant	18.09 (.48)	18.73 (.53)	16.62 (.55)	15.38 (.59)	21.29 (.56)	22.05 (.61)	21.92	23.13 (.84)
Time (ref baseline)								
Time 2	1.35 (.36)***	.33 (.59)	- 2.65 (.40)***	-.83 (.63)	.81 (.80)	1.00 (.64)	3.49 (.47)***	2.06 (.74)**
Time 3	1.47 (.37)***	.13 (.60)	- 2.54 (.41)***	.30 (.65)	2.22 (.39)*	1.25 (.66)	3.89 (.48)***	.60 (.76)
Group (ref control)								
ACT	1.03 (.68)	-.58 (.81)	-2.65 (.40)***	1.34 (.91)	2.2 (.39)***	-.36 (.93)	2.59 (1.17)*	.84 (1.29)
Mindfulness	1.02 (.68)	.53 (.81)	-1.32 (.79)	-.90 (.91)	2.87 (.40)***	.39 (.92)	2.37 (1.17)*	.09 (1.28)
Group x time		-						
ACT T2		2.71 (.87)**		-3.86 (.93)***		2.00 (.94)*		3.16 (1.09)**
MBI T2		.61 (.85)		-2.02 (.91)*		2.00 (.93)*		1.47 (1.08)
ACT T3		2.9 (.89)***		-5.59 (.95)***		2.94 (.96)**		5.19 (1.12)***
MBI T3		1.34 (.87)		-3.39 (.93)***		2.19 (.95)*		4.99 (1.10)***
<i>Random Effects</i>								
Random Intercept	11.11 (1.63)	11.26 (1.62)	15.40 (2.15)	15.61 (2.10)	16.41 (2.23)	16.41 (2.22)	38.57 (4.69)	39.09 (4.67)
Residuals	11.48 (.90)	10.99 (1.62)	13.87 (1.08)	12.52 (.97)	13.30 (1.03)	12.89 (1.00)	18.79(1.47)	17.18 (1.34)

Note. M1 = Model 1 (main effects only model), M2= Model 2 (main and interaction model), B = unstandardized coefficient, SE = Standard Error and Random Int. = Random intercept. * $p < .05$; ** $p < .01$; *** $p < .001$

6.4.4 Comparing MBI with ACT.

To examine differences between the two intervention groups, separate linear mixed effects models were performed with the mindfulness group as a reference group. Interaction effects revealed only two significant differences between intervention groups. The rate of improvement in Values Obstruction from T1 to T3 in the ACT group was significantly greater than the MBI group ($B = -2.20$, $SE = .99$, $p = .031$) and the rate of improvement from T1 to T2 in Values Progress was significantly greater in the ACT group than the MBI group ($B = 2.09$, $SE = .88$; $p = .019$), but rates of change were no longer significantly different in Values Progress at follow-up ($B = 1.55$, $SE = .89$; $p = .085$). No other differences between groups in these models were statistically significant.

6.4.5 Comparison of estimated marginal means.

The estimated marginal means from the interaction models are displayed in Table 6.5 (outcome variables) and Table 6.6 (process variables). They are also illustrated in Figure 6.3.

Mean changes in the control group

Means for each of the variables in the control group were examined to ascertain if the control group changed significantly over time. The only variable in the control group that reported significant change from either T1 to T2 or T1 to T3 was Perceived Stress which increased significantly from T1 to T3, ($t(49) = 2.37$, $p = .02$, $d = .29$). Reductions in Flourishing in the control group trended toward significance, $t(67) = 1.73$, $p = .09$, $d = .38$. It was posited that this increase in Perceived Stress in the control group could be attributed to the increasing academic demands associated with the approach of the end of the academic year.

Mean differences between experimental and control groups

Estimated marginal means of each time by condition interaction are reported in Table 6.5 and 6.6 along with within-group effect sizes of changes from baseline to follow-up. At T2, differences between the ACT group and the control group were significant in Perceived Stress, $t(51) = 3.75, p < .001$, Positive Experiences, $t(55) = 2.60, p = .012$, Values Progress, $t(51) = 2.45, p = .018$, Values Obstruction, $t(51) = 2.58, p = .013$, Acting with Awareness $t(51) = 2.30, p = .026$ and Non-judging $t(51) = 2.50, p = .016$. At T2, differences between the MBI group and the control group were significant in Perceived Stress, $t(55) = 3.14, p < .003$, Positive Experiences, $t(55) = 2.60, p = .012$, Negative Experiences, $t(55) = 3.09, p = .003$ and Values Obstruction, $t(55) = 3.04, p = .004$. At T3, all means in the ACT and MBI groups were significantly different from the control group with two exceptions. The ACT group was not significantly lower in Negative Experiences than the control group, $t(51) = 1.82, p = .075$, and the MBI group was not significantly greater than the control group in Acting with Awareness, $t(53) = 1.83, p = .073$.

Mean differences between experimental groups.

A comparison of estimated marginal means at each time point revealed no significant differences between ACT and MBI groups in any variable at T2. However, at T3, the MBI group was significantly lower than the ACT group in Negative Experiences, $t(49) = 2.27, p = .027$ as illustrated in Figure 6.3. There were no other significant differences in means between ACT and MBI groups at T3 in any other outcomes.

Table 6.5

Estimated Marginal Means and Standard Errors for Each Outcome Measure by Group and Time and Within-group Effect Sizes from Baseline to Follow-up

	MBI		ACT		Control	
	M	SE	M	SE	M	SE
<i>Flourishing</i>						
Baseline	42.03	.96	39.27	.95	41.76	.83
Post-intervention	43.81	.98	43.78	1.00	41.96	.91
Follow-up	44.66	.99	43.61	1.01	39.61	.93
Cohen's <i>d</i>	0.35		0.60**		-0.38	
<i>Perceived Stress</i>						
	-1.701		0.977			
Baseline	18.51	.67	19.60	.66	19.29	.58
Post-intervention	17.58	.69	16.97	.70	20.53	.64
Follow-up	17.04	.69	17.92	.71	20.76	.66
Cohen's <i>d</i>	-0.29		-0.45*		0.29	
<i>Positive Experiences</i>						
Baseline	20.75	0.49	19.78	0.49	20.50	0.42
Post-intervention	22.09	0.51	22.10	0.52	20.29	0.47
Follow-up	22.32	0.51	21.55	0.52	19.75	0.48
Cohen's <i>d</i>	0.38*		0.40**		-0.10	
<i>Negative Experiences</i>						
Baseline	17.48	0.46	17.97	0.46	17.96	0.40
Post-intervention	15.50	0.48	16.31	0.49	17.51	0.45
Follow-up	14.69	0.48	16.26	0.49	17.48	0.46
Cohen's <i>d</i>	-0.63***		-0.49**		-0.14	

Note. Cohen's *d* is the within-group effect size from baseline to follow-up based on estimated marginal means for each cell. Significance levels refer to t-tests measuring change in means from baseline to follow-up.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 6.6

Estimated Marginal Means and Standard Errors for Each Process Measure by Group and Time and Within-group Effect Sizes from Baseline to Follow-up

Measure	MBI		ACT		Control	
	M	SE	M	SE	M	SE
<i>Values Progress</i>						
Baseline	19.25	0.61	18.15	0.61	18.73	0.53
Post-intervention	20.19	0.63	21.19	0.64	19.06	0.59
Follow-up	20.72	0.63	21.18	0.65	18.86	0.61
Cohen's <i>d</i>	0.29		0.63***		0.02	
<i>Values Obstruction</i>						
Baseline	14.48	0.69	16.72	.69	15.38	.593
Post-intervention	11.62	0.70	12.03	.72	14.54	.657
Follow-up	11.39	0.71	11.43	.73	15.68	.676
Cohen's <i>d</i>	-0.57**		-0.94***		-0.02	
<i>Act-aware</i>						
Baseline	21.70	.71	22.43	.70	22.05	.61
Post-intervention	24.66	.72	25.39	.74	23.05	.70
Follow-up	25.14	.73	26.63	.74	23.30	.69
Cohen's <i>d</i>	0.60***		0.86***		0.25	
<i>Non-judging</i>						
Baseline	23.97	.98	23.22	1.0	23.13	.84
Post-intervention	27.49	.99	28.44	1.0	25.18	.91
Follow-up	29.56	1.0	29.01	1.02	23.73	.93
Cohen's <i>d</i>	0.89 ***		0.88***		0.10	

Note. Cohen's *d* is the within-group effect size from baseline to follow-up based on estimated marginal means for each cell. Significance levels refer to t-tests measuring change in means from baseline to follow-up.

* $p < .05$, ** $p < .01$, *** $p < .001$.

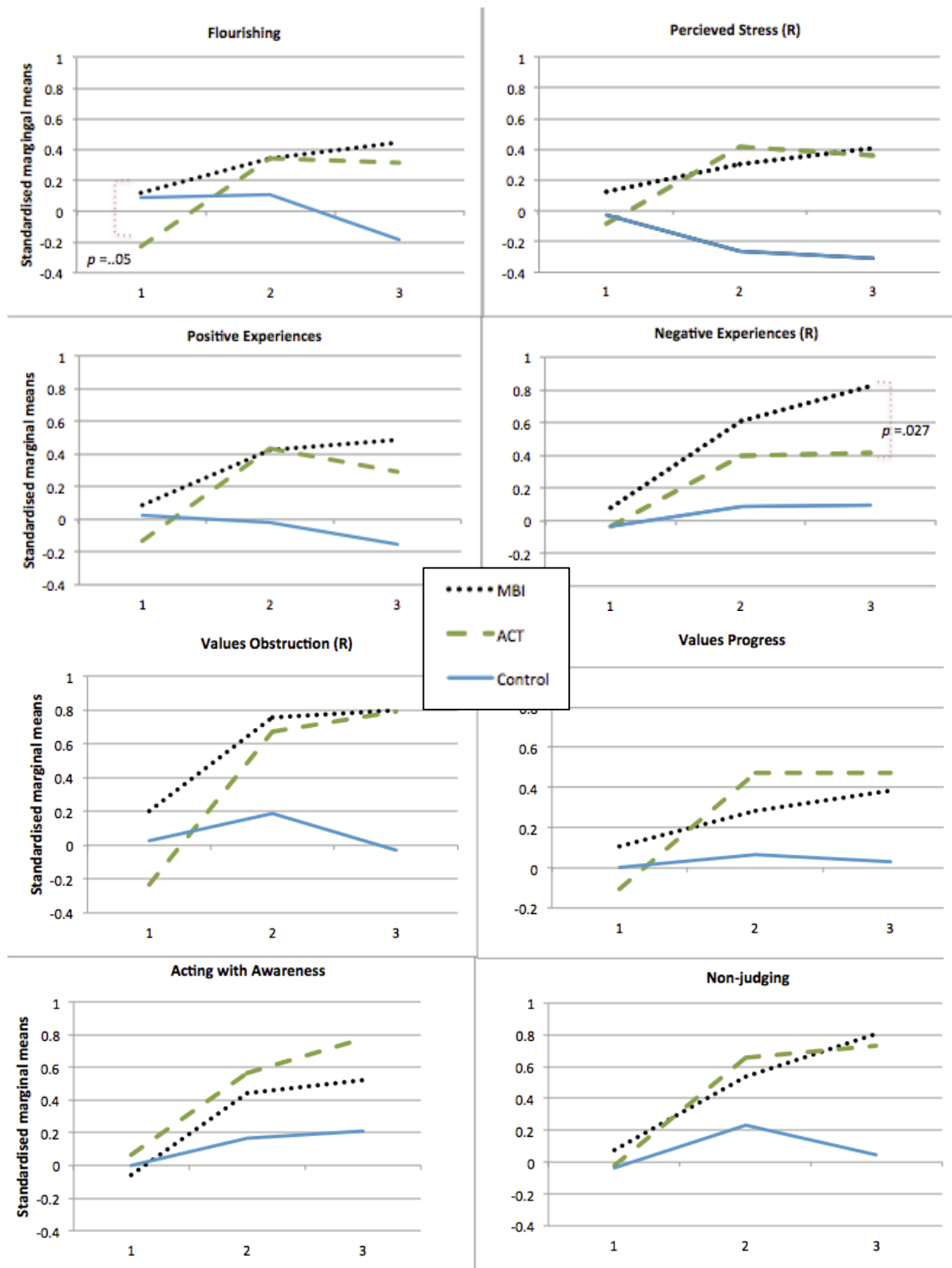


Figure 6.3. Standardised marginal means for outcome variables for interaction models. Negative scales have been reversed. Significant differences between intervention groups and their p values are also displayed.

6.5 Brief Discussion

This RCT sought to examine if an ACT intervention was more effective than a MBI intervention in improving wellbeing and reducing psychological distress. Results indicated no significant differences in the rates of change between ACT and MBI groups in wellbeing and distress variables. However, the ACT group changed at a significantly greater rate than the MBI group in Values Progress (at T2, but not by T3) and Values Obstruction (at both T2 and T3). Although rates of change in the MBI group were not significantly greater than the ACT group, the mean level of Negative Experience was significantly lower in the MBI group than the ACT group at T3.

6.5.1 Hypotheses.

Hypothesis 1.

The first hypothesis was that both the ACT and MBI groups would improve at significantly greater rates in all outcomes (Acting with Awareness, Non-judging, Values Progress, Values Obstruction, Negative Experiences, Positive Experiences, Flourishing and Perceived Stress), compared with the control group. This was confirmed at T2 for four variables in the MBI group and six in the ACT group. Specifically, at T2 there was significant change in the ACT group for all variables except Negative Experiences, and in the MBI group, in all variables except Flourishing, Values Progress and Non-judging.

At T3, rates of improvement in both the ACT and MBI groups were significantly greater than in the control group for all outcome variables with two exceptions. Values Progress improved at a significantly greater rates in the ACT group only, and Negative Experiences, reduced at a significantly greater rate only in the MBI group.

However, it is telling of the success of the interventions that while the control group *increased* in Perceived Stress ($d = .29$), possibly due to academic demands nearing the end of the year, both ACT and MBI groups significantly *reduced* in

Perceived Stress ($d = 0.45$ and 0.29) and increased in Flourishing ($d = 0.35$ and 0.60) respectively. It is also worth noting that the mean scores for the ACT group were significantly higher than the control group in Acting with Awareness by T3, while the MBI group was not, and the MBI group mean scores were significantly higher than the control group in Negative Experiences at T3, while the ACT group was not. All other variables in the ACT and MBI groups were significantly larger than the control group at T3.

Hypothesis 2.

The second hypothesis predicted that the ACT group would improve at a significantly greater rate than the MBI group in values-based action and wellbeing outcomes (Positive Experiences and Flourishing). This was only partly supported. The ACT group improved at a significantly greater rate of change than the MBI group in Values Obstruction from T1 to T3 and Values Progress from T1 to T2, but this difference was no longer significant by T3. Other differences in rates of change between the two intervention groups in values-based action and wellbeing variables were non-significant.

Hypothesis 3.

Hypothesis 3 predicted the MBI group would improve at a significantly greater rate than the ACT group in mindfulness (Non-judging and Acting with Awareness) and negative outcomes (Perceived Stress and Negative Experiences). This was not supported. There was no significant difference between the MBI and ACT group in rates of change in Perceived Stress, Negative Experiences, Non-judging or Acting with Awareness from T1 to T3. However, a comparison of marginal means indicated that the MBI group scored significantly lower than the ACT group in Negative Experiences at follow-up.

6.5.2 Comparisons between groups.

The success of both ACT and MBI interventions in improving most outcomes (by time 3), compared with an control group, is consistent with the general MBI and ACT literature indicating both types of interventions are effective in improving a range of wellbeing, distress and mindfulness outcomes (e.g., Hacker et al., 2016; Khoury et al., 2013). The absence of significant difference between the two active groups is also consistent with other studies comparing similar interventions. For example, an ACT vs MBCT study at an Australian university yielded no significant differences between groups in psychological distress, quality of life, mindfulness and psychological flexibility (Renner & Foley, 2013). A comparison of ACT vs CT for university students with anxiety and depression found the effects of the interventions on depression, anxiety, quality of life and life satisfaction did not differ between groups in AAQ or mindfulness, included Non-judging and Acting with Awareness scales (Forman et al., 2007). Further, a RCT comparing MBSR vs CBT for patients with GAD was effective in reducing social anxiety symptoms and improving mindfulness skills in both groups, compared to the waitlist, but did not differ between groups (Goldin et al., 2016).

Negative Experiences.

One of the key difference between ACT and MBI groups was in change in Negative Experiences. The ACT group did not change significantly compared with the control group at either post-test or follow-up, while the MBI group did. The strong and consistent effect of MBIs on reducing negative affect is well documented (see: Khoury et al., 2015). However, no ACT trials were identified measuring negative affect or experiences as an outcome measure, although there is some evidence that improved psychological flexibility predicted lower negative affectivity in the workplace (Bond & Bunce, 2003). As ACT interventions focus on improving psychological flexibility and values-based action, despite the presence of all kinds of experiences, including negative

affect (Blackledge & Hayes, 2001), it is perhaps not surprising that negative affect is rarely measured as an outcome in ACT studies. However, given that distress symptoms, such as depression, have been found to decrease in ACT interventions despite the absence of therapeutic focus on removing symptoms (e.g., Walser et al., 2015; Zettle et al., 2011), it is somewhat surprising that the ACT group did not reduce in Negative Experiences compared to the control group.

One explanation for the differences between groups in Negative Experiences is perhaps the more targeted focus on formal mindfulness practice in the MBI group. This may have facilitated more focussed “exposure” to negative experience and therefore desensitisation (e.g. Öst, 1997) or acceptance (e.g. Segal et al., 2002), as summarised in Section 2.4.3. The effects of the MBI group on increasing exposure may have been better measured with the FFMQ Non-reactivity scale as used by Carmody and Baer (2008) to measure ‘exposure’.

Differences in value-based action.

The other key result was the between-group difference in values-based action. It was expected that values-based action would improve more than the control group in both ACT and MBI interventions. While Values Obstruction showed significantly more change compared to the control group in the MBI group by T3, Values Progress did not. This was unexpected given the association between mindfulness and Values Progress in Study 1 and previous evidence that MBSR interventions have resulted in significantly greater values-based action (Guadagno, 2012) and similar constructs such as Purpose in life (Carmody et al., 2009).

However, this result is consistent with the expectation that the ACT intervention would result in greater improvement in values-based action than an MBI. It is also consistent with lab-based component studies indicating that mindfulness and values components combined together result in greater improvements in targeted outcomes,

than a mindfulness focus alone (Levin et al., 2015) and component studies indicating values components of ACT resulted in stronger rates of improvement in values-based action than mindfulness elements (J. L. Villatte et al., 2015).

However, Values Obstruction did change in the MBI group, compared to the control group by time 3, indicating that the MBI was more successful in reducing Values Obstruction than increasing Values Progress. Given that Values Progress measures purposeful values-based behaviour, while Values Obstruction measures *not* acting on values because of the presence of psychological barriers, it makes theoretical sense that improvements in mindfulness will more strongly influence Values Obstruction more than Values Progress. This is because it is plausibly easier for an individual to act in accordance with their values mindlessly (or with a lack of mindfulness) if there are no psychological barriers to doing so, than to be mindless *and* act on values in the presence of psychological barriers.

As the main difference between ACT and MBI interventions was the focus on values in the ACT group, it is tentatively concluded that differences between groups were due to this focus on values. The focus on values in the ACT intervention did not, however, translate to significantly greater rates of change in Flourishing and Positive Experiences in the ACT group, as expected. However, results did support early significant gains from T1 to T2 in Flourishing and Non-judging the ACT group, which were non-significant in the MBI group. It is offered that these early changes could be due to the integration of mindfulness and values components in the ACT group and the explicit focus on using mindfulness in daily life for behavioural change.

6.5.3 The influence of mindfulness practice on mindfulness.

The results did not support that the MBI, which focused more on mindfulness practice and did not include a focus on values-based action, was superior in improving self-reported mindfulness. This is consistent with the Renner and Foley (2013) study

comparing ACT and MBCT which found the two interventions did not differ in rates of self-reported mindfulness.

Rates of change in Acting with Awareness were similar in ACT and MBI groups and the rate of change in the ACT group in Non-judging was substantially greater than that of the MBI group at T2 (ACT: $B = 3.16$, $SE = 1.09$, $p < .01$; MBI: $B = 1.47$, $SE = 1.08$, ns), although once again direct differences between the two interventions were non-significant. However, as illustrated in Figure 6.3, the trajectory of improvements in Non-judging in the MBI group appears to be rising at T3, while the trajectory of the ACT group appears to have levelling off at T3. This pattern is much more pronounced in other variables including Value Progress, Negative and Positive Experiences, Flourishing and Perceived Stress. This suggests that the effects of the MBI intervention on outcomes resulted in slower, but steadier growth than the ACT group in these variables. This result supports the conjecture that mindfulness practice requires at least eight weeks to fully impact on wellbeing measures (Dobkin & Zhao, 2011). However, as previously stated in 2.5.4, the association between length of formal practice and wellbeing outcomes is inconsistent (Crane et al., 2014; Eberth & Sedlmeier, 2012; Vettese et al., 2009).

6.5.4 Comparisons with other MBIs.

Within-group effect sizes in this study were compared with effect sizes from other MBIs to ascertain if the interventions in this study were as efficacious as other MBIs. The within-group effect size for changes in Perceived Stress was comparatively smaller in this study (MBI: $d = 0.28$ and ACT: $d = 0.45$) than the effect sizes from other MBSR studies, which report average effect sizes of about $d = 0.70$ (Khoury et al., 2013). This difference suggests that the MBI intervention in this study was not as powerful at reducing perceptions of stress than most other MBIs. This could be explained by the reduced class time for this intervention (nine hours) compared to a typical MBSR

intervention (28 hours). However, the inferior result in this study could also be due to the increased stress experienced by the sample of this study during the testing period. The control group showed a statistically significant increase in stress over the testing period, which coincided with the second part and completion of the academic year. Thus reductions in Perceived Stress in the intervention groups may have been attenuated by the increased stress of the academic year.

The effect sizes for within-group changes in mindfulness variables in both MBI and ACT groups were similar in the present study to effect sizes in other MBI interventions (Visted et al., 2015). For example, an MBI of six hours resulted in a within-group effect size in mindfulness of $d = .73$ (Klatt, Buckworth, & Malarkey, 2009) while the effect sizes for mindfulness variables in this study were $d = 0.60 - 0.89$ (MBI) and $d = 0.86 - 0.88$ (ACT).

6.5.5 Limitations

Regression to the mean.

Despite randomisation, the ACT group was found to be significantly lower than the MBI and control group at baseline in Flourishing and significantly lower than the MBI group in Values Obstruction. This was unexpected as participants from both intervention conditions were measured simultaneously and there were no significant differences between the three locations in any measures. As illustrated in Figure 6.3, it was possible that the significant differences at baseline may have attributed to faster growth in the ACT group in Flourishing and Values Obstruction from T1 to T2 because of the greater potential for growth or due to the influence of regression to the mean. This contention is also supported by the fact that the mean levels of both Values Obstruction and Flourishing at T2 and T3 were similar (and not significantly different). Therefore, conclusions that the ACT group was more efficient in reducing Values Obstruction (T1 to T3) than the MBI group are tentative.

Confounding effects.

As previously stated in the Section 6.3 (Method), data for a daily diary study were also collected from the ACT and MBI groups for five consecutive days after Workshop 1, Workshop 3, and in the week prior to the follow-up measure.⁷ This may have primed individuals in both intervention groups to be more mindful and improved self-reported mindfulness beyond the effects of the face to face intervention, accounting for the larger effect sizes in mindfulness in this study than many other longer MBIs. The short survey asked participants to rate the day's most stressful situation and rate their level of awareness, acceptance, defusion during that stressful situation. The completion of this survey may have increased the likelihood of mindful responses to stress in subsequent days in both ACT and MBI groups.

The daily diary study also may have inadvertently introduced the values concept to those in the MBI group and perhaps primed those in the MBI group to think about their values during stressful situations. The survey asked one question related to values-consistent responding ("Did you respond to the situation in a way that you would generally like to respond?") and another about daily values clarity ("How aware were you today of what is important to you?").

Limitations and future directions are discussed in Chapter 12.

6.6 Chapter Summary and Conclusion

Chapter 6 compared the effects of an ACT and MBI intervention with a waitlist control group to investigate if the addition of a values component to a mindfulness intervention could improve outcomes. The results indicated that both intervention groups were efficacious at improving rates of change from T1 to T3 in Flourishing, Positive Experiences, Perceived Stress, Acting with Awareness, Non-judging and

⁷ These data were not used in the thesis for a number of reasons: 1. Some of these data were used in other papers in which a co-facilitator of the RCT, James Donald, was the primary author ((e.g. Donald, Atkins, Parker, Christie, & Ryan, 2016); 2. The preliminary analysis did not show links between values and mindfulness constructs in this data; and 3. The extra analysis was outside of the scope of this thesis.

Values Obstruction compared with the control group. The ACT group improved in Flourishing, Values Progress and Non-judging at T2, compared to the control group, while the MBI group did not. The ACT group also improved more than the MBI group in Values Progress (at T2) and Values Obstruction (at T2 and T3). It is contended that the stronger growth in the ACT group was due to the values focus of the intervention. However, the greater growth rate in Values Obstruction in the ACT group could also have been influenced by regression to the mean, given the significantly higher levels of Values Obstruction in the ACT group compared to the MBI group at baseline.

The MBI group finished the intervention with less frequent negative experience than both the ACT and control groups, possibly due to the focus of the MBI intervention on formal mindfulness training.

To address the possibility that baseline differences between groups could have influenced results, it was resolved to re-examine the results in Study 3 using a structural equation modelling approach which could control for baseline differences between groups. These models could be used to examine change between groups over time and potential mediators of change as outlined and examined in the next chapters.

Chapter 7

Mechanisms of Change: Theoretical and Methodological Issues

“Understanding mediators and then mechanisms is not a matter of one study but is a matter of creeping up on the process that draws on a series of projects ...” (Kazdin, 2007, p. 11).

The key aim of Study 3 is to address the third research question. Specifically, it aims to determine whether changes in values-based action over the course of an ACT and MBI intervention mediate the relationship between intervention groups and change in outcomes. It also aims to ascertain whether the strength of these mediation effects differ between groups and if the sizes of mediation effects through values-based action are different from those observed through mindfulness.

This chapter explores the rationale for mechanisms of change research and theoretical and methodological issues related to research focused on gathering evidence for mechanisms of change. Specifically, it identifies key requirements to support a construct’s validity as a mechanism of change and details the potential, as well as the challenges, for compliance with these requirements based on the design and data of Study 3.

7.1 Rationale for Mechanisms of Change Research

The identification of mechanisms of change in therapeutic interventions has been identified as crucial to the on-going evolution of evidence-based practice (Kazdin, 2007, 2009). It is essentially a question of how and why therapies work. There are a number of important reasons to focus on mechanisms of change in interventions. First, understanding mechanisms is expected to lead to more efficient therapy and better treatment outcomes. This understanding is expected to help therapists make informed choices about whether to intensify or refine active components of treatments and discard other components that have been part of traditional protocols but have been identified as

non-essential to change (Kraemer et al., 2002). It is also likely to lead to parsimony in the varied and overlapping treatment approaches and to advance understanding of clinical disorders by identifying mechanisms maintaining a disorder (Kazdin, 2009). For example, avoidance has been identified as one of the key symptoms of post-traumatic stress disorder (PTSD) and most evidence-based treatments for PTSD (e.g. prolonged exposure therapy, eye movement desensitisation and reprocessing, and cognitive processing therapy) share a common component of exposure to address this avoidance (Sripada et al., 2016). However, more evidence is required to empirically validate that exposure is indeed the key mechanism maintaining PTSD.

The identification of mechanisms of change could also address issues related to existing paradigms of research. Evidence from protocol-based RCTs is currently the gold standard support for a clinical treatment. However, even after initial evidence is established, continued replication is required to fully validate a treatment as evidence-based. New therapies, perhaps exploring new mechanisms of change, can take decades to achieve evidence-based status despite their efficacy. For example, the gold standard therapy for anxiety disorders is CBT. While effect sizes for ACT interventions are similar to those of CBT (Bluett et al., 2014; Öst, 2014), meta-analyses still conclude that there is insufficient evidence to validate ACT as efficacious as a treatment for anxiety (Hacker et al., 2016). However, more research focus on mechanisms of change in and between protocols would be likely to short circuit the need for replication of treatment packages allowing researchers to focus on refining the identification of active components responsible for change.

While RCT of protocols are currently the best practice for attempting to control for influences outside the therapy being tested, full protocols or treatment packages are very rarely followed in practice. One of the key reasons for this is that a clinical presentation with a single disorder is uncommon. For example, up to 90% of those

diagnosed with an anxiety disorder also meet diagnosis for Major Depressive Disorder (Tiller, 2012), while symptoms for many diagnoses are highly overlapping (Kessler, Chiu, Demler, Merikangas, & Walters, 2005). Therefore, transdiagnostic approaches to treating mental illness, based on the identification of common variables maintaining dysfunction, has been proposed as a pragmatic future direction for evidence-based and personalised psychological treatment (Craske, 2012). In the meantime, it has become commonplace for clinicians to treat patients using a variety of therapies or with eclectic approaches (Lambert, 2013b) in which they piece together their own understanding of mechanisms and moderators based on the existing literature and personal experiences.

The identification of mechanisms could also enhance the integration of varying treatment modalities. For example, CBT and pharmacotherapy together are identified as best practice for severe depression (National Collaborating Centre for Mental Health, 2010). However, clarity and evidence on how the treatments work would provide more insight into possible interactions between modes, while also addressing potentially incompatible or antagonistic mechanisms (Kraemer et al., 2002). For example, if pharmaceutical treatments reduce concentration or cognitive clarity, and therapy is focused on the awareness and identification of thoughts, the two approaches may be antagonistic. Therefore, the identification of elements of therapeutic change would be likely to improve outcomes and the rate by which change occurs.

Finally, this work is important for the development and progression of evidence-based practice in clinical psychology as it enhances the ability of clinicians to combine evidence-based treatment with individualised case conceptualisation or formulation. Individual case conceptualisation or formulation is a core skill for clinical psychologists and essential to linking theory with practice (The British Psychological Society, 2011) as it facilitates a more targeted and flexible response to individual client factors. These include their unique history, skills and circumstances, goals, preferences

for therapy (Kuyken & Padesky, 2008; The British Psychological Society, 2011) and the high possibility that they meet multiple diagnoses (Kessler et al., 2005).

Therefore, it is important for the future of evidence-based practice that clinicians are informed of the elements of therapeutic protocols that influence change and the mechanisms by which change occurs. As mindfulness is so commonly integrated into clinical interventions, the establishment of mechanisms by which mindfulness and mindfulness interventions improve wellbeing is central to the successful evolution of evidence-based practice.

7.2 Defining Mechanisms of Change

Mechanisms of change and mediators of change are often used interchangeably in the psychological research literature. However, as outlined by Kazdin (2007, 2009), they are conceptually different, albeit overlapping concepts. The identification of mediators is often the first step in understanding mechanisms of change. A mediator is a construct that can be shown statistically to intervene between an intervention and outcome. The mediator suggests a process of change but lacks specificity, as it may be measuring a number of correlated variables. A mechanism identifies more specifically *how* the intervention leads to an outcome, or the processes responsible for the change, and why the change occurred. Kazdin (2007, 2009) identified seven key requirements for demonstrating mediation and mechanisms of change which are discussed in the next section. They are: strong association, specificity, consistency, experimental manipulation, timeline and gradient.

7.2.1 Strong association.

The first requirement is a strong association between the intervention and the mediator, and the mediator and the therapeutic change. This effect has been traditionally evidenced through the causal steps process, although more recently the strength of the indirect effects (*ab*) that are statistically different from zero (or confidence intervals that

do not cross zero) have become the accepted practice to identify mediation effects (Hayes, 2013). Therefore while the indirect approach to establishing mediation will be used in Study 3, information based on the relationships between the intervention and mediator and the mediator and outcome will also be reported to address the strong association requirement.

7.2.2 Specificity.

The specificity requirement demonstrates that the association is specific to the mediator being examined, while others do not account for the change. Kazdin (2007) argues that if one of a number of potential mediators mediates change (while others do not), the inference for mediation is strengthened. This can be addressed by assessing mediation through multiple mediators. However, it is also unlikely that just one process is responsible for change in a complex intervention. Even if a number of mediators are identified, the same requirement can be satisfied by comparing the relative strength of multiple mediators and highlighting instances in which one mediator is associated with a specific outcome, and another is not. Thus, Study 3 will analyse multiple mediation effects in order to meet this requirement.

7.2.3 Consistency.

Consistency involves the replication of the relationships across studies, samples and conditions. The three studies in this thesis are concerned with the collection of various types of evidence to establish consistency. Study 1 provided evidence of a strong relationship between trait mindfulness (measured with three different mindfulness variables) and a number of wellbeing outcomes across two different samples through values-based action. Study 2 indicated that manipulation of mindfulness and values processes resulted in significantly different rates of change between groups in some outcomes. Study 3 aims to test if the relationship between interventions and change in wellbeing and distress outcomes is mediated by changes in

values-based and if these effects differ between intervention groups. This evidence will also be considered along side evidence from similar studies (e.g. Guadagno, 2012) in an attempt to establish a level of consistency.

7.2.4 Strong association, experimental manipulation and gradient.

As previously stated, the requirement of strong association refers to the association between the intervention (X) and hypothesised mediator of change (M) and the mediator of change and the outcome (Y). Experimental manipulation demonstrates a causal relationship between X (the intervention compared with another intervention) and Y (the change in outcome variable), which is generally the focus for a RCT. However, Kazdin (2007) argues that the case for mediation is further strengthened if the experiment also manipulates the proposed mediator and shows how this manipulation influences the impact of the mediator (M) on the outcome (Y). This manipulation was attempted in this RCT through the direct targeting, and attempted manipulation, of mindfulness and values-based action (the hypothesised mediators). If the interventions in Study 3 are found to also influence the relationship between the mediators and outcomes, the case for that mediator will be strengthened.

Kazdin's concept of gradient is somewhat connected to the above concept, particularly in the design of this intervention. Gradient refers to the establishment of a dose-response relationship between potential mediator and outcome. This will be established in Study 3 if the MBI group, which received more mindfulness practice and instruction than the ACT group, results in greater change in outcomes and a stronger relationship between changes in self-reported mindfulness (M) and changes in outcomes (Y).

While the Study 3 analyses will focus predominantly on the indirect effects (*ab* paths) from X through M to Y, the association between M and Y will also be examined in additional multigroup analyses. These will seek to identify if, and when, the

intervention (and dose of mindfulness) strengthens the relationship between change in mediators and change in outcomes (see Section 8.5 for details of the approach).

This is especially important to this analysis given both the programs were designed to target the potential mediators and manipulate them. The manipulation of mediators in an intervention has been identified as being of particular importance in the identification of mediators of change (see: Bullock, Green, & Ha, 2010; David P MacKinnon, Taborga, & Morgan-Lopez, 2002).

7.2.5 Timeline.

Timeline refers to evidence that the mediator temporally precedes the outcome. Without this evidence, any casual inferences are weaker and rely on alternate evidence to validate and strengthen claims.

Unfortunately, the design of the RCT was not optimal for this analysis as measures were administered at baseline, post-intervention and follow-up, rather than at multiple times during the intervention, as recommended by Kazdin (2007). Thus, as is often the case in interventions, results from Study 2 indicated that most change occurred in the period between baseline and post-test, compared with changes from post-test to follow-up. Therefore, it is less likely that changes in mediators during the intervention will predict changes in outcomes after the intervention.

Because of this likelihood, analyses will also focus on *concurrent* mediation or examining if the intervention (X) predicts changes in outcomes over the course of the intervention (Y) through change in proposed mediator(s) (M) over the same time period.

Experimental mediation with concurrent mediators and outcomes.

While the concurrent approach to mediation does not establish temporal precedence of a mediator to an outcome, it provides some limited evidence of a causal sequence, particularly when participants are randomly assigned to groups. Random assignment establishes X as preceding changes in M and Y, however, the causal

sequence of M and Y cannot be assumed as they are assessed simultaneously. Despite this, the concurrent mediation approach is common to the mechanism of change literature, particularly when only baseline and post-intervention measures are available and many of the studies cited in earlier chapters are based on this approach. For example, using a concurrent mediation design, MBIs have been found to reduce anxiety and stress through changes in mindfulness and decentering (Hoge et al., 2015; Vollestad, Sivertsen, & Nielsen, 2011), reduce anxiety, depression and stress through changes in self-compassion and mindfulness (Van Dam et al., 2014), and reduce worry through changes in self-compassion (Keng et al., 2012).

Causal inferences based on evidence of concurrent mediation can be strengthened with supporting theory or past research. For example, a number of RCTs of MBIs have found that changes in mindfulness temporally precede changes in self-compassion, anxiety, stress and quality of life (Baer et al., 2012; Snippe et al., 2015). Therefore, this evidence could lend support to causal claims that change in mindfulness precedes change in these outcomes in MBIs, even when results are based on concurrent mediation analyses.

However, as outlined by Spencer, Zanna and Fong (2005), the drawback of concurrent mediation remains that it is essentially a correlational design. They warn that when using this method, mediators and outcome measures must be demonstrated to be conceptually distinct or there is a danger that the results merely demonstrate that the intervention impacts two measures of the same concept. This is identified as of particular concern in the interpretation of mediation analyses testing if Values Progress mediates the relationship between intervention group and Flourishing in Study 3 as the two variables are highly correlated.

Finally, as argued by Hayes and Preacher (2014), even time-series mediation cannot prove causality, but rather indicate a relationship between variables and their

magnitude. Therefore, strong theory and supporting evidence are required to support causality regardless of the statistical method employed.

Timeline and plausibility.

A final point on the establishment of timeline is that although the concurrent mediation method cannot prove causality, it does not discount it. Measures in the RCT were recorded at traditional intervals (e.g. after intervention and then at four weeks follow-up) which may not provide an accurate reflection of when change occurs. For example, if the T2 measures were administered during the intervention, it is still possible that change in the mediator occurred just after that measure was taken (but before the post-intervention measure), in which case results would not support temporal precedence of change in the mediator. It is also possible, even probable, that proposed processes and outcomes change in close succession. For example, it is conceivable that as soon as a participant *begins* to mindfully accept their unpleasant emotions, that perceived stress reduces in the next instant (or in the next hour or later in that day).

Alternatively, it is conceivable that as soon as an individual begins to mindfully connect with, and act on, their values (e.g. values of gratitude), they also begin to experience more positive affect. Evidence from intensive longitudinal assessment studies (e.g. daily diary studies) are beginning to shed light on how close this link between change in some mechanisms and outcomes may be (Bolger & Laurenceau, 2013). For example, Snippe et al. (2015) found day-to-day changes in mindfulness predicted subsequent day-to-day changes in positive and negative affect, but day-to-day change in positive and negative affect did not predict subsequent day-to-day changes in mindfulness. However, if change was measured in a traditional design (with measures even a week apart), change might seemingly occur simultaneously. In a daily diary study, Brown and Ryan (2003) found mindfulness and autonomous behaviour changed simultaneously on the same day and Labelle et al. (2015) found most changes

in mindfulness and worry occurred simultaneously in the first part of an MBI intervention, and then both continued to reduce in the latter parts, suggesting temporally close change.

The remaining questions regarding temporality can be informed by other considerations. If the intervention targeted mindfulness, it is likely that mindfulness would precede change in outcomes, especially if the outcomes were more difficult to control or influence directly (e.g. anhedonia, fatigue or feelings of wellbeing) than levels of mindfulness. Thus, while the requirement that the mediator must precede the outcome lends greater support to inferences of mediation, this can be difficult to measure in clinical interventions.

7.2.6 Plausibility.

Finally, Kazdin (2007, 2009) also lists plausibility as a key condition for establishing a mechanism of change. This refers to the explanation for what the process does and a coherent explanation for how it does it. Chapters 2-4 provide numerous explanations for how and why values-based action might function as a mechanism of change linking trait mindfulness and MBI interventions with both changes in wellbeing and reductions in distress.

7.3 Chapter Summary

This chapter provided a definition for a mechanism of change and the rationale for this kind of research. It also explored six key requirements for the identification of a mechanism of change outlined by Kazdin (2007, 2009) and considered the extent to which the design of this research meets these requirements. A particular strength of this design was that both the treatment and mediator were manipulated, as recommended by Bullock et al. (2010), and the interventions were specifically adapted and designed to target and manipulate the proposed mediators (mindfulness and values-based action), as recommended by MacKinnon et al. (2002). This chapter also identified ways in which

Kazdin's requirements informed the anticipated statistical approach for Study 3. This is expanded upon in the next chapter.

Chapter 8

Statistical and Methodological Approaches to Mediation

Study 3 aims to address the third research question and determine whether changes in values-based action over the course of an ACT and MBI intervention mediate the relationship between intervention groups and change in outcomes. As mediation analyses with multiple experimental groups and a control group and multiple mediators and outcome variables is relatively uncommon in the literature, the analysis presented a number of statistical challenges. This chapter highlights considerations and challenges related to applying this approach with categorical predictors and modelling change over an intervention. This chapter explores issues and choices relating to the approach to mediation, the interpretation of mediation effects, change or difference score method, considerations concerning timeline of mediators and outcomes, multiple mediation and the homogeneity of regression assumption, as well as a summary of the overall design chosen for Study 3.

8.1 Path Analysis Approach

As outlined in Chapter 6, a linear mixed effects model with random effects was selected to examine changes over the intervention. However, extending this approach to include a mediation analysis is complex and requires advanced statistical training and specialised structural equation modelling (SEM) software (Blood, Cabral, Heeren, & Cheng, 2010). Other authors investigating mediators of RCTs have followed a similar mixed effects model with mediation analysis using a bootstrapped linear regression procedure carried out in SPSS (e.g. Westin et al., 2011). However, answering the research question required a comparison between a number of mediators in predicting change in multiple outcomes, and an approach that could control for baseline differences in measures. Therefore, a SEM-based path analysis approach using Mplus

software was chosen. Due to the complexity of the models and limited sample size, path analysis using observed variables was chosen rather than a latent variable approach.

8.2 Mediation, Indirect Effects and Inference Testing

While the causal steps approach to mediation (Baron & Kenny, 1986) remains popular when gathering evidence for mechanisms of change through mediation, it is no longer recommended (A. F. Hayes, 2013). Therefore, a procedure popularised by Mackinnon, Fairchild and Fritz (2007) and Hayes (2009) was chosen for the Study 3 analysis. This method infers mediation when the ab path, or product of the a path (the path from X to M) and b path (path from M to Y) is statistically different from zero. The ab path or indirect effect and can be established as statistically different from zero based on bootstrapped 95% confidence intervals (CI). Bootstrapping also has the advantage of bypassing assumptions of normality of sampling distribution of the indirect effect (MacKinnon et al., 2012; Preacher & Hayes, 2004, 2008). Using this method, the direct path from X to Y is labelled c (see Figure 8.1). This approach allows for simultaneous examination of multiple mediators and the identification of indirect effects, even when the relationship between X and Y is non-significant.

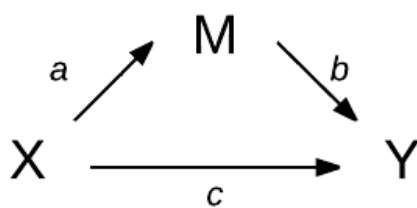


Figure 8.1. Simple mediation model.

Thus, in the Study 3 analysis, significance of indirect effects will be tested using 500 bootstrapped samples to compute a point estimate and associated 95% bias-corrected confidence interval. While p values for indirect effects will be reported in

most tables to conserve space, each will be checked against bias-corrected 95% confidence intervals and these confidence intervals will be reported in the text. When p values are non-significant to $p < .05$, but the 95% CI does not cross zero, this will be highlighted in tables and interpreted as significant. This disparity can occur because confidence intervals are based on repeated sampling, while p values are not.

Confidence intervals will not be reported for total and direct effects based on statements by Hayes and Preacher (2014) that there is generally “little statistical advantage in doing so because ... the sample distributions of these effects are typically normal or nearly so” (p. 463). Alpha levels for p values will be set to .05 for indirect, direct and total effects.

8.3 Interpretation of Mediation with Dichotomous X

This section describes how a mediation is interpreted when X represents an experimental group and is therefore dichotomous through having been coded as a dummy variable (e.g. 0 = control group; 1 = experimental group). In mediation, the constant is the estimated value of the a path when X is 0 and the coefficient for the a path is the estimated difference in M between two cases that differ by one unit on X . So when X is categorical, the constant represents the effect of the control group on M and the coefficient for the a path represents the amount by which the experimental group is different from the control group. A negative sign indicates that the experimental condition is estimated to be lower on Y than the control group. For example, when $a = 1.45$, those assigned to $X = 1$ are estimated to be 1.45 units higher on the mediator than those assigned to the control condition. This can also be interpreted as the mean difference between the control and active group on the mediator. The coefficients of the b path, however, are not conditional on X . The b path represents the effect of M on Y if two cases were equal (or average) on X , but differed by one unit on M . For example, if parameter $b = 1.80$, two people who were assigned to the same experiment condition,

but differed by one unit in the mediator value, would be estimated to differ by 1.80 units in Y. (Hayes & Preacher, 2014).

The indirect effect is the product of the effect of the group (X) on the mediator and the mediator (M) on Y (ab). The indirect effect estimates the amount by which the group coded 1 (experimental group) is estimated to differ from the group coded 0 (control group) on Y, as a result of the effect of X on M, which in turn affects Y. In the above example, $ab = 2.61$ (1.25×1.80) communicating that compared with the control group, those in the experimental condition are estimated to be on average 2.61 units higher than the control group in Y, due to the influence of the experimental group on M, which in turn influenced Y. The direct effect (c) of X on Y quantifies how much the experimental group differs from the control group on Y, if they were equal on M. This is also expressed as the difference between groups on Y holding M constant. The total effect is how much the experimental group is estimated to differ from the control group in Y through both indirect and direct effects. The total effect is the sum of direct and indirect effects and therefore an estimation of the amount by which two cases that differ in one unit on X will differ on Y, through all defined pathways.

8.4 Mediation Analysis with Multicategorical Predictors

Hayes and Preacher (2014) outline a technique for mediation analysis using multiple categorical predictors, designed specifically for mediation analyses based on RCTs involving more than one experimental group and a control group. As depicted in Figure 8.2, this model includes two dichotomous X variables.

This method was originally earmarked for Study 3, however, it was recognised that interpretation was less helpful in terms of answering the research questions than an approach using a single categorical predictor. This is because when more than one dichotomous variable is included in the same model, the indirect effect expresses the relationship unique to that X, *relative* to others in the model (A. F. Hayes, 2013). This

means the indirect effects depict only the unique relationship from X_1 to Y through M when controlling the relationship from X_2 to Y through M . As the research question was concerned with identifying significant indirect effects of each intervention compared to the control group *and* differences in indirect effects between groups, it was decided to model each experimental group separately (as illustrated in Figure 8.3 and 8.4). This was also considered more appropriate because models containing two highly correlated X variables can compete with each other, cancelling out each other's effects, leaving only a few significant indirect effects to interpret. It was also easier to assess how heterogeneity of the b path (described below) was likely to influence interpretation of indirect effects when the b path was affected by one intervention group and the control group, rather than two.

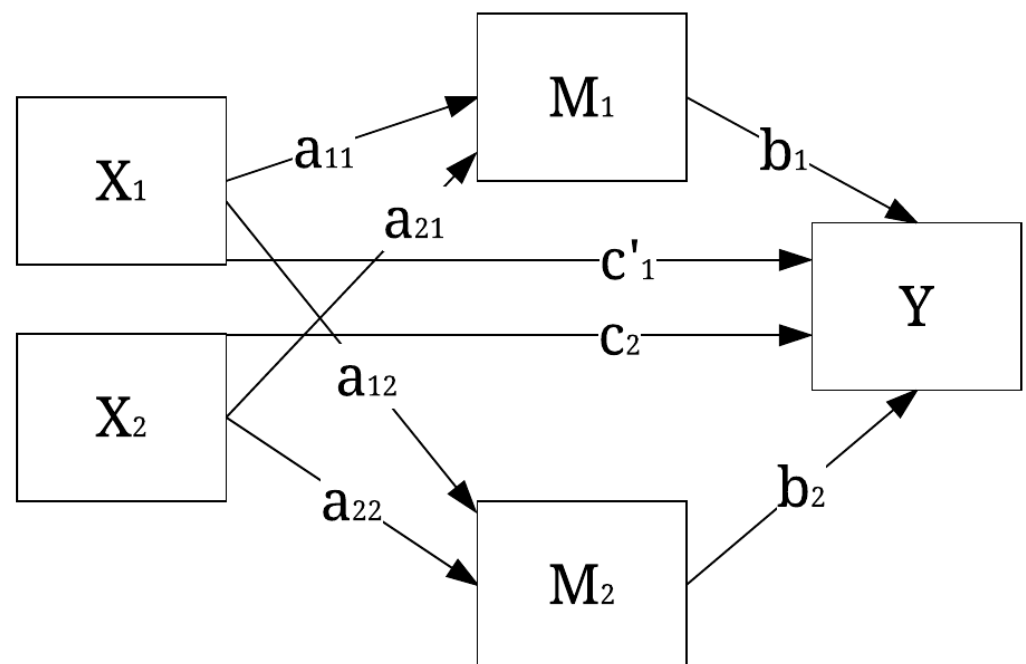


Figure 8.2. Multiple mediation model with multi-categorical predictors.

8.5 Relationship Between Change in Mediators and Change in Outcomes

In the Study 3 analysis, the a and b paths will also be examined for a number of reasons. The a paths shed light on the relationships between intervention groups and change in mediators to identify if the interventions significantly influence the change in mediators compared to the control group. Although this information was included in Study 2 in Chapter 6 in the mixed linear model analysis, the results of the path analysis of Study 3 may be different because they will not adjust for individual random effects and change scores will control for baseline differences.

The b paths will also be examined in separate analyses as a means to: (i) confirm the mediations adhered to the between group homogeneity of regression assumption; and if not (ii) to explore how intervention changed the relationship between mediator and outcome variable.

The homogeneity of regression assumption (or no interaction assumption) is commonly cited as necessary for causal inference, but often ignored in the literature (A. F. Hayes & Preacher, 2014). The relationship between M and Y (the b path), when using categorical predictors, represents the extent to which M predicts Y, when equating the groups as average or equal on X. This means that although we can calculate differences between the experimental groups and the control group with the a path coefficient, the b coefficient measures whether changes in the mediator predict changes in the outcome variables, irrespective of group allocation. If this assumption is violated it means that group allocation also potentially affects or moderates the relationship between changes in the proposed mechanisms and the outcome variables. In such a case the particular ab path or indirect effect is not a valid measure of the mediation because the relationship between M and Y is contingent on X.

However, such a violation also provides important information regarding the effect of the intervention on the relationship between mediators and outcomes. If the

relationship between the mediator and outcome (b path) is stronger in the intervention group than the control group, it can also be inferred that the intervention not only improves outcomes by strengthening the mediator, but also improves outcomes by strengthening the association between mediator and outcome. This means that the association between mediator and outcome (for example, the association between change in Values Progress and change in Positive Experiences) is stronger than the natural association in the control group. Any differences between the b paths provide further insight into how the treatment produces its effects, and as previously identified in Section 7.2.4, strengthens the inference that the mediator is a mechanism of change. For example, if the relationship between changes in Values Progress and changes in Perceived Stress is *stronger* in the ACT group than the control group, we can infer that the ACT intervention strengthened any naturally occurring relationship between these variables.

The between group homogeneity of regression assumption is tested in a number of ways in the literature. Hayes and Preacher (2014) suggest respecifying the model by including an interaction term between X and M and inquiring if ΔR^2 is significantly different between models or comparing the fit between models with and without the interaction terms. Judd and Kenny (1981) suggest adding an interaction effect to the regression equation to test whether the mediator is statistically significantly different from the control group in the treatment group as evidenced by a significant interaction.

However, it was decided that adding another interaction term to each regression equation in Study 3 would over-complicate the analysis and further reduce statistical power. Thus the between-group homogeneity of regression assumption will be tested in Study 3 by running a series of multigroup regression analyses whereby change in outcome will be regressed on change in the mediator, and coefficients compared between groups for significant differences.

Differences will be calculated by comparing the coefficients from the intervention groups with the coefficients from the control groups using t-tests for comparing two regression slopes based on the approach of J. Cohen, Cohen, West and Aiken (2003) and an online calculator from Soper (2007). Alpha levels for differences will be set to .05, however, a number of probability levels for t-tests approached $p < .05$ (e.g. $p < .09$). These will be reported and discussed because the smaller sample sizes in the multigroup analyses will result in a reduction of power. In line with American Statistical Association (ASA) recommendations (Wasserstein & Lazar, 2016), the t-tests that approach significance will be discussed in relation to their effect sizes.

8.6 Multiple Mediation

A multiple mediation analysis will be carried out in Study 3 because this research is interested in comparing the size of both mindfulness and values-based action mediators within and between interventions. Multiple mediation examines the indirect effects through more than one mediator variable. Total indirect effect estimates the effect of X on outcome through all mediators, while each individual indirect effect estimates the effect of the X on outcome through a single mediator, while controlling for the shared effect of the other mediators. Multiple mediation has the advantage over simple mediation in that it can identify the degree to which specific variables uniquely mediate the relationship between X and Y and allows for the comparison of the relative magnitudes of these indirect effects (Preacher and Hayes, 2013).

The disadvantage of this method, however, is that two highly correlated mediators are likely to attenuate the effect of each of the mediators on Y and reduce the ability to compare indirect effects across studies that use single mediators (A. F. Hayes, 2013; Preacher & Hayes, 2008). To address some of the effects of high correlations between mediators, the residuals associated with the mediators will be permitted to covary (Judd & Kenny, 1981; Preacher & Hayes, 2008). To address the possible

concealing of individual mediators due to attenuation effects, the multiple mediation analysis will be followed up with simple mediation analyses for each mediator (MacKinnon, Krull, & Lockwood, 2000; Preacher & Hayes, 2008).

8.7 Change Approach

Given that results of the linear mixed effects approach of Study 2 were uncertain due to the baseline differences in some measures, the decision of how to model change in Study 3 is critical. The use and limitations of change or difference scores in measuring change over time has been discussed and debated for decades (Cronbach & Furby, 1970; Gulliksen, 1950; Lord, 1958). Despite this, difference scores remain popular as a means to measure mechanisms of change in RCTs (e.g. Carmody et al., 2009; Neacsiu, Rizvi, & Linehan, 2010; Robins, Keng, Ekblad, & Brantley, 2012; Vollestad, Sivertsen, & Nielsen, 2011). Although new approaches to change, such as the use of latent difference scores, have been held up as an alternative to traditional change approaches (Gollwitzer, Christ, & Lemmer, 2014; Selig & Preacher, 2009), the complexity of the proposed Study 3 design, and limited sample size, were identified as obstacles to using a latent difference score approach for Study 3.

Three main types of changes scores were considered. 1. simple change scores (also called absolute or observed change); 2. change in analysis of covariance (ANCOVA), also sometimes called residualised change or autoregression; and 3. residual change (sometimes called residualised change/gain or benchmark score) (Twisk & Proper, 2004). There is some confusion between types 2 and 3 as they are both commonly called residualised change, thus I refer to type 2 as ANCOVA and type 3 as residualised change.

8.7.1 Simple change scores.

The most commonly used measure of change in the mechanisms of change literature, particularly in linear regression models, are the simple change scores. They

have been employed in past and present literature involving the identification of mechanisms of therapeutic change. For example, simple change scores were employed to identify if mindfulness mediated the relationship between an MBSR intervention and psychological symptoms and wellbeing (Carmody & Baer, 2008), if mindfulness and self compassion mediated the effect of an MBSR intervention on worry, emotional regulation and anger experiences (Keng et al., 2012) and if mindfulness mediated the relationship between an MBSR intervention and changes in anxiety symptoms and worry (Vollestad et al., 2011).

Simple change scores are calculated as the difference between the time 1 and time 2 variables relative to each participants' own baseline score. The advantage of simple change scores are they are easy to interpret and go some way to addressing unexplained variance between measures over time. For example, individual differences that may not change over time for one participant (e.g. their high neuroticism) are factored into the time 2 score. However, simple change scores have been criticised for low reliability (e.g., Cronbach & Furby, 1970; Gulliksen, 1950) and failing to control for differences between groups at baseline, particularly when baseline values differ between groups. However, assumptions about the reliability of simple change scores have also been challenged. Bolger and Amarel (2007) argued that low reliability in simple change scores was unlikely particularly in studies that produce reasonable change with measures that are sensitive to change.

It was recognised that change based on simple change scores for the Study 3 mediation analysis would produce results that were most congruent with the Study 2 mixed effects model results, as they measure change over time within-groups. However, the obvious disadvantage of employing simple change scores in this study, is that that they do not control for baseline differences between groups and therefore do not address baseline differences identified in Chapter 6.

8.7.2 ANCOVA and residualised change scores.

Due to issues related to regression to the mean, Twisk and Proper (2004) argue that defining change with either ANCOVA or residualised change is preferred when comparing groups in a RCT (see: Forman, Herbert, Yeomans, & Geller, 2007). The ANCOVA approach is common in SEM analyses and involves adding the baseline measure as a covariate to a linear regression of T1 on T2. The change, or more accurately difference score, is then based on the difference between time 2, given an equal or average baseline between the groups (see: Twisk & Proper, 2004). Thus, while the coefficient (e.g. $a = .33$) using a simple change score indicates that the intervention group showed an increase of .33 points more than the control group in the mediator, the same coefficient using ANCOVA suggest that the intervention group is .33 points higher than the control group in the mediator, given an equal or average baseline value across the intervention and control groups.

Residualised change is the difference between the actual change and predicted change using a general linear model. It is calculated when T1 is regressed on time 2 and the difference between the observed value and the predicted value (or saving unstandardised residuals from a regression in SPSS). Twisk and Proper (2004) state the interpretation is “more or less the same” (p. 266) than in the ANCOVA method and recommend ANCOVA change scores if baseline measures are different, particularly as ANCOVA is easier to interpret.

As outlined by Gollwitzer et al. (2014) the critical difference between simple change scores and ANCOVA are the assumptions they make about change. The ANCOVA change score assumes the score at T2 is a linear function of the T1 score if there had been no treatment and the simple difference score assumes no change given no treatment. They also state that if the assumption is no change without the intervention, the simple change score could be more plausible.

8.7.3 Change score selection.

Based on the above, ANCOVA appeared to be the most appropriate change approach for Study 3 given the differences between some baseline measures. Thus it was decided to model change within the SEM model by regressing the later score on the earlier score in all analyses.⁸

8.8 Timeline

As outlined in Chapter 6, data were collected at three time points, baseline (T1), post-test (T2) and at four weeks follow-up (T3). And as mentioned in Chapter 7, temporal precedence of the mediator to the outcome provides stronger evidence for mediation. Despite indications from the results of Study 2 that early change in proposed mediators would be unlikely to predict later change in outcome variables, time-series mediation models will be tested. These models will test if group allocation (X) predicts change in proposed outcomes (from T2 to T3) through changes in proposed mediators (from T1 to T2).

The same analyses will also be carried out using *concurrent* mediation or examining if the intervention (X) predicted changes in outcome over the course of the intervention (T1 to T3) through change in proposed mediator(s) over the same time period. This method was also discussed in Section 7.2.5.

8.9 Overall Designs for Study 3 and 4

Based on the above considerations, the path analyses will be performed in Mplus 7.4 (Muthen & Muthen, 2011) using ML estimation, and indirect effects will be estimated based on 500 bootstrapped samples. The models will be based on the model illustrated in Figure 8.3 for the time-series analyses, and Figure 8.4 for the concurrent mediation analyses. Each model will include a single X or dichotomous variable

⁸ The analysis for Study 3 was also conducted using residualised change scores and results were almost identical to ANCOVA and so were not included in the thesis.

(dummy coded with either ACT or MBI = 1 and Control = 0) which will be regressed on the mediators which in turn will be regressed on outcome variables. In all models, the errors in the mediators and outcome variables will be covaried.

The mediators will be change in Acting with Awareness, Non-judging, Values Progress and Values Obstruction, and the outcome variables will be change in Positive Experiences, Negative Experiences, Flourishing and Perceived Stress. Change will be modelled by regressing later scores on earlier scores within the model.

A further analysis will be conducted (Study 4) to examine if the effect of MBI and ACT groups on later changes values-based action will be mediated by earlier change in mindfulness, based on the models in Figure 8.3. Although the primary analyses will use multiple mediation models, simple mediations will also be analysed to aid investigation into possible attenuation effects of individual mediators in the multiple mediator models.

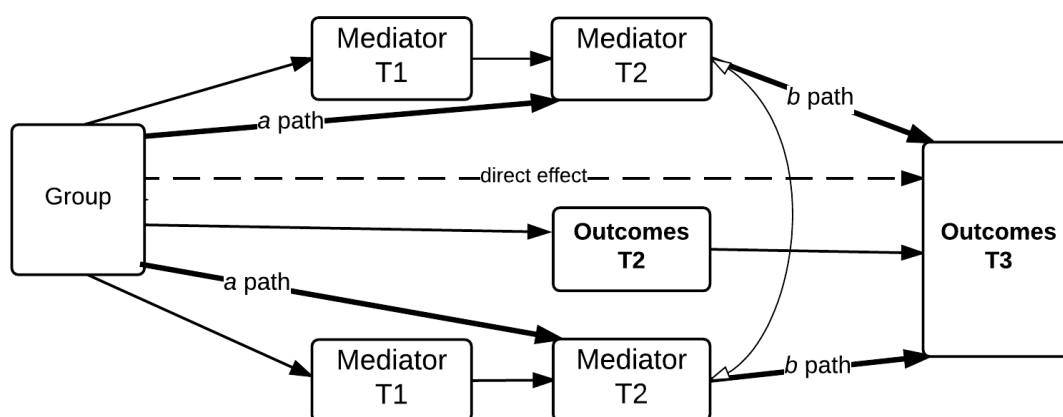


Figure 8.3. Main time-series multiple mediation model. Only two mediators are included and one box representing four outcomes for simplicity.

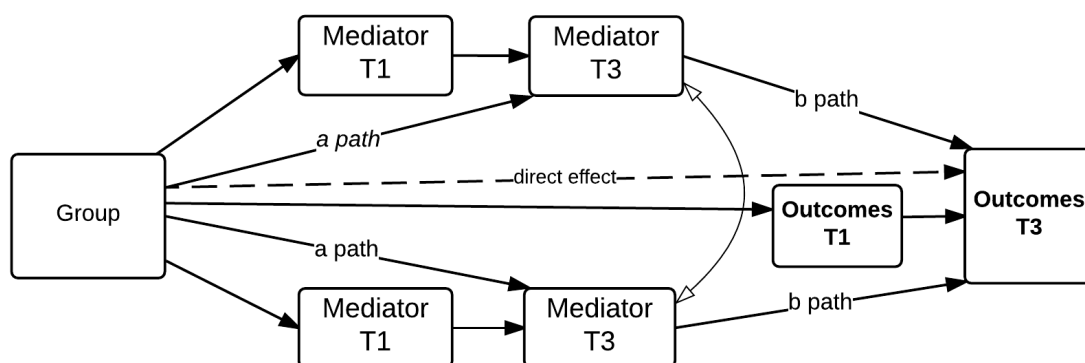


Figure 8.4. Concurrent multiple mediation model. Only two mediators are included and one box representing four outcomes for simplicity.

8.10 Chapter Summary

This chapter outlined statistical and methodological considerations for modelling the mediation analysis for Study 3 and outlined justifications for the selection of various methods. Based on these choices, the studies of the next three chapters examine the mediators of relationships between ACT and MBI groups on outcomes based on the results of the RCT outlined in Chapter 6. The next chapter, Chapter 9, outlines the results of the time-series mediations, Chapter 10 outlines the results of the concurrent mediations and Chapter 11 uses the same approach to examine the effect of the intervention groups on changes in values-based action through changes in mindfulness, to test if prior changes in mindfulness can be linked to later changes in values-based action.

Chapter 9

Empirical Study 3: Time-series Mediations

The primary aim of Study 3 is to determine whether change in values-based action and mindfulness variables mediate the effect of ACT and MBI interventions on outcomes from the RCT outlined in Chapter 6. Study 3 also aims to re-examine differences between the ACT and MBI groups in overall changes in outcomes, while controlling for baseline differences. This chapter outlines the results for the time-series models in which change in mediators (T1 to T2) are modelled to temporally precede the outcomes (T2 to T3).

9.1 Literature Review Summary

The following literature review summarises evidence outlined in Chapters 2 and 3 concerning the roles of mindfulness and values-based action as mediators of change in MBI and ACT interventions.

9.1.1 Mindfulness as a mediator of the effects of MBI on outcomes.

As outlined in Section 2.4.1, the role of mindfulness as a mediator of the effects of MBIs on a variety of wellbeing and clinical outcomes has a strong theoretical and empirical evidence base (e.g., Brown et al., 2007; Hölzel et al., 2011; Khoury et al., 2013, 2015; Shapiro et al., 2006). A meta-analysis of mechanisms by which MBSR and MBCT improve mental health and wellbeing outcomes found moderate and consistent evidence to support mindfulness as a mediator of outcomes (Gu et al., 2015). This meta-analysis included RCTs and quasi-experimental designs measuring pre-post change in variables and included 16 studies that measured the mediating effects of mindfulness.

However, in the aforementioned Gu et al. (2015) meta-analysis, only one RCT and one quasi-experimental study measured the change in mediator prior to change in outcome, consistent with the present study and recommendations by Kazdin (2007). The

RCT found that prior change in mindfulness and self-compassion mediated the relationship between an MBI and reduced depressive symptoms 15 months after the intervention, compared with a control group comprised of patients on maintenance antidepressants (Kuyken et al., 2010). The quasi-experimental study, which drew participants from a non-clinical university population, compared an MBSR group with an active control group comprising of psycho-education and interactive response exercises (Bergen-Cico & Cheon, 2014). This study found that significant reductions in anxiety were mediated by prior changes in mindfulness in the MBI group, compared with the control group.

9.1.2 Mindfulness as a mediator of the effects of ACT on outcomes.

In ACT interventions, most mediation studies have identified psychological flexibility or cognitive defusion as mediators of outcomes, rather than mindfulness alone (e.g., Bluett et al., 2014; S. C. Hayes et al., 2006; Francisco J Ruiz, 2010). However, mindfulness has been identified as a mediator of the effect of ACT (compared with TAU) on borderline personality disorder symptoms (Morton et al., 2012) and Non-judging has been identified as a mediator of the effects of ACT bibliotherapy on psychological health in a sample of Japanese college students living abroad (Muto et al., 2011). Further, an RCT comparing CT and ACT found that changes in Acting with Awareness and Acceptance mediated change in anxiety and depressive symptoms in the ACT group, while Observing and Describing mediated outcomes in the CT group (Forman et al., 2007). However, mediator and outcome variables were measured contemporaneously in all of these studies and therefore it could be argued that changes in mediators could be an outcome of treatment rather than a mediation effect.

One study was identified in which change in a mindfulness-based mediator preceded change in outcomes. In a moderated mediation study of an ACT and CT RCT on anxiety and depression symptoms, Forman et al. (2012) found cognitive and

affective acceptance mediated the effect of being in the ACT group on later change in symptom distress and goal progress.

Finally, there is evidence to suggest that even when mindfulness measures do change in an ACT intervention, they do not always mediate outcomes. For example, in an ACT RCT to identify mediators of change in adaptive eating behaviour, the Observe, Acting with Awareness, and Non-reactivity scales of the FFMQ changed compared with the control, while the Describe or Non-judge did not (Sairanen et al., 2017). However, the measure of mindfulness that did change failed to mediate the effect of the intervention on intuitive eating regulation.

9.1.3 Values-based action as a mediator of the effects of ACT on outcomes.

The roles of values clarity and values-based action as processes or mechanisms of change are central to the ACT model (S. C. Hayes et al., 2012). While there is considerable evidence that values-based action changes over ACT interventions (e.g., Forman et al., 2007; Pakenham, 2015; Pinto et al., 2015), the evidence for the mediating effect of values-based action on outcomes is limited. This is possibly because change in values-based action is usually measured together with other ACT processes with measures of psychological flexibility (e.g. the AAQ-II). However, there have been a number of studies in which values-based action has been identified as a mediator of ACT interventions.

For example, changes in values attainment and ‘persistence in values-based action in the face of barriers’ mediated the within-group effects of ACT on seizures, quality of life and personal well-being for patients with epilepsy (Lundgren et al., 2008). Values-based action mediated the effect of an ACT bibliotherapy-based intervention on general health outcomes, compared with a waitlist control (Muto et al., 2011). Activity engagement, along with symptom acceptance, were found to mediate the relationship between ACT intervention (compared with CBT) for tinnitus (Hesser et

al., 2014) and values-based action was found to mediate change in anxiety symptoms for individuals diagnosed with generalised anxiety disorder in a non-controlled ABBT intervention (S. A. Hayes et al., 2010). Finally, in the only study in which change in the mediator was measured prior to change in the outcome, Forman et al, (2012) found prior change in values-based action mediated later change in symptom intensity and goal progress in both CT and ACT groups (Forman et al., 2012). They also found that cognitive acceptance and affective acceptance mediated the change in goal progress (committed action), but only in the ACT group

9.1.4 Values as a mediators of the effects of MBI on outcomes.

Change in values clarity and values-based action is rarely targeted in traditional MBIs, however, change in values-based action or similar processes, has been identified as a process of change in a number of theoretical models (Brown et al., 2007; Hölzel et al., 2011; Shapiro et al., 2006) (see Section 2.4 for details). However evidence for values-based action as a mediator of the effects of MBIs is limited. Change in valued living has been found to mediate the relationship between MBSR (vs control) and satisfaction with life (Guadagno, 2012) and values clarity was found to mediate the within-group relationship between change in mindfulness and change in psychological distress in an MBSR intervention (Carmody et al., 2009). However, neither of these studies provided evidence that the change in mediator preceded the change in outcome variable.

Although values processes were not measured in the trial comparing ACT and MBCT (Renner & Foley, 2013), the authors noted that students in the MBCT were observed to speak increasingly about life meaning during the course, despite an absence of explicit reference to values in the MBCT protocol.

9.2 Summary and Hypotheses

Although the above summary provides preliminary evidence that both

mindfulness and values-based action could be mechanisms of change in both MBI and ACT interventions, there is little evidence supporting the proposition that changes in mindfulness and values-based action precede change in outcomes in either MBI or ACT interventions. Therefore, given the results of Study 2, in which most of the change in processes and outcomes occurred simultaneously over the same measurement periods, it was hypothesised that changes in the proposed mediators (from T1 to T2) would not mediate the effects of either ACT or MBI groups on later changes in outcomes (from T2 to T3).

9.3 Method

The participants, recruitment and interventions for this study are described in the method section of Chapter 6 (Section 6.9). The design and statistical approach are covered extensively in Chapters 7 and 8. To reiterate, the analysis sought to identify the indirect effects from each of the experimental groups (ACT or MBI compared with the control group) to changes in outcome variables (T2 to T3) through changes in proposed mediators (T1 to T2). Both multiple mediator models with four mediators and simple mediations (with one mediator in each model) were examined.

9.4 Time-series Approach 1

In the initial time-series models, change from T2 to T3 in the outcome variables, also controlled for changes in the outcome variables from T1 to T2 (see: J. Twisk, de Boer, de Vente, & Heymans, 2013) as outlined in Figure 9.1. The analysis yielded no statistically significant indirect effects from either the ACT or MBI groups to changes in any outcome from T2 to T3 (controlling for changes from T1 to T2) through the proposed mediators (T1 to T2). The indirect effects from group to outcomes through each individual mediator were also examined in separate models (as simple mediations), but still no significant indirect effects were identified.

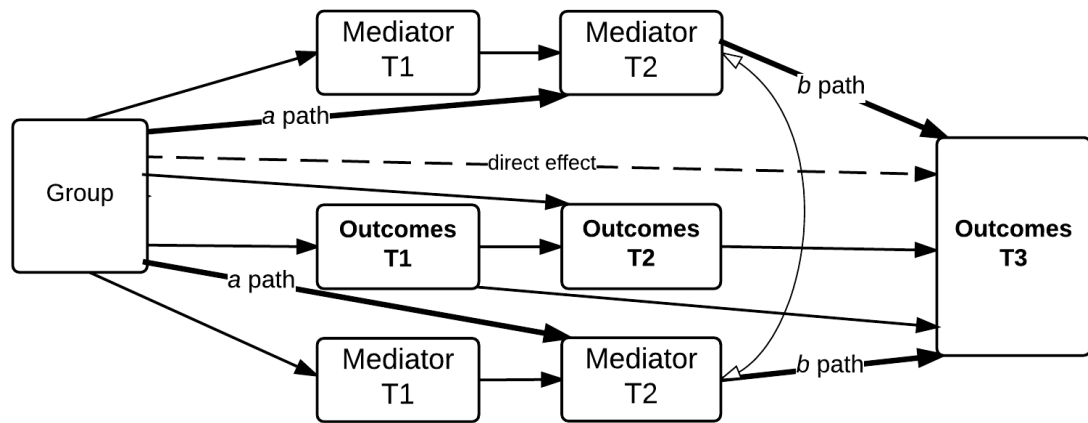


Figure 9.1. Time-series multiple mediation Model 1. Only two mediators are included and one box representing four outcomes for simplicity.

9.5 Time-series Approach 2

A similar model, which regressed T3 outcome variables *only* on T2 (and did not control for T1), was analysed as outlined in Figure 9.2. Removing the autoregression of T2 on T1 in the outcome variables reduced the likelihood of over-correcting for group differences (see: Twisk & De Vente, 2008).

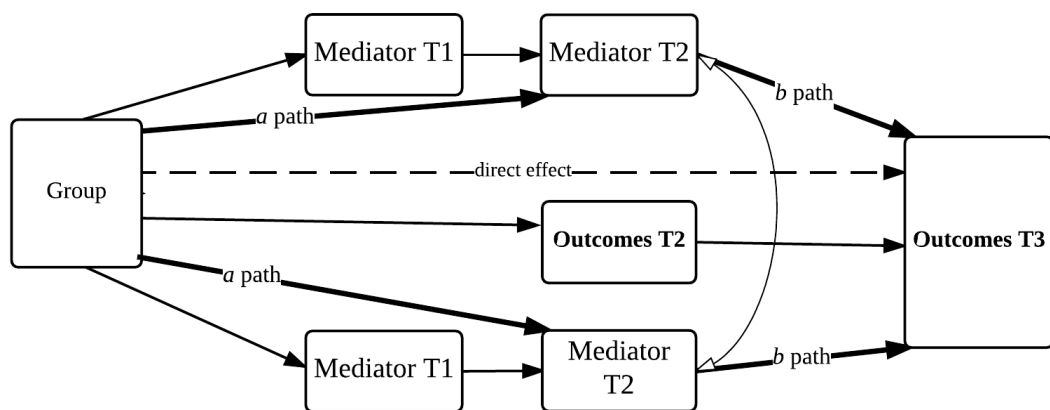


Figure 9.2. Time-series multiple mediation Model 2. Only two mediators are included and one box representing four outcomes for simplicity.

9.6 Results: Multiple Mediation Models

9.6.1 Results: *a* paths.

While the analysis focused on indirect (*ab*) effects, the *a* paths were also of interest as they described the total effect of group on change in proposed mediators (T1 to T2), while controlling for baseline differences between the intervention groups and the control group. Results for the *a* paths of both models (from ACT group and the from MBI group) are displayed in Table 9.1. The ACT group predicted a significantly greater rate of improvement, compared with the control group, in all proposed mechanisms (Values Progress, Values Obstruction, Acting with Awareness and Non-judging). The MBI group predicted significantly greater rate of change in Values Obstruction and Acting with Awareness, compared with the control group.

The *a* path coefficients were compared between groups to check for significant differences using t-tests (J. Cohen et al., 2003; Soper, 2007). There were no significant differences as indicated in Table 9.1.

Table 9.1

Coefficients for the a Paths for the Time-series Model and Between-Group Differences

Δ T1 to T2	MBI		ACT		t-tests
	B (SE)	β	B (SE)	β	
Δ Acting with Awareness	1.72 (.75)*	.16	2.07 (.78)**	.19	$t(104) = .32, p = .747$
Δ Non-judging	1.50 (.88)	.09	3.07 (1.04)**	.19	$t(104) = 1.52, p = .252$
Δ Values Progress	.88 (.80)	.09	2.36 (.75)**	.25	$t(104) = 1.35, p = .180$
Δ Values Obstruction	- 2.44 (.80)**	-.24	-3.10 (.77)***	-.31	$t(104) = .59, p = .553$

Note. Δ = change, B = unstandardised coefficient and β = standardised coefficient.

*** $p < .001$, ** $p < .01$, * $p < .05$.

9.6.2 Total, total indirect and direct effects.

Total, total indirect and direct effects of the multiple mediator models are displayed in Table 9.2. Total effects indicated that both the MBI and ACT groups predicted significantly greater rates of change in all outcomes from T2 to T3, compared with the control group. There were no significant differences between the ACT and MBI groups in total effects. Total indirect effects (that is the collective mediation effects through all four mediators) from both ACT and MBI groups to Perceived Stress, Positive Experiences and Negative Experiences, were statistically significant. However, individual single mediation effect (that is a mediation effect controlling for the influence of the other three indirect effects) was statistically significant.

Direct effects from the MBI group to changes in Flourishing, Positive Experiences and Negative Experiences (T2 to T3) were significant, and direct effects from the ACT group to changes in Flourishing (T2 to T3) were also significant. The significant direct effects indicated that proposed mediators did not account for all effects of group on outcomes. Direct effects from the MBI group to Perceived Stress and direct effects from the ACT group to Positive Experiences and Negative Experiences were non-significant. These results indicated the proposed mediators from T1 to T2 accounted for all effects of group on these outcomes (T2 to T3).

Table 9.2

Total and Direct Effects of Intervention Groups on Changes in Outcome Variables (T2-T3) and Total Indirect Effects Through Changes in Four Mediator Variables (T1-T2)

	<u>Flourishing</u>		<u>Perceived Stress</u>		<u>Positive Experiences</u>		<u>Negative Experiences</u>	
	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
MBI								
Total effects	5.38 (1.52)***	.36	-3.87 (1.02)***	-.35	2.66 (.69)***	.36	-2.75 (.64)***	-.38
Direct effects	3.79 (1.16)***	.25	-1.48 (.83)	-.13	1.37 (.50)***	.18	-1.37 (.50)***	-.19
Total indirect	1.60 (1.14)	.11	-2.39 (.78)**	-.22	1.29 (.52)*	.17	-1.39 (.46)**	-.19
ACT								
Total effects	4.29 (1.47)**	.28	-3.69 (1.04)***	-.33	1.80 (.79)*	.23	-1.25 (.55)*	-.21
Direct effects	2.66 (1.22)*	.17	-1.28 (.93)	-.12	.65 (.61)	.08	-.40 (.49)	-.07
Total indirect	1.63 (1.11)	.11	-2.41 (.74)***	-.22	1.15 (.50)*	.15	-.85 (.35)*	-.14

Note. Δ = change, B = unstandardised coefficient and β = standardised coefficient.

*** $p < .001$, ** $p < .01$, * $p < .05$.

9.7 Results: Simple Mediation Models

The effects of intervention groups on outcomes through proposed mediators were also examined with simple mediation models (one mediator in each model). Only three significant mediation effects were identified. These models are illustrated in Figure 9.3 and indirect, total and direct effects for these models are displayed in Table 9.3. The relationship between the ACT group and Perceived Stress (T2 to T3) was mediated by Values progress (T1 to T2). The relationship between the ACT group and Negative Experiences (T2 to T3) was mediated by Non-judging (T1 to T2). The relationship between the MBI group and Flourishing (T2 to T3) was mediated by Values Obstruction (T1 to T2).

9.7.1 Reversed mediations.

These significant mediation effects were also tested to ascertain if the significant effects would also be found in reverse, that is if the relationship between group and proposed mediators (T2 to T3) would be mediated by the outcome variables (T1 to T2) (see: Snippe et al., 2015 for an example of this method). None of these mediation effects were statistically significant. Perceived Stress (T1-T2) did not mediate the relationship between ACT and Values Progress (T2-T3) ($B = -.23$; 95% CI $[-.86, .40]$). Negative Experiences (T1-T2) did not mediate the relationship between ACT and Non-judge (T2-T3) ($B = .49$; 95% CI $[-.33, 1.13]$). Flourishing (T1-T2) did not mediate the relationship between the MBI group and Values Obstruction (T2-T3) ($B = .19$; 95% CI $[-.13, .52]$). These results strengthened inference of a causal pathway from group to outcomes through these mediators.

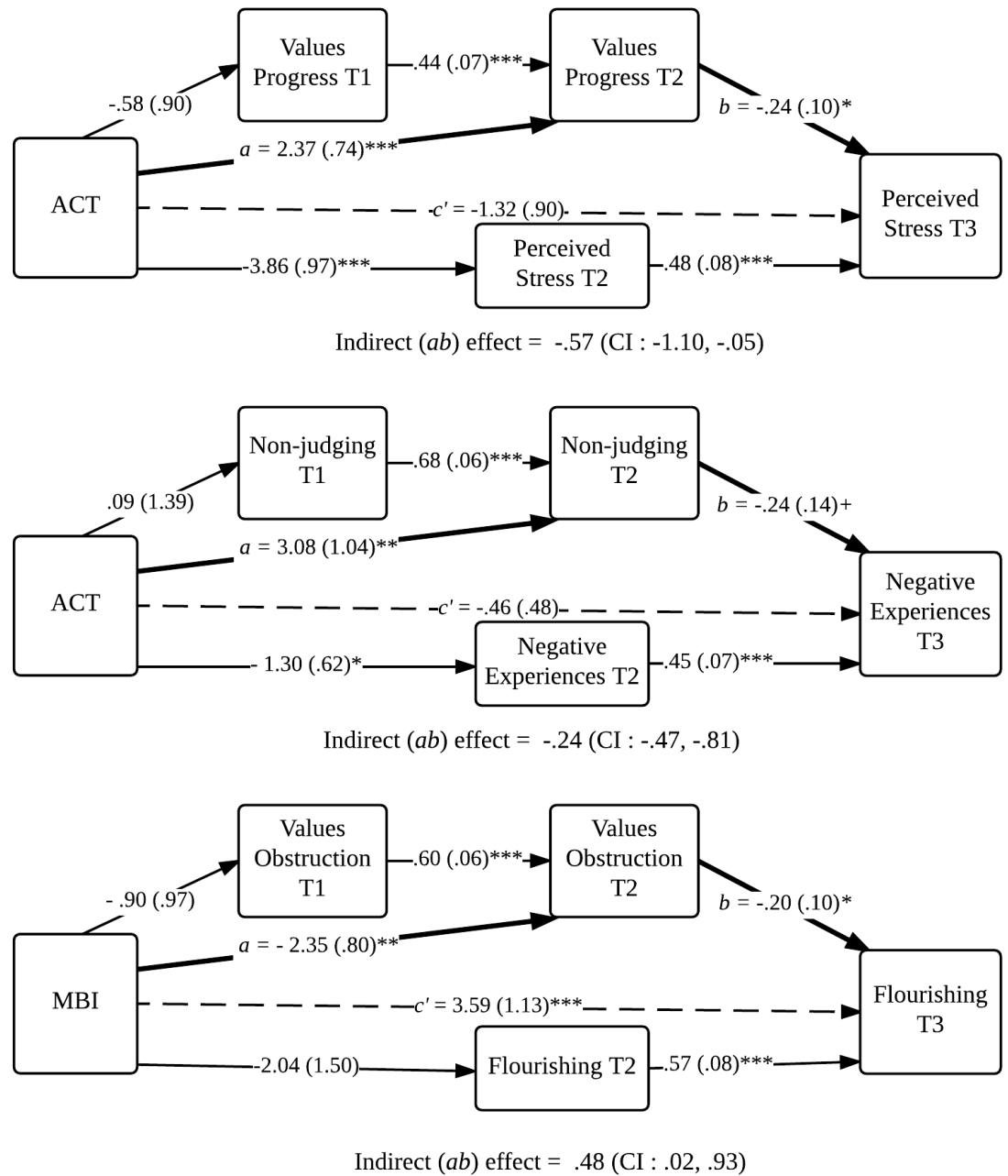


Figure 9.3. Unstandardised coefficients for simple mediation models with significant indirect effects from group to change in outcomes (T2 to T3) through change in mediators (T1 to T2).

Table 9.3

Significant Unstandardised Indirect Effects from Group to Change in Outcomes (T2 to T3) Through Change in Single Mediators (T1 to T2) and Associated Total and Direct Effects

Mediation pathways			Total effects	Indirect effects			Direct effects
				Point estimate	CI 95%		
MBI	→ Values Obstruction	→ Flourishing	5.35 (1.47)***	.48	.02	.93	3.59 (1.13)***
ACT	→ Values Progress	→ Perceived Stress	-3.68 (1.04)***	-.57	-1.10	-.05	-1.32 (.90)
ACT	→ Non-judging	→ Negative Experiences	-1.28 (.56) *	-.24	-.47	-.01	-.46 (.48)

Note: Indirect and direct effects do not total the total effect as an additional (non-significant) indirect effect is calculated from X to M (T2) through M (T1) paths, as illustrated in Figure 9.3. CI = confidence intervals.

*** $p < .001$, ** $p < .01$, * $p < .05$.

9.8 Multigroup Regression Analyses

Consistent with the method outlined in Section 8.5, multigroup analyses of the b paths, or the relationships between changes in mediators and changes in outcomes, were conducted for each significant mediation model. This was performed to check if the between group homogeneity of regression assumption was violated. As illustrated in Figure 9.4, change in mediators were regressed on change in outcomes (b paths from previous analysis) by group (ACT, MBI and control group). The coefficients from the ACT and MBI groups were compared with the control group to check for significant differences.

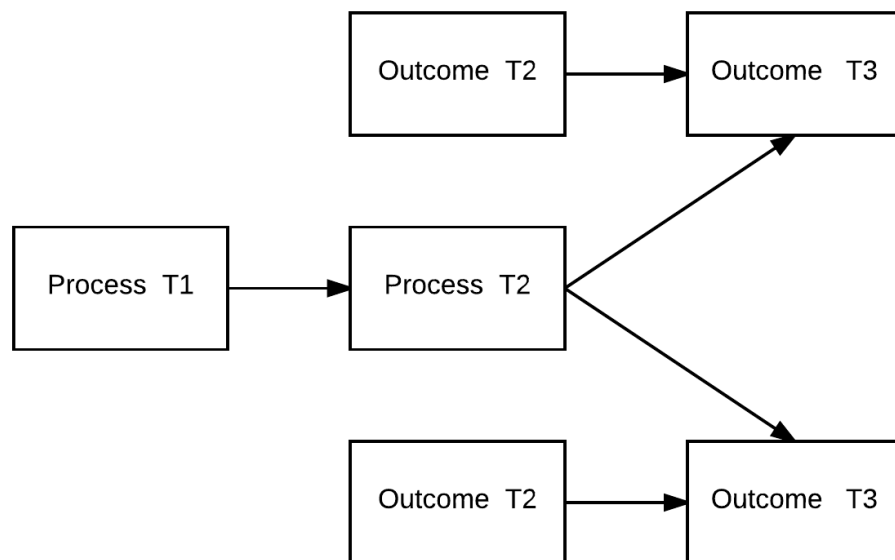


Figure 9.4. Multigroup regression model.

Results from the regression analyses indicated that in the MBI group, changes in Values Obstruction (T1 to T2) did not significantly predict later change in Flourishing (T2 to T3) ($B = -.27$, $SE = .10$, $p = .790$), however this relationship was statistically significant in the control group ($B = -.42$, $SE = .19$, $p = .029$). Differences between the two coefficients was non-significant $t(105) = 1.81$, $p = .073$). In the ACT group, changes in Values Progress (T1 to T2) did not significantly predict later change in

Perceived Stress (T2 to T3) ($B = -.14$, $SE = .15$, $p = .357$), but the same relationship in the control group was statistically significant ($B = -.30$, $SE = .13$, $p = .022$). Difference between these coefficients was non-significant $t(100) = .81$, $p = .423$). In the ACT group, change in Non-judging (T1 to T2) significantly predicted later change in Negative Experiences (T2 to T3) ($B = -.12$, $SE = .05$, $p = .013$) and this relationship was non-significant in the control group ($B = -.04$, $SE = .04$, $p = .326$). Difference between these coefficients was also non-significant $t(100) = 1.31$, $p = .193$). As there were no significant differences between the intervention and control group coefficients (b paths), the assumption was not violated for the associated mediation effects.

9.9 Brief Discussion

9.9.1 Hypotheses.

It was hypothesised that there would be no significant mediation effects of either ACT or MBI groups on changes in outcomes (from T2 to T3) through prior changes in proposed mediators (T1 to T2), primarily due to the pattern of change over time found in Study 2. However, three significant time-series mediation effects were identified: (i) Values Progress (T1 to T2) mediated the relationship between ACT and Perceived Stress (T2 to T3), (ii) Non-judging (T1 to T2) mediated the relationship between ACT and Negative Experiences (T2 to T3), and (iii) Values Obstruction (T1 to T2) mediated the relationship between the MBI group and Flourishing (T2 to T3).

9.9.2 Discussion of significant results.

Given that the ACT intervention targeted values-based action and the MBI group had a stronger focus on formal mindfulness, it was surprising that Values Obstruction was a significant mediator only in the MBI group and Non-judging was a significant mediator only in the ACT group. These results are discussed below.

Non-judging as a significant mediator of ACT on Negative Experiences.

This result is inconsistent with the limited evidence from MBSR programs that

changes in mindfulness occur prior to changes in outcomes. For example, prior change in mindfulness was found to mediate the relationship between an MBSR-type intervention and later changes in trait anxiety and self-compassion (Bergen-Cico & Cheon, 2014) and prior change in mindfulness was found to mediated the relationship between an MBI and depressive symptoms (Kuyken et al., 2010). It should be noted that in both of these studies, mindfulness was measured as a total mindfulness score, rather than specific elements, or “how” components such as Non-judging. However, the result is consistent with evidence that Non-judging mediated the effect of ACT on depressive symptoms (e.g., Forman et al., 2007; Muto et al., 2011).

Values Obstruction as a mediator only in the MBI group.

The role of Values Obstruction (the deficiency of behaviour in line with values due to internal barriers) as a mediator of the effect of an MBI on Flourishing was perhaps more unexpected. This is because Values Obstruction did not mediate change in the ACT group, even though it was the ACT intervention that focussed on the reduction of this process. This result is possibly best explained best by the very limited change in Flourishing in the ACT group from T2 to T3, rather than the strength of change in Values Obstruction in the ACT group. However, this result is consistent with a previous study in which the effect of MBSR on Satisfaction with Life was mediated by valued living (Guadagno, 2012).

Values Progress as a mediator of ACT on Perceived Stress.

The result indicating Values Progress was a mediator of the relationship between ACT and Perceived Stress is unprecedented in the literature. While S. A. Hayes et al. (2010) found values-based action mediated the relationship between ACT and anxiety symptoms in an ABBT intervention, this was a within-group study and the mediator did not temporarily precede the outcome. As reduction in Perceived Stress is a state goal and focus of the an MBSR-type intervention, it is surprising that it was changes in

Values Progress, rather than changes mindfulness, that was identified as a mediator of Perceived Stress and that this was only in the ACT group, rather than the MBI group.

However, given the focus of the items on the Values Progress and Perceived Stress scales, it makes sense that Values Progress was found to be a mediator of Perceived Stress. Specifically, if the intervention reduced perceived stress or feeling like “things were not going your way” from the Perceived Stress Scale (S. Cohen, Kamarck, & Mermeistein, 1983), it could conceivably be through earlier improvements in “progress in the areas of my life I care about” from the VQ (Smout et al., 2014). These results are discussed further in Chapter 12 in concert with other results included in this thesis.

9.9.3 Evidence for values-based action as a mechanism of change.

These results together support the role of values-based action as a mediator of change in the relationship between MBIs in general (ACT and other MBIs) and some outcome variables. Importantly, they also provide initial support for a causal link between change in values-based action and change in Perceived Stress and Flourishing in MBIs. The case for temporal precedence of mediators is strengthened with the results indicating the same effects were not identified when the order of mediators and outcome variables was reversed. However, the analysis of the *b* paths indicated a non-significant relationship between change in Values Obstruction and change in Flourishing in the MBI group and change in Values Progress and change in Perceived Stress in the ACT group. These latter results indicate that most of the indirect effect was established through the *a* paths, weakening the case for values-based action as a mediator of change in both cases.

9.9.4 Limitations.

Given the results of Study 2 which indicated that most of the change in outcomes in the ACT group occurred between T1 and T2, significant time-series

mediation effects were not expected. However, it should be noted that significant time-series mediation effects can be directly linked to the method used to analyse change in Study 3, which differed from the method used in Study 2.

Figure 9.5 illustrates the difference between the two methods. The black lines show the slopes or change between mean scores in Perceived Stress and Negative Experiences in the ACT and control groups. These lines clearly indicate that the slope of the two lines from T2 to T3 in Study 2 were similar. The grey lines depict the change from T2 to T3 in Study 3. It is clear from the diagram that the slopes are meaningfully different between the ACT and control groups in Study 3 because the T2 scores were based on a mean between-group score at T2. This approach was in keeping with the approach of this study which was to control for baseline differences between groups. While this is a statistically valid approach, in practice it masks the reality that most change in proposed mediators and outcomes occurred during the intervention (from T1 to T2).

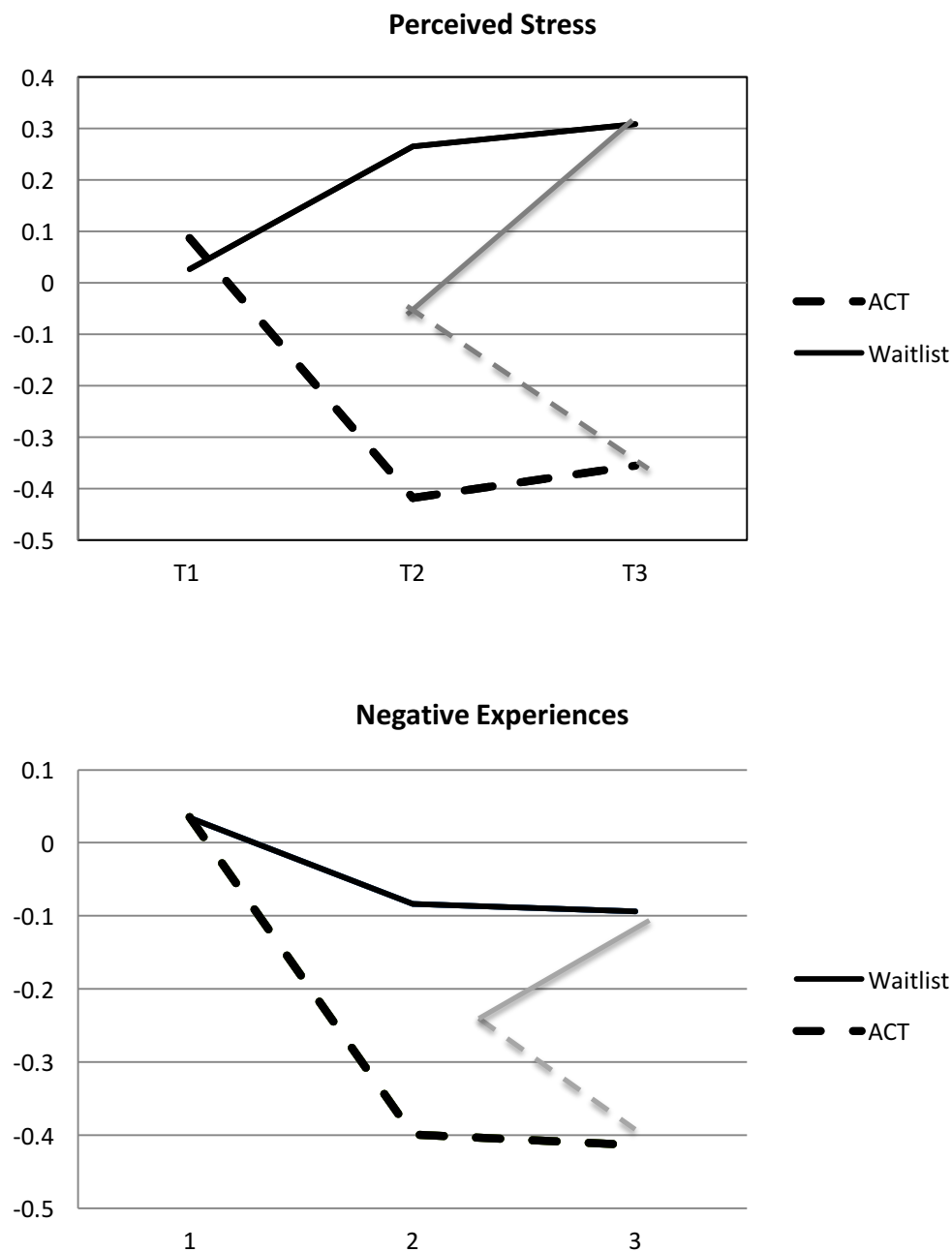


Figure 9.5. Standardised estimated marginal means of Perceived Stress and Negative Experiences in ACT and control groups from Study 2 and expected slope in Study 3. The dark lines depict the Study 2 estimated marginal means and the light lines are indicative of change from T2 to T3 in Study 3, assuming an average baseline at T2.

9.10 Chapter Summary

This chapter examined if changes in proposed mediators from T1 to T2 mediated changes between ACT and MBI groups and outcomes from T2 to T3. Three significant

mediation effects were identified: (i) Values Progress (T1 to T2) mediated the relationship between ACT and Perceived Stress (T2 to T3), (ii) Non-judging (T1 to T2) mediated the relationship between ACT and Negative Experiences (T2 to T3), and (iii) Values Obstruction (T1 to T2) mediated the relationship between the MBI group and Flourishing (T2 to T3). These results provide initial evidence that values-based action could be a mechanism by which ACT and MBI interventions effect wellbeing and distress outcomes. They also provide evidence that Values Obstruction (or acting on values despite the presence of psychological barriers) and Values Progress (acting in line with values) are independent process and have differentially facilitate outcomes.

Chapter 10

Empirical Study 3: Concurrent Mediation Analyses

This chapter outlines the results of the concurrent mediation analyses of Study 3. The major aim of Study 3 was to explore whether changes in proposed mediators (values-based action and mindfulness) mediate the effects of the ACT and MBI interventions on change in outcome variables. However, given the between group differences in variables at baseline identified in Study 2, Study 3 also aimed re-examine rates of change in process and outcome variables to determine whether they differed between intervention groups, while controlling for baseline differences. In this study, change is modelled from T1 to T3 in both proposed mediators and outcomes. A review of the relevant literature concerning the mediating effects of MBI and ACT interventions on outcomes through mindfulness and values-based action can be found in Chapters 2 and 3 and at the beginning of Chapter 9.

10.1 Hypotheses

Based on the pattern of results in Study 2 (Section 6.4.3), it was hypothesised that the rate of change in Values Obstruction (from T1 to T3) in the ACT group would be greater than the rate of change in Values Obstruction in the MBI group, when controlling for baseline differences. It was also predicted that the rate of change in Negative Experiences (T1 to T3) would be greater in the MBI group than the ACT group. These predictions are consistent with existing evidence that an ACT interventions targeting only mindfulness processes resulted in greater reductions in symptom severity than an ACT intervention targeting only values processes and an ACT intervention targeting values process resulted in greater improvements in values-based action than one targeting only mindfulness processes (J. L. Villatte et al., 2015).

Based on the results of Study 2, it was also hypothesised that the rate of change in both ACT and MBI groups would be equal in mindfulness processes (Non-judging and Acting with Awareness) and Positive Experiences, Flourishing and Perceived Stress, when controlling for baseline differences.

The hypotheses regarding mediation effects in this chapter centre on concurrent mediation effects (the role of change in proposed mediators from T1 to T3 in mediating the relationship between groups and changes in outcomes from T1 to T3). Given the greater rate of change in Values Progress and Values Obstruction in the ACT group compared to the MBI group in Study 2, and the focus of the ACT group in improving values-based action, it was predicted that values-based action would mediate the relationship between the ACT group and change in all outcomes. It was further expected that these mediation effects would be stronger in the ACT group than the MBI group. It was also predicted that the mediation effect of group on all outcomes through values-based action variables would be stronger in the ACT group than the MBI group.

Given the focus of the MBI group on developing mindfulness through formal mindfulness practice, it was also predicted that Non-judging would mediate the effect of MBI on Negative Experiences, and this effect would be stronger in the MBI group than the ACT group. This prediction was based on three considerations: (i) the strong relationship between Non-judging and Negative Experiences observed in Study 1, (ii) the considerably greater rate of change in Negative Experiences observed in the MBI group in Study 2, and (iii) theory and evidence supporting the contention that formal mindfulness practice may have a stronger influence on improving acceptance (measured here with the Non-judging variable) due to repeated exposure to aversive experience and the flow-on effect this has on reducing negative experiences (e.g., Hölzel et al., 2011; Shapiro et al., 2006).

Given that Values Progress did not change significantly in the MBI group

compared to the control group in Study 2, and there was no focus on developing values-based action in the MBI group, it was predicted that the indirect effect of MBI on all outcomes through mindfulness variables would be significantly larger than the indirect effects of MBI on all outcomes through Values Progress.

Therefore, based on this rationale and Study 2 results, hypotheses regarding change over the intervention from T1 to T3 were:

1. Both ACT and MBI groups will report greater increases in mindfulness variables (Non-judging and Acting with Awareness), Positive Experiences, Flourishing, Perceived Stress, in comparison with the control group, after controlling for baseline differences.
2. The ACT group, but not the MBI group, will report greater increases in Values Progress in comparison with the control group, after controlling for baseline differences, but there will be no significant difference between increases in Values Progress between ACT and MBI groups.
3. Both the ACT and MBI groups will report greater increases in Values Obstruction in comparison with the control group, after controlling for baseline differences, and the ACT group report greater increases in Values Obstruction in comparison with the MBI group.
4. The MBI group, but not the ACT group, will report greater increases in Negative Experiences in comparison with the control group, after controlling for baseline differences, and the MBI group will report greater increases in Negative Experiences in comparison with the ACT group.

The following hypotheses relate to the concurrent mediations which examine if change in proposed mediators (T1 to T3) were responsible for driving change in outcomes (T1 to T3). They are:

5. Changes in Values Obstruction, Non-judging and Acting with Awareness

will mediate the relationship between both ACT and MBI groups and all outcomes (Perceived Stress, Negative Experiences, Positive Experiences and Flourishing), controlling for baseline differences.

6. In the ACT group, but not the MBI group, changes in Values Progress will mediate change in all outcomes (Perceived Stress, Negative Experiences, Positive Experiences and Flourishing), controlling for baseline differences.

Hypotheses 7 and 8 concern differences between mediation effects between and within groups. They are:

7. The indirect effects of the ACT group on changes in all outcomes (Perceived Stress, Negative Experiences, Positive Experiences and Flourishing) through Values Progress and Values Obstruction (when controlling for baseline differences) will be significantly larger than the equivalent mediation effects from the MBI group through these pathways.
8. The indirect effects from the ACT group on changes in all outcomes (Perceived Stress, Negative Experiences, Positive Experiences and Flourishing) through Values Progress and Values Obstruction, when controlling for baseline differences, will be significantly larger than the indirect effects from the ACT group to equivalent outcomes through change mindfulness variables (Non-judging and Acting with Awareness).

10.2 Method

Consistent with the approach outlined in Chapter 8 and illustrated in Figure 10.1, hypotheses were tested using a path analysis model in which each intervention group was modelled to predict change in outcomes (T1-T3), through changes in proposed mediators over the same time period (T1 to T3).

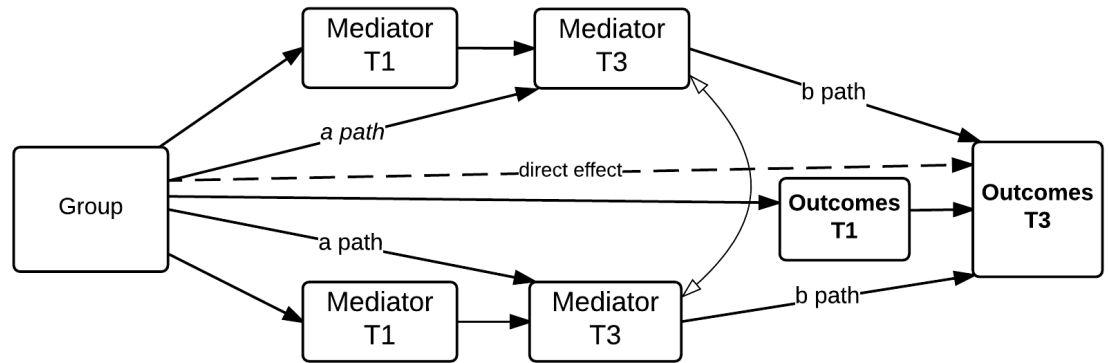


Figure 10.1. Concurrent multiple mediation model. Only two mediators are included and one box representing four outcomes for simplicity.

10.3 Results: Multiple Mediation Models

10.3.1 Change in process variables in multiple mediator models.

The *a* paths, or relationships between group and changes in proposed mediators, were examined to ascertain whether the rates of change in proposed mediators (T1-T3) in ACT and MBI groups were significantly different from rates of change in the control group, while controlling for baseline differences. As indicated in Table 10.1, change in all proposed mediators (Values Progress, Values Obstruction, Non-judging and Acting with Awareness) was significantly different in the ACT and MBI group compared with the control group.

The size of the *a* path coefficients were also compared between and within groups using *t*-tests (J. Cohen et al., 2003; Soper, 2007). Results are included in Table 10.1 and indicated there were no statistically significant differences between groups. However, there were a number of statistically significant within-group differences between changes in process variables as illustrated in Figure 10.2. Within the MBI group, the rate of change in Non-judging was significantly greater than the rate of change in Acting with Awareness, $t(104) = 2.42, p = .017$ and Values Progress $t(104) = 2.65, p = .009$. Within the ACT group, the rate of change in Values Progress was significantly smaller than the rate of change in Values Obstruction $t(96) = 2.04, p = .044$.

and Non-judging $t(96) = 1.99, p = .050$.

10.3.2 Total change in outcome variables.

The total effects for each outcome variable are displayed in Table 10.2 and Figure 10.2. The total effects for all outcome variables (Flourishing, Positive Experiences, Negative Experiences and Perceived Stress) were statistically significant, indicating that the rate of change in both ACT and MBI groups was significantly larger than that reported in the control group, when controlling for baseline differences. To ascertain if differences between ACT and MBI groups were significantly different, the coefficients for total effects were compared using t -tests. There were no significant differences between groups, however, in the MBI group the rate of reduction in Negative Experience was substantially more than in the ACT and approached acceptable significance levels, $t(100) = 1.74, p = .090$.

Table 10.1

Coefficients for the a Paths of the Concurrent Mediators Models and Differences Between Groups

	MBI		ACT		t-tests
	<i>B (SE)</i>	β	<i>B (SE)</i>	β	
Δ T1 to T3					
Δ Acting with Awareness	2.08 (.83)*	.20	3.16 (.87)***	.30	$t(100) = .90, p = .371$
Δ Non-judging	5.40 (1.09)***	.34	5.32 (1.16)***	.35	$t(100) = .05, p = .960$
Δ Values Progress	1.82 (.80)*	.20	2.54 (.78)***	.28	$t(100) = .64, p = .521$
Δ Values Obstruction	- 4.04 (.87)***	-.35	- 5.00 (.92)***	-.44	$t(100) = .76, p = .450$

Note. Δ = change, B = unstandardised coefficient and β = standardised coefficient.

*** $p < .001$, ** $p < .01$, * $p < .05$.

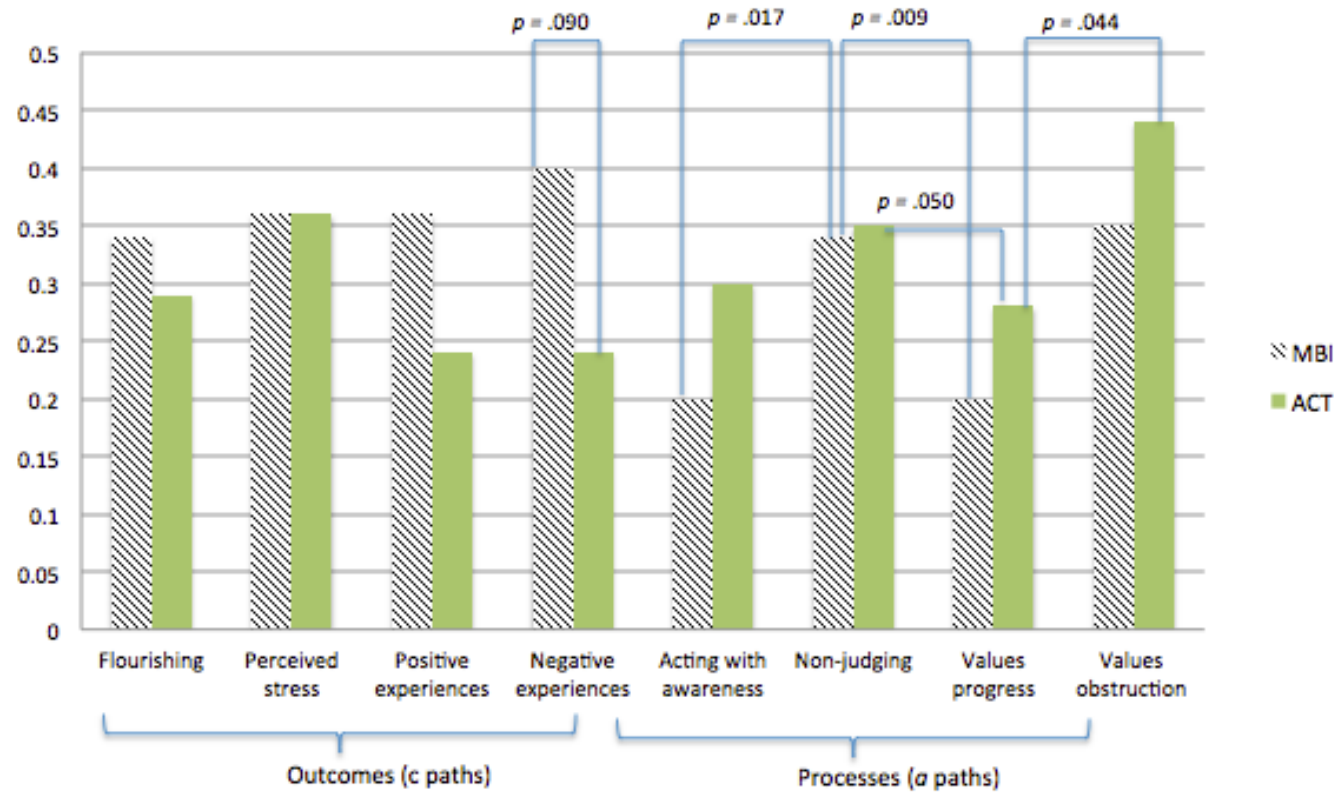


Figure 10.2. Standardised coefficients comparing change (T1 to T3) in process variables (a paths) and outcomes (total effects or c paths) in ACT and MBI groups. Only significant differences between coefficients and related p values are identified in the figure.

Table 10.2

Total, Direct and Indirect Effects from Multiple Mediator Models

	<u>Flourishing</u>		<u>Perceived Stress</u>		<u>Positive Experiences</u>		<u>Negative Experiences</u>	
	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
MBI								
Total effects	5.17 (1.42)***	.34	-3.83 (1.04)***	-.36	2.66 (.68)***	.36	-2.88 (.65)***	-.40
Direct effects	3.33 (.84)***	.22	-.89 (.72)	-.08	1.29 (.57)**	.19	-1.35 (.56)*	-.19
Total indirect	1.82 (1.22)	.12	-2.94 (.92)***	-.27	1.19 (.51)*	.18	-1.53 (.46)***	-.21
Via Act-aware	.83 (.40)*	.06	-.28 (.19) ⁺	-.03	.02 (.13)	>.01	.02 (.15)	<.01
Via Non-judging	-.76 (.41) ⁺	-.05	-.68 (.32) ⁺	-.06	-.27 (.23)	-.04	-.61 (.32) ⁺	-.08
Via Values Progress	1.74 (.85)*	.12	-.79 (.34)*	-.07	.71 (.33)*	.10	-.32 (.25) ⁺	-.04
Via Values Obstruction	-.09 (.84)	-.01	-.70 (.37) ⁺	-.06	.64 (.31)*	.09	-.39 (.32)	-.04
ACT								
Total effects	4.22 (1.42)***	.29	-3.67 (1.03)***	-.36	1.83 (.79)*	.24	-1.39 (.56)*	-.24
Direct effects	1.71 (.90)	.12	-.79 (.75)	-.07	.91 (.62)	.12	.13 (.51)	.02
Total indirect	2.51 (1.38) ⁺	.17	-2.89 (.88)***	-.28	.92 (.56) ⁺	.12	-1.52 (.43)***	-.26
Via Act-aware	.80 (.44) ⁺	.05	-.50 (.29) ⁺	-.05	.03 (.30)	<.01	-.12 (.20)	-.02
Via Non-judging	-.72 (.44) ⁺	-.05	-.64 (.36) ⁺	-.06	-.52 (.30) ⁺	-.07	-.38 (.20)	-.06
Via Values Progress	2.45 (.93)**	.17	-1.27 (.42)**	-.12	.84 (.31)**	.11	-.33 (.18) ⁺	-.06
Via Values Obstruction	1.05 (.82)	.07	-.72 (.40) ⁺	-.07	1.06 (.44)*	.14	-.80 (.42)*	-.14

Note. An indirect effect from group to T3 through T1 of each process variable was also calculated in the models and is therefore included in the total indirect effect. However, none of these indirect effects were statistically significant.

⁺ $p > .05$ but 95% CI did not cross zero, * $p < .05$, ** $p < .01$, *** $p < .001$.

10.3.4 Total indirect effects.

The total indirect effects from ACT and MBI groups to all outcomes in the multiple mediator models are also displayed in Table 10.2. All total indirect effects from ACT and MBI groups to all outcomes (through all proposed mediators collectively) were statistically significant, with the exception of the total indirect effect from the MBI group to change in Flourishing. There were no significant differences between ACT and MBI groups in the size of total indirect effects.

10.3.5 Direct effects.

The direct effects from ACT and MBI groups to all outcomes in the multiple mediator models are also displayed in Table 10.2. In the MBI group, direct effects from group to Perceived Stress, Positive Experiences and Negative Experiences were statistically significant. There were no statistically significant direct effects from the ACT group to changes in outcomes. These results suggest that most of the change that occurred in outcomes in the ACT group could be accounted for through the mediators and that a portion of the total change that occurred in three outcomes in the MBI group was not accounted for by the identified mediators. There were no significant differences between ACT and MBI groups in the size of direct effects. Figure 10.3 compares the standardised size of total, direct and total indirect effects for each outcome by group.

It should be noted that the direct effect from ACT on Negative Experiences is mathematically positive. This is discussed in Section 10.3.8.

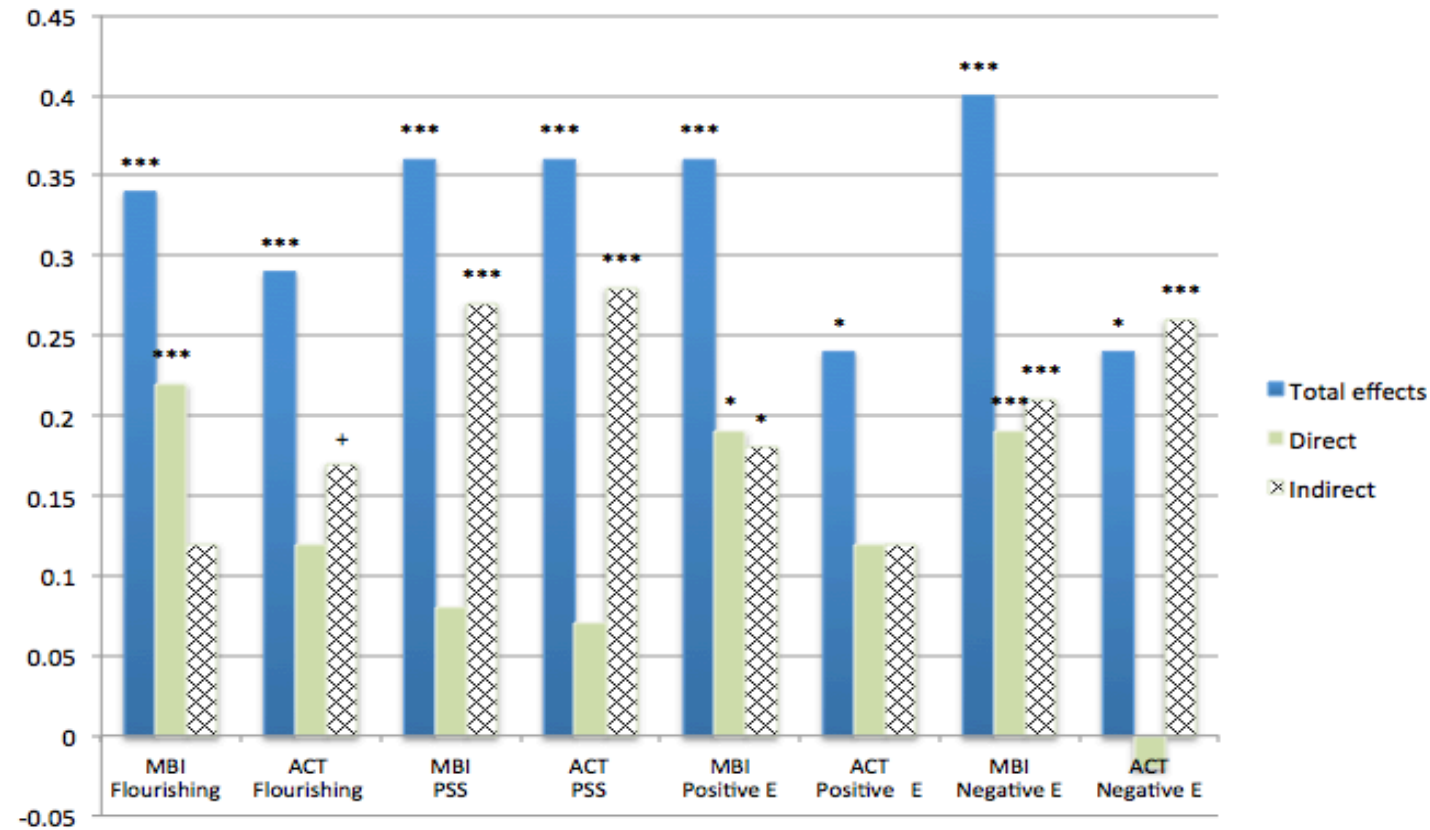


Figure 10.3. Standardised total, direct and total indirect effects by group. PSS = Perceived Stress Scale, PE = Positive Experiences, NE = Negative Experiences. Mathematically negative outcomes have been reversed for ease of display.

p values indicate effects that were statistically significant from zero. ⁺ $p > .10$ with 95% CI that did not cross zero, * $p < .05$, ** $p < .01$, *** $p < .001$.

10.3.6 Specific indirect effects.

Specific mediation effects, each representing the unique indirect effect through each process in each model, are outlined in Table 10.2. There were no statistically significant differences between specific indirect effects between the ACT and MBI groups.

As illustrated in Figure 10.4, values-based action variables (either Values Progress or Values Obstruction) were the most consistent significant mediators of the relationship between group and outcomes across all models. When compared with other mediators within each group, Values Progress was also significantly stronger than some of the other mediators within each model (illustrated in Figure 10.4). In the MBI group, Values Progress was a stronger mediator of Positive Experiences than Acting with Awareness $t(104) = 1.95, p = .054$, a stronger mediator of Flourishing than Non-judging, $t(104) = 2.65, p = .009$, and a stronger mediator of Positive Experiences than Non-judging $t(104) = 2.44, p = .017$. Values Obstruction was also a stronger mediator of Positive Experiences than Non-judging $t(104) = 2.36, p = .020$. Within the ACT group, Values Progress was a stronger mediator of Flourishing than Non-judging, $t(100) = 3.08, p = .003$, and Values Obstruction was a stronger mediator of Flourishing than Non-judging, $t(100) = 1.09, p = .054$. Values Progress was also a stronger mediator of Positive Experiences than Non-judging $t(100) = 3.15, p = .002$, and Values Obstruction was a stronger mediator of Positive Experiences than Non-judging, $t(100) = 2.67, p = .003$. When the strength of mindfulness-based mediators were compared within groups, one significant difference was identified. In the MBI group, Acting with Awareness was a stronger mediator of Flourishing than Non-judging, $t(104) = 2.78, p = .007$.

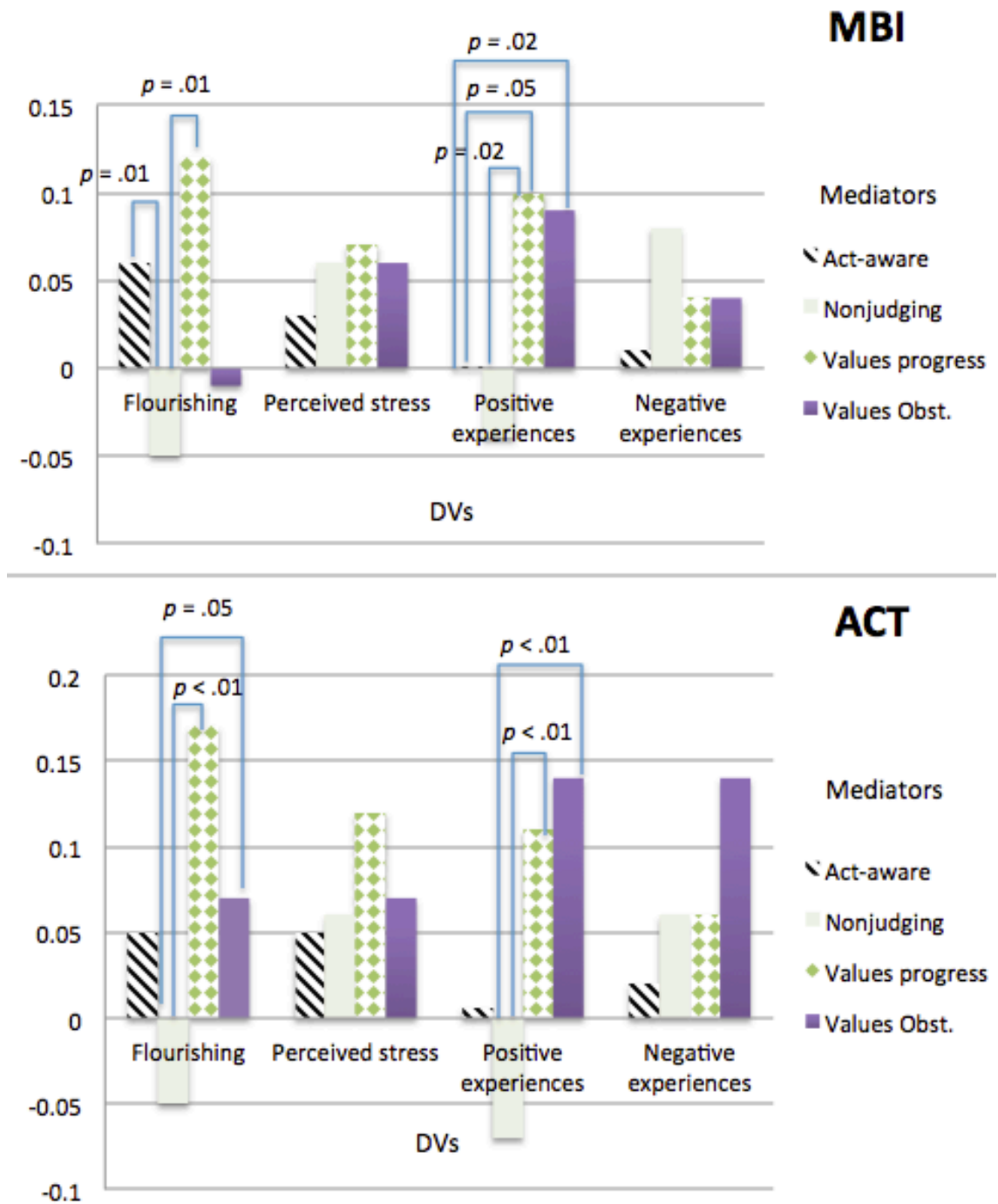


Figure 10.4. Standardised indirect effects compared by mediator and outcome in multiple mediator models. Significant differences between the size of mediators are highlighted.

10.3.7 Issues related to attenuation effects.

One of the reasons that Non-judging was identified as a significantly weaker mediator than other processes was that it predicted *reductions* in positive outcomes (Flourishing and Positive Experience) while the other mediators predicted *improvements* in positive outcomes. This result is inconsistent with the results of other studies which indicate Non-judging predicts improvements in positive outcomes (Cash & Whittingham, 2010; Hollis-Walker & Colosimo, 2011; Veehof et al., 2011). This unexpected result can be explained by attenuation effects that commonly occur in multiple mediations when mediators are highly correlated (A. F. Hayes, 2013; Preacher & Hayes, 2008) as discussed in Section 8.6. In this case, high correlations between Values Obstruction and mindfulness variables were posited to be responsible for the mathematically negative coefficient. At baseline the correlation between Acting with Awareness and Values Obstruction was $r = -.67, p < .001$, the correlation between Non-judging and Values Obstruction was $r = -.52, p < .001$, and the correlation between Acting with Awareness and Non-judging was $r = .52, p < .001$. The correlations between Values Progress and the other proposed mediators tended to be lower (Non-judging, $r = .30, p < .001$; Acting with awareness: $r = .37, p < .001$; Values Obstruction, $r = .49, p < .001$). In fact, the relationship between Values Progress and Acting with awareness was significantly lower than the relationship between Values Obstruction and Acting with Awareness ($z = -2.24, p = .025$). Thus, it was assumed that Values Progress was a stronger mediator across most models because it was less likely than other mediators to share variance with the other mediators in the model. It should also be noted that the negative coefficients predicting positive variables were non-significant or barely significant.

Many of the individual indirect effects in all models either failed to reach statistical significance or were barely significant (e.g. confidence intervals were very

close to zero). The existence of strong attenuation effects explains both the low significance levels in most mediators and the negative indirect effect coefficients in Non-judging. Therefore, in line with recommendations by MacKinnon et al. (2000) and Preacher and Hayes (2008), the multiple mediations were followed up with simple mediation analyses for each mediator and were used for the bulk of the interpretation regarding specific mediation effects.

10.3.8 Inconsistent mediation.

Another unusual effect can be identified in Table 10.2 and Figure 10.3. The direct effect from the ACT group on Negative Experiences was mathematically positive, while the total effects and total indirect effects of the ACT group on Negative Experiences were mathematically negative. This is an example of inconsistent mediation. This occurs when the collective strength of the indirect effects is greater than the total effect, rendering the remaining direct effect negative (A. F. Hayes, 2013). Despite seeming paradoxical, Hayes (2013) states that this is both common and statistically legitimate. It can be interpreted to mean that if the mediators were held constant (there was no change in mindfulness or values-based action), those in the ACT group would be likely to have more Negative Experience. However, as this effect was non-significant, it can be interpreted to mean that absence of the change in mediators, the ACT intervention would likely have resulted in no change. As noted by MacKinnon et al. (2007), such results can also shed light on the importance of certain processes in interventions.

10.4 Results: Simple Mediation Models

The analyses were repeated using simple mediator models (modelling a single mediator in each model) as illustrated in Figure 10.5. Each model consisted of an intervention group dummy variable as a predictor (ACT or MBI), a single mediator (T1 regressed on T3) and four outcomes variables (T1 regressed on T3).

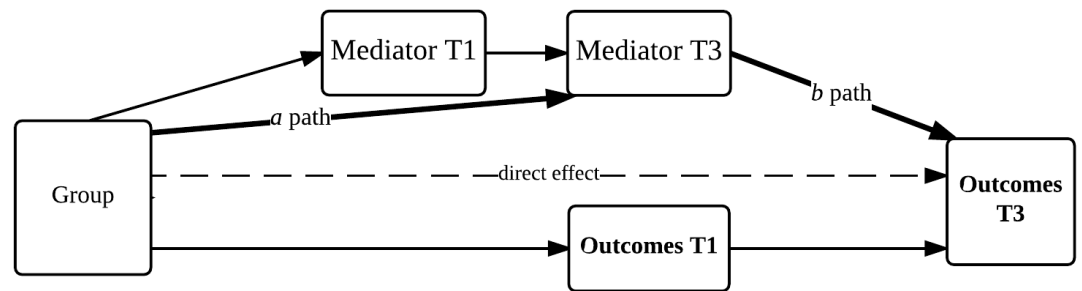


Figure 10.5. Concurrent simple mediation model. For simplicity, one box represents paths to all four outcomes.

10.4.1 Change in process variables in single mediator models.

Once again the a paths were examined to determine if rate of change in proposed process variables (a paths) from T1 to T3 were significantly different to rates of change in the control group, while controlling for baseline differences. As outlined in Table 10.3, all a paths were significantly different from the control group. There were no significant differences between groups. As expected, the a path coefficients were the same as in the multiple mediator models (Table 10.1) or within $<.01$ standardised points of those in Table 10.1 and not significantly different.

Table 10.3

Coefficients for the a Paths of the Concurrent Mediators Models and Differences Between Groups

Δ T1 to T3	MBI		ACT		t-tests
	<i>B (SE)</i>	β	<i>B (SE)</i>	β	
Δ Act-Aware	2.08 (.83)**	.20	3.13 (.87)***	.29	$t(100) = .32, p = .747$
Δ Non-judging	5.38 (1.09)***	.33	5.32 (1.16)***	.34	$t(100) = .04, p = .970$
Δ Values Progress	1.84 (.81)*	.21	2.54 (.78)***	.28	$t(100) = .62, p = .535$
Δ Values Obstruct	- 4.05 (.87)***	-.35	- 4.98 (.94)***	-.44	$t(100) = .73, p = .469$

Note. Δ = change, B = unstandardised indirect effect; β = standardised effect.

* $p < .05$, *** $p < .001$, ** $p < .01$.

10.4.2 Total change in outcome variables in simple mediator models.

The total effects for each outcome were also examined to identify if rate of change in outcome variables (from T1 to T3) differed between the intervention groups and the control group. The rate of change in all outcome variables was significantly greater in both ACT and MBI groups than in the control group. Total effects for the simple mediator models are not included in Table 10.5 and Table 10.6 due to space considerations and because they were similar in size to total effects of the multiple mediator models (outlined in Table 10.2). Although total effects might be expected to vary between the models multiple mediators and the single mediator models, in this case, variation was $< .03$ standardised points between the models and differences were not statistically significant. Consistent with the results from the multiple mediator models, there were no significant differences between groups in total effects in the simple mediation analysis, however, differences between total effects on Negative Experiences approached significance as outlined in Table 10.4.

Table 10.4

Total Effects of ACT and MBI groups on Negative Experiences in Simple Mediation Models and Between group Differences

	ACT	MBI	t tests
Acting with Awareness	-1.35 (.56)*	-2.84	$t(100) = 1.74,$
Non-Judging	-1.42 (.56)*	-2.92	$t(100) = 1.75,$
Values Progress	-1.38 (.56)*	-2.84	$t(100) = 1.70,$
Values Obstruction	-1.37 (.56)*	-2.87	$t(100) = 1.79,$

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

10.4.3 Patterns of direct effects.

Direct effects from the MBI group on outcomes are reported in Table 10.5 and direct effects from the ACT group on outcomes are reported in Table 10.6. All direct effects from the MBI group to outcomes, controlling for indirect effects through Non-

judging, Acting with Awareness, Values Progress and Values Obstruction, were significantly different from the control group, with one exception. The direct effect from the MBI group to changes in Flourishing, after accounting for the mediation effect of change in Values Progress, was non-significant. In the ACT group, direct effects to changes in all outcomes, through changes in all mediators, were significant, with five exceptions. The direct effect from the ACT group to Positive Experiences, after accounting for the mediation effect of Values Obstruction, was non-significant. Also all direct effects from the ACT group to changes in Negative Experiences, controlling for the four individual mediators, were non-significant. These results indicate that change in all processes (Acting with Awareness, Non-judging, Values Progress and Values Obstruction) fully mediated the effect of the ACT on the change in Negative Experiences.

When direct effects were compared between ACT and MBI groups, one significant difference was noted. The direct effect from the MBI group on changes in Negative Experiences, accounting for changes in Acting with Awareness, was significantly larger than the equivalent direct effect from the ACT group, $t(100) = 2.08$, $p = .040$. There were no other significant differences between any other direct effects between groups.

Table 10.5

MBI Group Indirect and Direct Effects and b paths for Simple Mediation Models

Simple Mediator	Paths	Flourishing		Perceived Stress		Positive Experiences		Negative Experiences	
		B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
Acting with Awareness	<i>b</i>	.48 (.12)***	.32	-.40 (.08)***	-.37	.17 (.06)**	.23	-.17 (.06)**	-.24
	<i>ab</i>	1.00 (.45)*	.07	-.84 (.36)*	.07	.36 (.18) ⁺	.05	-.36 (.19) ⁺	-.05
	<i>c'</i>	4.18 (1.06)***	.27	-2.59 (.82)**	-.23	2.22 (.59)***	.29	-2.41 (.62)***	-.33
Non-judging	<i>b</i>	.07 (.08)	.08	-.27 (.05)***	-.39	.05 (.04)	.12	-.17 (.04)***	-.38
	<i>ab</i>	.39 (.45)	.03	-1.45 (.37)***	-.13	.29 (.23)	.04	-.91 (.30)**	-.13
	<i>c'</i>	4.77 (1.27)***	.31	-2.00 (.82)*	-.18	2.27 (.62)***	.30	-1.84 (.58)**	-.25
Values Progress	<i>b</i>	1.01 (.14)***	.61	-.59 (.08)***	-.47	.44 (.07)***	.53	-.27 (.09)**	-.32
	<i>ab</i>	1.86 (.92)*	.13	-1.09 (.47)*	-.10	.81 (.37)*	.11	-.49 (.31) ⁺	-.07
	<i>c'</i>	3.16 (.91)	.21	-2.23 (.75)**	-.20	1.69 (.50)***	.23	-2.21 (.59)***	-.30
Values Obstruction	<i>b</i>	-.40 (.11)***	-.30	.47 (.06)***	.48	-.25 (.05)***	-.38	.23 (.06)***	.36
	<i>ab</i>	1.62 (.56)**	.11	-1.89 (.50)***	-.17	1.00 (.31)**	.13	-.93 (.32)**	-.13
	<i>c'</i>	3.40 (1.12)**	.22	-1.40 (.80) ⁺	-.12	1.48 (.58)*	.20	-1.75 (.61)**	-.24

Note: B = unstandardised coefficient, β = standardised coefficient, *b* = b path, *ab* = indirect effect, *c'* = direct effect.

p* < .05, *p* < .01, ****p* < .001.

Table 10.6

ACT Group Indirect and Direct Effects and b paths for Simple Mediation Models

Simple Mediator	Paths	<u>Flourishing</u>		<u>Perceived Stress</u>		<u>Positive Experiences</u>		<u>Negative Experiences</u>	
		B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
Acting with Awareness	<i>b</i>	.44 (.12)***	.31	-.38 (.09)***	-.39	.13 (.06)*	.19	-.20 (.06)***	-.36
	<i>ab</i>	1.39 (.53)**	.09	-1.20 (.45)**	-.11	.42 (.25) ⁺	.05	-.62 (.26)*	-.10
	<i>c'</i>	3.85 (1.14)***	.25	-2.45 (.85)**	-.23	1.64 (.69)*	.21	-.70 (.54)	-.12
Non-judging	<i>b</i>	.12 (.09)	.12	-.27 (.06)***	-.39	.03 (.04)	.05	-.16 (.04)***	-.41
	<i>ab</i>	.64 (.52)	.04	-1.45 (.46)***	-.13	.14 (.25)	.02	-.85 (.27)**	-.14
	<i>c'</i>	4.81 (1.30)***	.31	-2.37 (.92)**	-.22	1.97 (.68)**	.25	-.56 (.55)	-.09
Values Progress	<i>b</i>	1.07 (.16)***	.64	-.63 (.09)***	-.53	.40 (.08)***	.47	-.23 (.06)***	-.37
	<i>ab</i>	2.71 (1.01)**	.18	-1.61 (.56)**	-.15	1.01 (.36)**	.13	-.59 (.26)*	-.10
	<i>c'</i>	2.64 (.97)**	.18	-2.29 (.79)**	-.21	1.14 (.68) ⁺	.15	-.83 (.52)	-.14
Values Obstruction	<i>b</i>	-.54 (.12)***	-.40	.49 (.06)***	.52	-.24 (.06)***	-.36	.28 (.05)***	.53
	<i>ab</i>	2.68 (.77)*** ^a	.17 ^a	-2.41 (.58)***	-.22	1.19 (.40)**	.16	-1.39 (.34)***	-.23
	<i>c'</i>	2.96 (1.26)***	.19	-1.62 (.83)***	-.15	1.02 (.74)	.13	-.14 (.52)	-.02

Note: B = unstandardised coefficient, β = standardised coefficient, *b* = b path, *ab* = indirect effect, *c'* = direct effect.

^a Indirect effect is not valid as it violates the homogeneity of regression assumption (see: 10.5.1).

* $p < .05$, ** $p < .01$, *** $p < .001$.

10.4.4 Patterns of indirect effects.

Table 10.5 and Table 10.6 outline the b paths, indirect effects and direct effects for each model. As illustrated in Figure 10.5, the pattern of indirect effects was very similar between groups and although indirect effects tended to be slightly larger in the ACT group, there were no significant differences between groups.

All indirect effects from both groups on all outcomes through all mediators were statistically significant, with the exception of a number of indirect effects through Non-judging. Changes in Non-judging did not significantly mediate the effects of either group on changes Flourishing or Positive Experiences. This result can be linked to the non-significant b paths in these models which indicate that changes in Non-judging did not significantly predict changes in Flourishing and Positive Experiences. This was confirmed in the multi-group analysis performed to analyse between group differences in the b paths (detailed in Section 10.5 and Table 10.7). These results indicated that changes in Non-judging failed to predict changes in Flourishing in any of the three groups (ACT, MBI and control groups). Therefore the interventions had no effect on the relationship between non-judging and Flourishing.

Within groups differences in mediators.

The indirect effects from the ACT and MBI groups to outcomes in the simple mediations are also outlined in Table 10.5 and Table 10.6. Figure 10.6 compares the size of indirect effects within each outcome by group and highlights significant differences between the size of the indirect effects within each outcome. Within the ACT group, there were a number of significant differences. The indirect effect of the ACT group on Flourishing through Values Obstruction was significantly larger than the indirect effect of ACT on Flourishing through Non-judging, $t(96) = 2.20, p = .031$. The indirect effects of the ACT group on Positive experiences through Values Obstruction (t

(96) = 2.26, $p = .028$) and Values Progress ($t(96) = 1.98, p = .050$) were significantly larger than the equivalent indirect effect through Non-judging. In the MBI group, there were no significant differences between the size of mediators of each outcome.

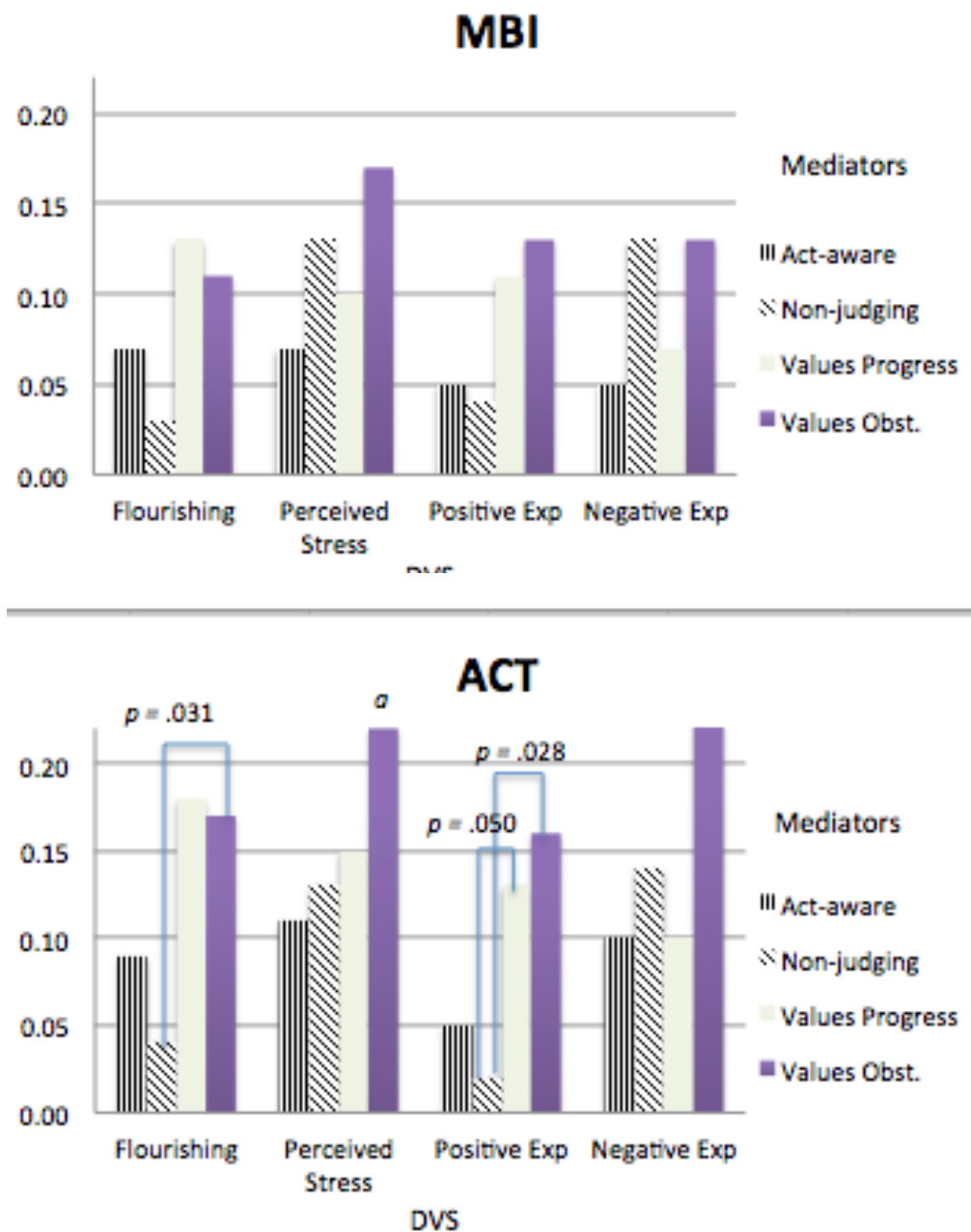


Figure 10.6. Standardised indirect effects compared within outcomes by group in single mediator models with significant differences highlighted. ^a Indicates an indirect effect which violated the homogeneity of regression assumption (see: Section 10.5.1). Act-aware = Acting with Awareness; Values Obst. = Values Obstruction, Exp = Experiences.

Within groups differences in indirect effects across outcomes.

Figure 10.7 compares the size of each specific mediation effect across all outcomes by group. In the ACT group, Values Progress was a significantly stronger mediator of Flourishing than it was of Negative Experiences ($t(96) = 2.03, p = .05$). In the MBI group, Non-judging was a significantly larger mediator of Perceived Stress than Positive Experiences ($t(104) = 2.66, p = .009$).

It should be noted that while the size of significant standardised indirect effects were small ($\beta = .05 - .21$), indirect effects were of a comparable size in similar studies identifying mediation effects through change or difference scores. For example, in Bergen-Cico and Cheon (2014), the standardised indirect effects from MBSR to changes in anxiety and self-compassion through changes in mindfulness were $\beta = -.043, p = .008$ and $\beta = .031, p = .039$ respectively.

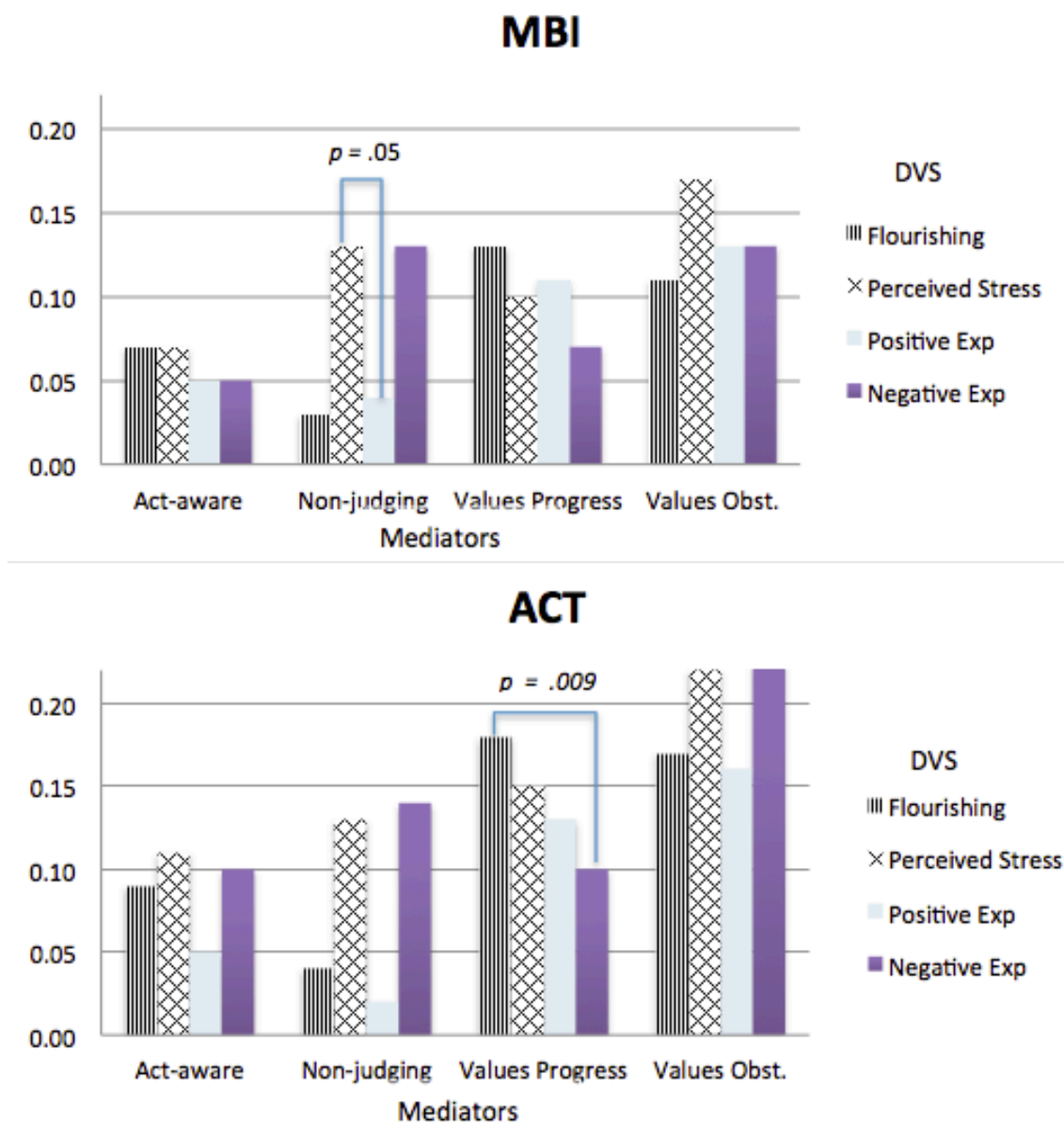


Figure 10.7. Standardised indirect effects compared across outcomes by group in single mediator models with significant differences highlighted. Act-aware = Acting with Awareness; Values Obst. = Values Obstruction, Exp = Experiences.

10.5 Multigroup Regression Analyses

10.5.1 Method.

As outlined in Chapter 8 (Section 8.5), a multi-group analysis was performed to ensure the homogeneity of regression assumption was not violated in significant mediations effects in the concurrent simple mediation analyses. As illustrated in Figure 10.8, change in outcomes were regressed on change in process variables in the three

groups (ACT, MBI and control group). The coefficients from the ACT and MBI groups were then compared with the control group to check for significant differences, which, if identified, would indicate a violation of the homogeneity of regression assumption required for the identification of a mediation effect. However, as stated in Section 7.2.4 and Section 8.5, this violation can also strengthen the case for the process in question being identified as a mechanism of change in the intervention under certain circumstances. If the coefficient in the intervention group is significantly greater than that reported in the control group, then the difference between groups indicates that the intervention has strengthened the relationship between change in the proposed mechanism and change in the outcome (*b* path) in the mediation models.

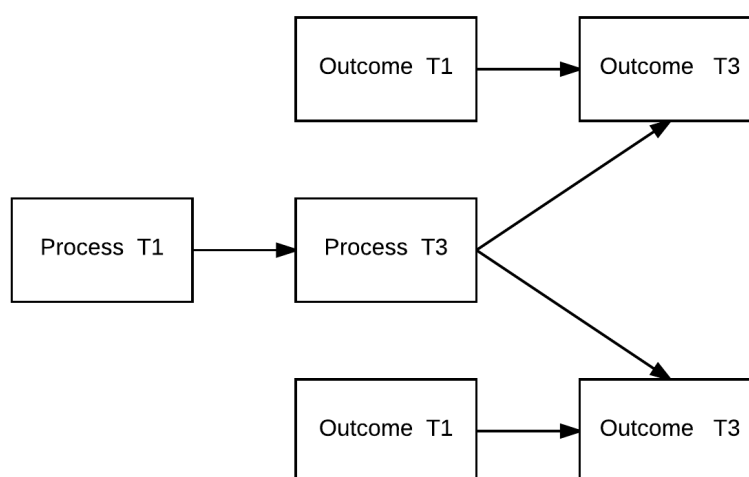


Figure 10.8. Multigroup regression model.

10.5.2 Results of multigroup regression analyses.

The results of the multigroup regression analyses are outlined in Table 10.7. The relationships between change in values-based action variables and change in outcomes were statistically significant in all three groups, with a few exceptions. The relationships between change in Non-judging and positive outcomes (Flourishing and Positive Experiences) were non-significant in all three groups.

Only one significant between group difference in regression coefficients was

identified. The relationship between change in Values Obstruction and change in Perceived Stress was significantly larger in the ACT group than in the control group ($t(101) = 2.21, p = .029$). This result indicates that the indirect effect from the ACT group to changes in Perceived Stress through changes in Values Obstruction did not meet the heterogeneity of variance assumption and is thus invalid. However, this result also strengthens the case for Values Obstruction as a mechanism of change in Perceived Stress in an ACT intervention. Results indicate that those in the ACT group not only reduced more than the control group in Perceived Stress and Values Obstruction but the association between changes in Values Obstruction and changes in Perceived Stress was also stronger in the ACT group, than it was in the control group. This means that the ACT intervention strengthened the association between the two variables beyond what is found in the general population.

Table 10.7

Standardised Coefficients of Simple Regressions of Changes in Process Variables on Changes in Outcome Variables

	MBI	ACT	Control
Perceived Stress			
Non-judging	-.39 (.09)***	-.42 (.15)**	-.26 (.09)**
Acting with Awareness	-.42 (.08)***	-.47 (.11)***	-.28 (.10)**
Values Progress	-.42 (.09)***	-.57 (.10)***	-.47 (.10)***
Values Obstruction	.48 (.09)***	.61 (.08)*** ^a	.36 (.08)*** ^a
Negative Experiences			
Non-judging	-.38 (.14)**	-.41 (.13)**	-.34 (.14)*
Acting with Awareness	-.18 (.14)	-.40 (.16)**	-.26 (.12)*
Values Progress	-.20 (.18)	-.27 (.12)*	-.37 (.09)***
Values Obstruction	.28 (.15)	.59 (.09)***	.38 (.09)***
Positive Experiences			
Non-judging	.13 (.14)	.01 (.15)	.06 (.11)
Acting with Awareness	.17 (.12)	.08 (.13)	.28 (.13)*
Values Progress	.69 (.11)***	.49 (.17)**	.41 (.10)***
Values Obstruction	-.37 (.12)**	-.29 (.11)**	-.36 (.11)***
Flourishing			
Non-judging	.11 (.16)	.20 (.14)	.04 (.11)
Acting with Awareness	.31 (.09)***	.28 (.10)**	.33 (.09)***
Values Progress	.64 (.10)***	.63 (.11)***	.56 (.10)***
Values Obstruction	-.27 (.11)*	-.48 (.12)***	-.30 (.11)**

Note. ^a differences between ACT and control group were significant to $p = .034$.

*** $p < .001$; ** $p < .01$; * $p < .05$

10.6 Brief Discussion

The aim of this analysis was twofold: 1. to further address the second research question and examine differences between groups in the changes in process and outcome variables from T1 to T3, controlling for differences at the baseline; and 2. to address the third research question, that is to examine if values-based action facilitates change in outcomes (controlling for baseline differences), and to identify if the size of the mediation effects through values-based action differ between ACT and MBI groups and differ from the mediation effects through mindfulness variables.

10.6.1 Hypotheses.

The first four hypotheses concerned rate of change in process and outcome variables over the intervention (T1 to T3).

The first hypothesis predicted both ACT and MBI groups would report greater increases in mindfulness variables (Non-judging and Acting with Awareness), Positive Experiences, Flourishing, Perceived Stress, in comparison with the control group, after controlling for baseline differences. This was confirmed.

The second hypothesis predicted that the ACT group, but not the MBI group, would report greater increases in Values Progress in comparison with the control group, after controlling for baseline differences. It was also predicted that there would be no significant difference between increases in Values Progress between ACT and MBI groups. Contrary to predictions, both ACT and MBI groups improved at significantly greater rates than the control group in Values Progress, when controlling for baseline differences. However, as predicted, there were no significant differences between the ACT and MBI groups in change in Values Progress.

Hypothesis three predicted that both the ACT and MBI groups would report greater increases in Values Obstruction in comparison with the control group, after

controlling for baseline differences. This was confirmed. It was also predicted that the ACT group would report greater increases in Values Obstruction in comparison with the MBI group. This was not confirmed.

Hypothesis four predicted that only the MBI group, and not the ACT group, would report greater increases in Negative Experiences in comparison with the control group, after controlling for baseline differences. It also predicted that the MBI group would improve at a greater rate in Negative Experiences than the ACT group, controlling for baseline differences. This was not confirmed. Both ACT and MBI groups changed at a greater rate in Negative Experiences than the control group, and there were no significant differences between the rate of change between ACT and MBI groups. However, the difference between change in Negative Experiences in ACT and MBI groups approached significance ($p = .090$).

Hypotheses five and six concerned the predictions related to mediation effects. As the hypotheses concern individual mediators, these results are based on the simple mediation analyses. Hypothesis five predicted that changes in Values Obstruction, Non-judging and Acting with Awareness would mediate the relationship between both ACT and MBI groups and all outcomes (Perceived Stress, Negative Experiences, Positive Experiences and Flourishing), controlling for baseline differences. This was confirmed for all mediators except Non-judging. Change in Non-judging did not significantly mediate the relationships between either ACT or MBI groups and change in Flourishing or Positive Experiences.

Hypothesis 6 predicted that changes in Values Progress would mediate the relationship between the ACT group, but not the MBI group, and all outcomes (Perceived Stress, Negative Experiences, Positive Experiences and Flourishing), when controlling for baseline differences. This was not confirmed. Change in Values Progress mediated the relationship between both ACT and MBI groups in change in all

outcomes.

Hypotheses 7 and 8 concerned differences between mediation effects between and within groups. Hypothesis 7 predicted that the mediation effects from the ACT group to changes in all outcomes (Perceived Stress, Negative Experiences, Positive Experiences and Flourishing) through Values Progress and Values Obstruction (when controlling for baseline differences) would be significantly larger than the equivalent mediation effects from the MBI group through these pathways. This was not confirmed. There were no significant differences between groups in the size of any of the mediation effects.

Finally, hypothesis eight predicted that the mediation effects from the ACT group to changes in all outcomes (Perceived Stress, Negative Experiences, Positive Experiences and Flourishing) through Values Progress and Values Obstruction (when controlling for baseline differences) would be significantly larger than the indirect effects from the ACT group to equivalent outcomes through changes in Non-judging and Acting with Awareness. This was partly confirmed. The mediation effect from the ACT group to changes in Positive Experiences and Flourishing through changes in Values Obstruction were significantly larger than the indirect effects from the ACT group to Positive Experiences and Flourishing through Non-judging. Also the indirect effect from the ACT group to changes in Positive Experiences through change in Values Progress was significantly larger than the indirect effect through change in Non-judging. No other differences between indirect effects from ACT or MBI groups to individual outcomes were significantly different within groups.

10.6.2 Key outcomes.

A number of key outcomes are highlighted below. However, the bulk of the discussion concerning these results can be found in Chapter 12.

Both MBI and ACT resulted in significant change in all outcomes.

Both MBI and ACT interventions resulted in significant changes in all processes and outcomes when controlling for baseline differences. These results suggest that both interventions were efficacious for improving mindfulness (Non-judging and Acting with Awareness), Values Progress, Flourishing, Positive Experiences and for reducing Values Obstruction, Negative Experiences and Perceived Stress. However, the rate of reduction in Negative Experiences was considerably more in the MBI than in the ACT group and approached statistical significance at $p = .09$.

This result is consistent with results of Study 2, except that in Study 2 Values Progress did not change significantly in the MBI group compared to the control group. This result is also consistent with the general MBI and ACT literature indicating both types of interventions are effective for improving a range of wellbeing, distress and mindfulness outcomes (e.g., Hacker et al., 2016; Khoury et al., 2013). The statistically significant change in Values Progress in the MBI group, compared with the control group, in Study 3 was likely due to a range of considerations pertaining to the different statistical methods used in Study 2 and 3.

For example, the statistical approach used in this study was more conservative than the mixed linear approach and therefore fewer differences between groups were expected. However, the most intuitive explanation is illustrated in the graphs of estimated marginal means comparing the three groups in Figure 6.3. These indicate that growth from T1 to T3 in Values Progress would appear to be only slightly greater in the ACT group compared with the MBI group if the baseline scores were measured from an average base rate. Therefore, the lack of statistical difference between change in groups is most likely due to the fact that the SEM approach controls for these baseline differences between groups.

Values-based action as a mediator of both ACT and MBI on outcomes.

Values Progress and Values Obstruction were significant mediators of the effects of both ACT and MBI interventions on all outcomes (Flourishing, Positive Experiences, Negative Experiences and Perceived Stress). But there were no differences between groups. However, a number of the results suggest that values-based action facilitated more change in the ACT group than in the MBI group.

First, the size of mediation effects through values-based action variables was consistently larger from the ACT group than MBI group to all outcomes (although not significantly so). Second, the size of the mediation effects from ACT to positive outcomes through values-based action were significantly larger than mediation effects from the ACT group to positive outcomes through Non-judging. This was not the case in the MBI group. Therefore, when considered together, there is evidence that values-based action had a more dominant role to play in facilitating change in outcomes in the ACT group than in the MBI group.

Mediators of positive versus negative outcomes.

Results also suggested that Values Progress was a stronger mediator of positive outcomes and Non-judging was a stronger mediator of negative outcomes, depending on group allocation. In the ACT group, Values Progress was a stronger mediator of change in Flourishing than in Negative Experiences. And in MBI group, Non-judging was a stronger mediator of change in Perceived Stress than in Positive Experiences. This results was consistent with the results of earlier studies indicating that a focus on mindfulness in interventions is more efficacious in reducing negative outcomes and a focus on values in interventions is more efficacious for improving positive outcomes (J. L. Villatte et al., 2015).

10.7 Chapter Summary

The primary aim of this chapter was to examine evidence for the role of values-based action as a mediator of change in MBI and ACT interventions. Values Progress and Values Obstruction were found to be mediators of change from both groups to all outcomes (Flourishing, Perceived Stress, Positive Experiences and Negative Experiences). Although there were no significant differences in the size of the indirect effect between groups, results suggested that values-based action may be a more robust mediator of change in the ACT group than in the MBI group.

The second aim of this chapter was to examine the effect of the ACT and MBI interventions on change in all processes and outcomes, when controlling for baseline differences. Overall the results suggest that both interventions were efficacious for improving all processes and outcomes (Non-judging, Acting with Awareness, Values Progress, Flourishing, Positive Experiences, Values Obstruction, Negative Experiences and Perceived Stress) and there were no significant differences in the size of the effect between groups. However, differences between groups in change in Negative Experiences approached significance, suggesting the MBI group was superior at reducing Negative Experiences than the ACT group.

Chapter 11

Empirical Study 4: Mindfulness as Mediator of Values-based Action

11.1 Overview and Rationale

The analyses outlined in this chapter aim to investigate if prior change in mindfulness variables (T1 to T2) mediate the relationship between the ACT and MBI interventions and later values-based action (T2 to T3). Study 4 is a supplementary analysis to examine if there is evidence to support the theory that change in mindfulness facilitates change in values-based action.

Analyses from previous chapters examined if change in mindfulness and change in values-based action occurred simultaneously to either predict later change in outcomes (Chapter 9) or simultaneous changes in outcomes (results from Chapter 10). The analysis in this chapter aims to test if the ACT and MBI interventions result in improvements in values-based action due to improvements in mindfulness.

11.1.1 Brief literature review.

As stated in Chapter 3, the key aim of an ACT intervention is to increase behaviour based on values-based action and do this despite the presence of psychological barriers to values-based action (e.g. aversive feelings or unhelpful thoughts) (S. C. Hayes et al., 2006). While it is posited that improvement in values-based action will also lead to wellbeing, the aim of an ACT intervention is predominantly to increase mindful responses to events, which in turn are expected to lead to values-based action. Despite this stated aim, no mediation studies were identified that tested if the relationship between ACT interventions and changes in values-based action was mediated by mindfulness. This is perhaps because the ACT model emphasises the interrelated nature of mindfulness and values-based action in facilitating outcomes (e.g., Fletcher et al., 2010; Hayes et al., 2006), rather than this being a stepped process. However, it is posited that establishing if earlier change in

mindfulness facilitates later change in values-based action remains an interesting and helpful line of inquiry.

The exploration of these associations is perhaps more pertinent to the examination of change in MBI rather than ACT interventions. This is because a number of key frameworks (outlined in Section 2.4) theorise that mindfulness leads to wellbeing partly through values. For example Shapiro et al. (2006) posited that mindfulness improves wellbeing through the process of observing, reflecting on, and rediscovering personal values and the ability to make more conscious choices based on values. Brown et al. (2007) proposed that mindful awareness facilitates sensitivity to what is occurring in the present moment which results in more self-endorsed or choiceful behaviour.

However, there is only weak evidence to support of these contentions. Guadagno (2012) found that changes in values-based action partially mediated the effect of an MBSR intervention (compared to a control group) on Satisfaction with Life, however, changes in mediator and outcomes were measured concurrently. Carmody et al. (2009) found values clarity and emotional and behaviour regulation, mediated the relationship between within-group changes in mindfulness and changes in psychological distress, over the course of an MBSR intervention. However, this study was not controlled.

11.2 Hypotheses

Based on the theory and evidence outlined above, it was hypothesised that: (i) both ACT and MBI groups would predict later changes in Values Progress (T2 to T3) through prior changes in Acting with Awareness and Non-judging (T1 to T2); and (ii) both ACT and MBI groups would predict later changes in Values Obstruction (T2 to T3) through prior changes in Acting with Awareness and Non-judging (T1 to T2).

11.3 Method

The statistical approach was consistent with the second time-series analysis in Chapter 9 (Section 9.5). Figure 11.1 illustrates the model. In this approach, models

include one mediator (Acting with Awareness or Non-judging) and two outcome variables (Values Obstruction or Values Progress). Due to the high correlation between Acting with Awareness and Non-judging as discussed in Section 10.3.7, only simple mediation models were tested in this chapter.

11.4 Results: Simple Mediation Models

Results of a series of simple mediation models are displayed in Table 11.1 and statistically significant results are displayed in Figure 11.1. Neither Acting with Awareness nor Non-judging (T1 to T2) mediated the effects of MBI or ACT group on Values Progress (T2 to T3). However, Acting with Awareness and Non-judging mediated the effects of the ACT group on Values Obstruction (T2 to T3). Only Acting with Awareness (T1 to T2) mediated the effects of MBI on Values Obstruction (T2 to T3). Direct effects from both ACT and MBI groups to changes in Values Obstruction (T2 to T3), controlling for change in mediators (T1 to T2), were all statistically significant, indicating that mindfulness did not explain all variance in later changes in Values Obstruction in either group.

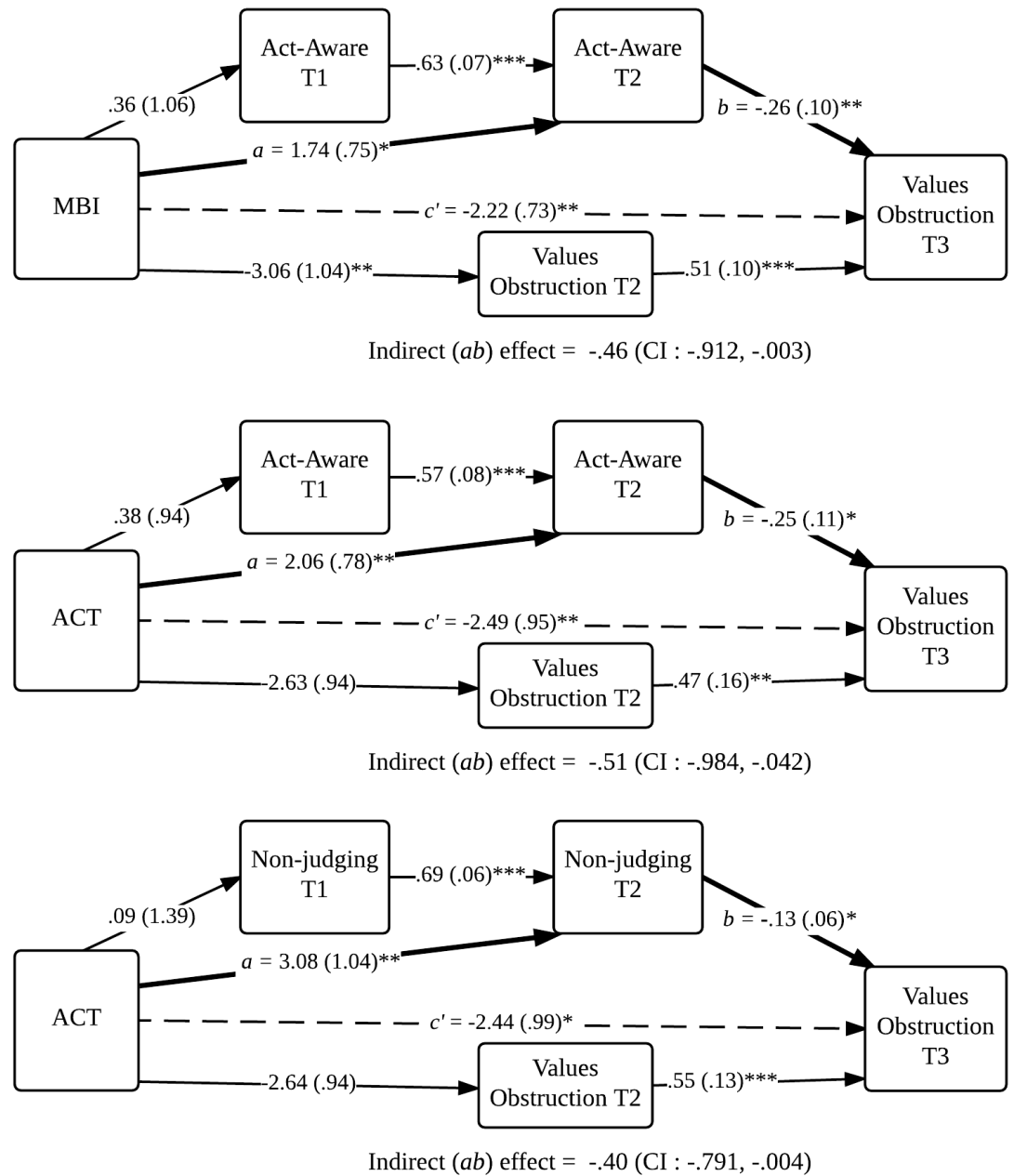


Figure 11.1. Unstandardised coefficients for simple mediation models with significant indirect effects.

Table 11.1

Unstandardised Indirect Effects of Group on Valuing Variables (T2 to T3) through Earlier Changes in Individual Mindfulness Variables (T1 to T2)

		Values Progress			Values Obstruction		
		β (SE)	95% CI		β (SE)	95% CI	
MBI							
Act-aware	<i>ab</i>	-.15 (.14)	-.38	.09	-.46 (.28)	-.91	-.01
	<i>c'</i>	-.13 (.60)			-2.22 (.06)**		
Non-judging	<i>ab</i>	-.04 (.08)	-.16	.09	-.15 (.11)	-.33	.03
	<i>c'</i>	1.16 (.64)			-2.09 (.74)**		
ACT							
Act-aware	<i>ab</i>	-.16 (.17)	-.44	.13	-.51 (.29)	-.98	-.04
	<i>c'</i>	-1.17 (.70)			-2.49 (.95)**		
Non-judging	<i>ab</i>	-.17 (.17)	-.05	.01	-.40 (.24) ^a	-.79	-.01
	<i>c'</i>	1.20 (.70)			-2.44 (.99)*		

Note: Act-aware = FFMQ Acting with Awareness, β = standardised coefficient, *ab* = indirect effect, *c'* = direct effect.

^a Indirect effect is invalid as it violated the homogeneity of regression assumption (see Section 11.5).

* $p < .05$, ** $p < .01$.

11.4.1 Reversed associations.

The significant mediation effects highlighted in Figure 11.1 were also tested in reverse, that is the relationship between group and proposed mediators (T2 to T3) through the outcome variables (T1 to T2) was also tested. This analysis was performed to ascertain if the causal relationship was one way. Values Obstruction (T1-T2) did not mediate the effects of the ACT group on Acting with Awareness (T2-T3) ($B = -.18$; 95% CI [-.48, .84]) and Values Obstruction (T1-T2) did not mediate the effect of the ACT group on Non-judging (T2-T3) ($B = .19$; 95% CI [-.40, .73]). However, Values Obstruction (T1-T2) significantly mediated the effect of the MBI group on Acting with Awareness (T2-T3) ($B = .42$; 95% CI [.03, .81]). Results therefore strengthen inference for a causal relationship from ACT to Values Obstruction through mindfulness, and

indicated that Values Obstruction and Acting with Awareness may change simultaneously.

11.5 Multigroup Regression Analyses

Multigroup analyses were performed to check that the significant time-series mediation effects, described in Section 11.5, met the homogeneity of regression assumption. Change in Values Obstruction was regressed on Non-judging and Acting with Awareness (*b* paths from Section 11.4) by group (ACT, MBI and control group). Coefficients from the ACT and MBI groups were compared with the control group to check for significant differences. Results from the regression analyses indicated that changes in Acting with Awareness (T1 to T2) significantly predicted later change in Values Obstruction (T2 to T3) in both intervention groups (MBI: $B = -.40$, $SE = .17$, $p = .022$; ACT: $B = -.40$, $SE = .19$, $p = .036$), while the effects reported in the control group were smaller in magnitude and non-significant ($B = -.19$, $SE = .11$, $p = .077$). Differences between intervention groups and the control group were non-significant (MBI compared with the control group: $t(105) = 1.04$, $p = .302$; ACT compared with the control group: $t(101) = .97$, $p = .341$). A multigroup analysis of the relationship between changes in Non-judging (T1 to T2) and changes in Values Obstruction (T2 to T3) found that changes in Non-judging predicted significant changes in Values Obstruction in the ACT group ($B = -.41$, $SE = .14$, $p = .003$) and the MBI group ($B = -.17$, $SE = .08$, $p = .030$) but not the control group ($B = -.04$, $SE = .06$, $p = .459$). However, differences between the MBI and the control groups were non-significant ($t(105) = 1.04$, $p = .302$). In contrast, the difference between the ACT and control group were substantial and significant, ($t(101) = 2.43$, $p = .017$). Therefore, the homogeneity of regression assumption was violated for the indirect effect from ACT to changes in Values Obstruction (T2 to T3) through changes in Non-judging (T1 to T2). As previously discussed, this means that the significant indirect effect reported in Table

11.1 is invalid as it does not meet the homogeneity of regression assumption. However, as discussed below, this result does not imply that Non-judging is not mechanism by which the ACT group influences Values Obstruction.

11.6 Brief Discussion

11.6.1 Hypotheses.

The first hypothesis was that both ACT and MBI groups would predict later changes in Values Progress (T2 to T3) through Acting with Awareness and Non-judging (T1 to T2). This was not confirmed. There was no evidence that intervention groups resulted in change in Values Progress through either mindfulness variable.

The second hypothesis was that both ACT and MBI groups would predict later changes in Values Obstruction (T2 to T3) through prior changes in Acting with Awareness and Non-judging (T1 to T2). This was partly confirmed. Both ACT and MBI groups predicted later change in Values Obstruction through prior changes in Non-judging, but only the ACT group predicted later change in Values Obstruction through prior changes in Acting with Awareness. However, the homogeneity of regression assumption was violated for the mediation effect from ACT to changes in Values Obstruction (T2 to T3) through change in Non-judging (T1 to T2). Therefore, this mediation effect was invalid.

11.6.2 Discussion of significant mediation results.

These results are an important addition to the results of Study 3 in Chapters 9 and 10 for a number of reasons. First, the time-series results support a causal relationship between mindfulness and values-based action. This is particularly strong for the relationships between ACT and Values Obstruction through Acting with Awareness and Non-judging, as the relationships were non-significant when reversed. Although the mediation effect of the ACT group on changes in Values Obstruction (T2 to T3) through changes in Non-judging (T1 to T2) was statistically invalidated due to a

violation of the homogeneity of regression assumption, this result can also be interpreted as evidence supporting the case for Non-judging as a mechanism by which ACT impacts on Values Obstruction. As highlighted in Section 8.5, as the relationship between change in mediator and change in outcome (the b path) is statistically stronger in the ACT group than the control group, it can also be inferred that the ACT intervention not only improves the outcomes by strengthening the mediator, but also improves outcomes by strengthening the *association* between mediator and outcome.

This result suggests that the ACT intervention strengthened the relationship between prior change in the Non-judging and later change in Values Obstruction (b path). As this result was unique to the ACT group, it also suggests that it was aspects unique to the ACT intervention that were responsible for the strengthening of this relationship.

11.6.3 Implications for Values Obstruction.

These results also suggest that both interventions improved the ability of individuals to be more mindful during actions (Acting with Awareness) over the course of the intervention (to T2) which in turn predicted their ability to act more on values, despite the presence of psychological barriers, in the month following the intervention (to T3). And in the ACT intervention, individuals improved more in their ability to act on their values despite the presence of psychological barriers after the intervention, due to changes in Non-judging during the intervention. As this second result is unique to the ACT group, it provides some evidence that Values Obstruction was targeted more efficiently through the ACT intervention, possibly by specifically pairing acceptance with values-based action, as demonstrated in the Choice point model.

11.6.4 Implications for Values Progress.

Prior changes in mindfulness were not found to mediate the relationship between either the ACT or MBI groups and later changes in Values Progress. The difference between Values Obstruction and Values Progress is that Values Progress measures progress toward, and engagement in, meaningful behaviour, while the Values Obstruction items measure values progress, despite the presence of barriers. Thus, this result suggests there is a stronger association between being more mindful and the processes of acting on values when it is difficult, rather than mindfulness and acting on values when it may not be difficult. This makes theoretical sense given that acting on values when all is well is not likely to require mindfulness, but if psychological barriers to values-based action are present, greater mindfulness may help an individual overcome these barriers.

11.7 Chapter Summary

This chapter outlined results of Study 4, a supplementary analysis investigating if prior change in mindfulness variables (T1 to T2) mediate the relationship between the ACT and MBI interventions and later change in values-based action (T2 to T3). Results provided evidence that Acting with Awareness mediates the effect of both ACT and MBI groups on Values Obstruction. Although the mediation effect of ACT on Values Obstruction through Non-judging was invalidated, evidence suggests that it is a mechanism of change in the ACT intervention. Further these results provide evidence that changes in mindfulness precede changes in Values Obstruction, providing some support for a causal relationship.

Chapter 12

General Discussion

In this final chapter, the main findings of the thesis are discussed in relation to the research questions and the results of all four studies are discussed in more detail. The strengths and limitations of the current research are also reviewed and the implications of these findings for clinical practice and possible future directions for research into mechanisms of change are discussed.

12.1 Main Findings in Reference to Research Questions

This thesis sought to answer four broad research questions:

1. Can the relationship between mindfulness and both wellbeing and psychological distress be explained partly through values-based action?
2. Is a mindfulness-based intervention that integrates mindfulness and values (ACT) more effective than a mindfulness-only intervention (MBI) for improving wellbeing and reducing psychological distress?
3. Does values-based action mediate the relationship between ACT and MBI interventions and change in both wellbeing and distress outcomes? If so, does the size of these effects differ between MBI and ACT groups?
4. Is values-based action a mechanism of change in the relationship between mindfulness-based interventions and improved wellbeing and reduced psychological distress?

12.1.1 Question 1: Can the relationship between trait mindfulness and both wellbeing and psychological distress be explained partly through values-based action?

Study 1 in Chapter 5 examined whether the effects of mindfulness on both wellbeing and psychological distress could be explained through values-based action. The results of this cross-sectional study provided initial evidence that the relationship

between trait mindfulness and wellbeing could be explained predominantly through Values Progress and Values Obstruction. It also found that the relationship between trait mindfulness and Negative Experiences could be explained partially through Values Obstruction, but not through Values Progress. This evidence suggests that mindful people tend to have greater wellbeing, which can be explained through their propensity to act on their values, *and* act on their values despite the presence of thoughts and feelings that could normally be barriers to values-based action. The evidence also suggests that mindful people have less frequent negative experiences and affect and this can be explained by their propensity to act on their values despite the presence of aversive experience.

This evidence is consistent with previous research that found the relationship between trait mindfulness and satisfaction with life was partially mediated through values-based action (Guadagno, 2012). This result is also consistent with studies identifying similar constructs to values-based action as possible mechanisms of change between mindfulness and both distress outcomes and clinical symptoms. For example, a mindfulness predicted higher autonomous behaviour which in turn predicted less negative affect in a daily diary study (Brown & Ryan, 2003) and values clarity was identified as a mediator of the relationship between trait mindfulness and reduced depression and alcohol-related symptoms (Pearson et al., 2014).

Given this collective evidence, and the theoretical basis for this relationship, it is concluded that the relationship between trait mindfulness and both wellbeing and psychological distress, can be explained partly through values-based action. These results also provide strong initial evidence that values-based action could be a mechanism by which mindfulness, and possibly mindfulness-based interventions, improve wellbeing and reduces psychological distress.

12.1.2 Question 2: Is an intervention integrating mindfulness and values more effective than a pure mindfulness intervention for improving wellbeing and reducing psychological distress?

Study 2, outlined in Chapter 6, investigated if a values focus would add incremental value to a mindfulness intervention. To test this, outcomes from an MBI, which focused predominantly on mindfulness instruction and practice, were compared with outcomes from an ACT intervention, which focused on mindfulness skills in the service of values-based action. Process measures were Values Progress, Values Obstruction, Non-judging and Acting with Awareness and outcome measures were Flourishing, Perceived Stress, Positive Experiences and Negative Experiences. This study sought to address the second research question: “Is a mindfulness-based intervention that integrates mindfulness and values (ACT) more effective than a mindfulness-only intervention (MBI) in improving wellbeing and reducing psychological distress?”

Study 2 results.

Results from Study 2, which used a mixed linear model with random intercepts, indicated that both ACT and MBI groups improved at a significantly greater rate than the control group in all variables, with a few exceptions. The rate of change in the MBI group was not significantly greater than the control group in Values Progress (from either T1 to T2 or from T1 to T3) nor in Flourishing and Non-judging from T1 to T2. The rate of change in the ACT group was not significantly greater than the control group in Negative Experiences from T1 to T2 nor from T1 to T3.

When rates of change in ACT and MBI groups were compared directly, only two significant differences were identified. The ACT group improved at a significantly greater rate in Values Obstruction from T1 to T2 and T1 to T3 and in Values Progress from T1 to T2, compared to the MBI group. The rates of improvement in Negative

Experiences in the MBI group were not significantly greater than the ACT group, however, the MBI group's final measure of Negative Experiences at T3 was significantly less than both the ACT and control groups. Results in Table 6.3 and Table 6.4 also indicated that the pattern of improvements in the ACT group tended to be larger (compared to the control group) than those of the MBI group from T1 to T2. This is particularly apparent in changes in Flourishing and Non-judging which changed significantly from T1 to T2 in the ACT group (compared with the control group), while corresponding changes in the MBI group were not significantly different from the control group.

Based on these results it was concluded that the MBI group performed better than the ACT group in reducing Negative Experiences due to the focus of the MBI on formal mindfulness training. It was also concluded that the ACT group outperformed the MBI group in change to values-based action variables, due to the inclusion of the values component. Further early significant gains from T1 to T2 in Flourishing, Values-based action variables and Non-judging the ACT group, which were non-significant in the MBI group, were concluded to be stronger due to the integration of values and mindfulness processes in the ACT intervention. However, as the baseline levels of variables differed significantly between groups in Flourishing and Values Obstruction, it was proffered that superior changes in these variables in the ACT group could also have been due to the influence of regression to the mean.

Study 3 results.

Study 3 re-examined between group differences in the rate of change over time using an SEM approach. This approach controlled for baseline differences between groups to ensure that faster growth in the ACT group was not attributable to lower mean levels of wellbeing at baseline. However, unlike Study 2, the Study 3 analysis did not adjust for individual random effects within groups. The pattern of results from Study 3

were consistent with those of Study 2 with a few key exceptions. In Study 3, the MBI group improved significantly in Values Progress from T1 to T3, compared with the control group, while it did not in Study 2 (Chapter 6). In Study 3, the ACT group improved significantly in Negative Experiences from T1 to T3 (compared with the control group), while it did not in Study 2. In Study 3, the difference between ACT and MBI groups in rate of change in Values Obstruction from T1 to T3 was non-significant, although this difference was significant in Study 2. However, consistent to both studies, the ACT group predicted significant rates of change in Values Progress and Non-judging from T1 to T2 compared with the control group, while the MBI group did not.

Conclusions: Values Progress and Non-judging T1 to T2.

Based on the results of both Study 2 and Study 3, it was concluded the ACT intervention was superior to the MBI intervention in improving Values Progress and Non-judging in the short-term (T1 to T2). This was based on the following: (i) Study 2 results indicated Values Progress changed significantly more than in the ACT group compared with the MBI group; (ii) Study 2 results indicated that Non-judging changed significantly more in the ACT group than the control group, but this was not the case in the MBI group; and (iii) Study 3 results indicating the ACT group changed significantly in Non-judging and Values Progress from T1 to T2, compared to the waitlist, but this was not the case in the MBI group.

Conclusions: Values Progress T1 to T3.

Based on both sets of results it was concluded that the ACT group improved more in Value Progress from T1 to T3. This conclusion was based on the following evidence. In Study 2, the ACT group changed at a significantly greater rate in Values Progress from T1 to T3, compared to the control group, while the rate of change in Values Progress in the MBI group failed to reach significance. This result was also supported by the large observed difference between the within-group effect size for change in

Values Progress in ACT group (Cohen's $d = 0.63$) and the MBI group (Cohen's $d = 0.29$) and the control group (Cohen's $d = .02$). As there were no significant differences at baseline between MBI, ACT or the control group in Values Progress, there is a strong argument for the superiority of the ACT group. While both groups changed significantly in Values Progress, compared to the control group, in Study 3, the change in the ACT group was larger (although not significantly so) and more reliable.

Conclusions: Values Obstruction.

Based on both sets of evidence it was tentatively concluded that the ACT group outperformed the MBI group in changes in Values Obstruction T1 to T2 and T1 to T3. This conclusion is based on the following evidence. Study 2 results indicated that the rate of improvement in Values Obstruction from T1 to T3 was significantly greater in the ACT group than the MBI group. Study 2 also indicated that the rate of change in the ACT group (compared to the control group) was larger over both time periods compared with the rate of change in the MBI group (compared to the control group). These differences were non-significant but suggested a pattern by which the change in Values Obstruction was more consistently robust in the ACT group.

Further, in Study 3, when the baseline differences in Values Obstruction were controlled, the rate of change in Values Obstruction (compared to the control group) remained larger in the ACT group than that in the MBI group (although not significantly so) over both time periods. This provides some consistent evidence for the superiority of ACT in improving Values Obstruction.

Conclusions: Negative Experiences.

Based on both sets of results it was concluded that the MBI group improved more in Negative Experiences than the ACT group. This conclusion is based on Study 2 results that indicated the MBI group changed significantly in Negative Experiences over both time periods, while the ACT group did not. Further, the MBI group's final measure

of Negative Experiences at T3 was significantly less than both the ACT and control groups. This was also supported by Study 3 evidence that changes in Negative Experiences from T1 to T3 (total effects) compared to the control group, were larger than equivalent changes in the ACT group (although not significantly so). Further the direct difference in the rate change in Negative Experiences between MBI and ACT groups approached statistical significance.

Conclusions: Other variables.

There was insufficient evidence to suggest differences between groups in Acting with Awareness, Flourishing, Perceived Stress and Positive Experiences.

Summary.

In answering the second research question: “Is an intervention integrating mindfulness and values (ACT) more effective than a pure mindfulness intervention (MBI) for improving wellbeing and reducing psychological distress?”, it is concluded that the MBI group was superior in reducing Negative Experiences but neither group was superior in improving wellbeing variables. However, it is also concluded that the ACT group was superior in Non-judging from T1 to T2 and improving values-based action over both time periods.

These results are consistent with the only other study identified that compared an MBCT and ACT intervention in a similar university population, in that no between group differences were identified in wellbeing variables (quality of life) (Renner & Foley, 2013). However, it is arguably inconsistent with results of the same study which also found no significant differences between ACT and MBCT in change in psychological distress, mindfulness and psychological inflexibility, particularly if the strong association between the psychological inflexibility and Values Obstruction constructs and psychological distress and Negative Experiences constructs are considered. However, it should be noted that the results in the Renner and Foley (2013)

study were based on direct comparisons between ACT and MBI only, rather than being derived from a number of results indicative of difference as outlined in this section.

12.1.3 Question 3a: Does values-based action mediate the effect of ACT and MBI interventions on wellbeing and distress outcomes?

Chapters 9 and 10 addressed the third research question using a series of path analysis models. The time-series models in Chapter 9 examined whether the ACT and MBI groups predicted later change in outcomes (T2 to T3) mediated through early change in values-based action (T1 to T2). Two significant mediation effects from group to outcomes through values-based action variables were identified: (i) Values Progress (T1 to T2) mediated the relationship between ACT and Perceived Stress (T2 to T3), and ii) Values Obstruction (T1 to T2) mediated the relationship between the MBI group and Flourishing (T2 to T3). These results provided some support that values-based action was a causal mediator of the relationship between intervention groups and Perceived Stress and Flourishing.

Results from the concurrent mediation models, outlined in Chapter 10, provided overwhelming support that values-based action, as measured by Values Progress and Values Obstruction, was a mediator of change in the relationships between both ACT and MBI groups and all outcomes (Positive Experiences, Negative Experiences, Perceived Stress and Flourishing). The simple mediation results indicated that Values Progress and Values Obstruction mediated the relationships between both groups and all outcomes. The multiple mediation models, which measured unique mediation effects for each mediator when controlling for the influence of the other three mediators, indicated that Values Progress and Values Obstruction mediated the relationships between both groups and *most* outcomes.

Although time-series mediations are generally considered stronger evidence for mediation than concurrent mediation results, this could be disputed in this case. As

explained in Section 9.9.4, the significant time-series mediation effects were likely to be due to an inflation of change in the outcome variables from T2 to T3, given that change was measured based on the average T2 difference between groups. Further, although the concurrent mediation results do not provide evidence of causality, or that the change in the mediators preceded the change in the outcomes, as discussed in Section 7.2.5, it is also important to remember that the non-significant time-series results do not *discount* causality. It is theoretically likely that change in values-based action and change in outcomes occurred in close temporal proximity to one another. If I mindfully connect with my values now in reference to writing this thesis, it would be likely that I experience an increase in positive affect very soon after I make that symbolic connection (rather than tomorrow or next week). This perspective is supported by evidence from a daily diary study that found mindfulness and autonomous behaviour changed on the same day (Brown and Ryan, 2007).

Therefore, in answer to research question, the studies reported in this thesis support the role of values-based action as a mediator of change between both ACT and MBI groups and all outcomes (Positive Experiences, Negative Experiences, Perceived Stress and Flourishing).

12.1.4 Question 3b: Does the size of the mediation effect of ACT and MBI interventions on well-being and distress outcomes through values-based action differ between groups?

Having established evidence for the mediating effect of values-based action in the relationship between both ACT and MBI interventions and outcomes, the question remains as to whether the size of these mediation effects differ between groups. No significant between-group differences were found between the size of mediation effects from intervention group to any outcomes through values-based action, controlling for baseline differences. However, the indirect effects from the ACT group to all outcomes

through Values Progress and Values Obstruction were consistently larger in the ACT group (compared with the control group) than the equivalent indirect effects from MBI to all outcomes (compared with the control). However, as differences were non-significant, no conclusions regarding the superiority of the ACT group in mediating change through values-based action can be drawn from these differences.

However, there was also some collective evidence that values-based action was a stronger facilitator of change in Perceived Stress in the ACT group than in the MBI. First, the indirect effects of ACT on changes in Perceived Stress through value-based action variables were larger (although not significantly so) in the ACT than the MBI group (Values Obstruction: $\beta = -.22, p < .001$ and $\beta = -.17, p < .001$ respectively; Values Progress: $\beta = -.15, p < .01$ and $\beta = -.10, p < .05$ respectively). Second, only in the ACT group did prior changes in Values Progress (T1 to T2) mediate later changes in Perceived Stress (T2 to T3), providing some evidence of causality. Third, the results of the multigroup regression analyses and comparison of regression coefficients between groups outlined in Chapter 10 (Section 10.5.2) indicated that the relationship between change in Values Obstruction (T1 to T3) and change in Perceived Stress (T1 to T3) was significantly stronger than in the ACT group than the control group, while the equivalent coefficient in the MBI was not significantly different from the control group. Considered together, these results provide some evidence that values-based action was a more robust mediator of change between ACT and Perceived Stress, than MBI and Perceived Stress.

Further, within-group comparisons of indirect effects provided evidence that values-based action was a stronger mediator of the relationship between the ACT and outcomes than mindfulness. Specifically, Values Obstruction was a significantly stronger mediator of change in the relationship between the ACT group and Flourishing than through Non-judging and both Values Obstruction and Values Progress were

significantly stronger mediators of change in the relationship between ACT and Positive Experiences than through Non-judging. While similar patterns of difference were found in the MBI group, within group differences between the strength of individual mediators did not reach significance in the MBI group.

In answer to the research question, this evidence presents a tentative case that values-based action was a more robust and more consistent influence on change in the ACT group than in the MBI group in Perceived Stress, and to a lesser extent, Flourishing and Positive Experiences, when controlling for baseline differences.

12.1.5 Question 4: Is values-based action a mechanism of change in the relationship between mindfulness-based interventions and both improved wellbeing and reduced distress?

An answer to the fourth research question requires an examination of all evidence presented in the thesis, as well as pre-existing evidence. As suggested by Kazdin (2007), the establishment of a variable as a mechanism of change cannot be based on just mediation analyses or other statistical results, but must consider many types of evidence. He likened the process of establishing a variable as a mechanism of change to a chess game, which “... is won on multiple fronts, an integrated sequence of actions, and converging moves that make checkmate possible.” (p. 11). It is contended that these results provide some strong opening moves in the establishment of values-based action as a mechanism of change in the relationship between mindfulness interventions and both wellbeing and psychological distress.

In order to evaluate if the evidence presented in this thesis collectively supports the role of values-based action as a mediator of the relationship between MBIs and wellbeing and distress, results are now examined based on the six major requirements for demonstrating a mechanism of change outlined by Kazdin (2007, 2009). They are:

strong association, specificity, consistency, experimental manipulation, timeline and gradient and plausibility.

Specificity

Kazdin's (2007, 2009) specificity requirement called for evidence that the proposed mechanism drives change in an outcome, while other variables do not. The results of this thesis provide evidence supporting this contention in a number of ways. First, significant indirect effects from intervention groups to outcomes through values-based action variables in the time-series results were unique to only two pathways. Specifically, the ACT intervention predicted change in Perceived Stress (T2 to T3) uniquely through changes in Value Progress (T1 to T2), and the MBI intervention impacted change in Flourishing (T2 to T3) uniquely through change in Values Obstruction (T1 to T2). Second, values-based action variables were significant mediators from MBI and ACT to Positive Experiences and Flourishing, while Non-judging was not. Further, in both ACT and MBI groups, Values Obstruction and Values Progress were significantly larger mediators of positive outcomes than Non-judging. Third, in the concurrent multiple mediation models, only Values Progress emerged as a consistently significant mediator of unique change in the relationship between ACT and MBI groups and all outcomes. Together these results provide evidence for the specificity of values-based action as a mediator of change in the relationship between MBIs and various wellbeing and distress outcomes.

Strong association

Results also met Kazdin's (2007, 2009) strong association requirement which specified that there should be a strong association between intervention and hypothesised mediator of change and between the proposed mediator and outcome. Both ACT and MBI interventions were strongly associated with changes in the proposed mechanisms, Values Progress and Values Obstruction, as indicated in the α

paths of the analyses. In most cases, as indicated by the multigroup analyses in which changes in outcomes were regressed on changes in processes by group (Table 10.7), changes in values-based action mechanisms were also significantly associated with changes in proposed outcomes. The only exception in the concurrent mediation results was the non-significant relationship between changes in both Values Progress and Values Obstruction and changes in Negative Experiences in the MBI group.

Experimental manipulation

Kazdin's (2007, 2009) experimental manipulation requirement was also met in these results. Both interventions were significantly associated with changes in all outcome variables (Perceived Stress, Negative Experiences, Positive Experiences and Flourishing), when controlling for baseline differences. Kazdin (2007) also argued that the case for establishing a mechanism of change would be further strengthened if the intervention also influenced the impact of the mediator (M) on the outcome (Y). This requirement was supported only in the association between changes in Values Obstruction and changes in Perceived Stress which was significantly larger in the ACT group than in the control group (Section 10.5.2). This result provided evidence that the ACT intervention not only affected change in Values Obstruction and Perceived Stress independently but strengthened the relationship between Values Obstruction and Perceived Stress. Many of the other associations between both Values Progress and Values Obstruction and outcomes outlined in the multigroup analysis results (Table 10.7) were also larger in the intervention groups than the control group, but differences did not reach statistical significance.

Gradient

Kazdin (2007) also highlighted that gradient (the establishment of a dose-response relationship between the mediator and outcome) also supported stronger inferences for the identification of a mechanism of change. This requirement was

relevant only to mediation effects from groups to outcomes through mindfulness. This is because mindfulness was the only component of the two interventions that was larger in dose between groups, that is there was more focus on mindfulness practice in the MBI group compared to the ACT group. The higher dose of mindfulness instruction in the MBI group, however, did not result in significantly greater changes in self-reported mindfulness in the MBI group, compared to the ACT group, nor did it result in stronger relationships between change in mindfulness and change in outcomes in the MBI group, compared to the ACT group.

However, the greater reductions in Negative Experiences in the MBI group compared to the ACT group, which approached statistical significance, suggested that some component of the MBI intervention was likely to be responsible for this difference. While this did not show up as self-reported mindfulness (e.g. measured by greater improvements in Acting with Awareness or Non-judging scales), it is possible that the additional focus on mindfulness practice in the MBI group had its effects through other unmeasured variables associated with mindfulness practice. One possibility is increased exposure as discussed in Section 12.2.2.

Consistency

Further work must be done to confirm the results of the mediation effects of this RCT across non-student and clinical populations. However, it is tendered that the results in this thesis go some way toward satisfying Kazdin's (2007, 2009) consistency requirement which requires the replication of relationships across studies, samples and conditions. Evidence for the consistency of values-based action as a mediator of the effects of MBIs on wellbeing thus far includes: (i) evidence that values-based action mediates the relationship between trait mindfulness and Satisfaction with Life, Positive Affect, Negative Affect, Flourishing, Positive Experiences and Negative Experiences, based on two student samples; (ii) evidence that values-based action mediates the

effects of both ACT and MBI groups on concurrent changes in Perceived Stress, Flourishing, Positive Experiences and Negative Experiences through values-based action; and (iii) evidence that Values Progress (T1 to T2) mediates the relationship between an ACT intervention and change in Perceived Stress (T2 to T3) and Values Obstruction (T1 to T2) mediates the relationship between an MBI intervention and Flourishing (T2 to T3). Additional to these results, Guadagno (2012) found that changes in values-based action mediated the effect of an MBSR intervention on Satisfaction with Life in a concurrent mediation analysis. Together these results provide the foundation for consistency of this relationship in non-clinical student populations.

Timeline

Kazdin's (2007, 2009) timeline requirement concerns evidence that the mediator temporally precedes the outcome. This evidence was limited to two results outlined in Chapter 9. These are: (i) the mediating effect of prior change in Values Progress in the relationship between the ACT group and changes later in Perceived Stress and; (ii) the mediating effect of prior changes in Values Obstruction in the relationship between the MBI group and later changes in Flourishing.

However, as previously argued it is more theoretically plausible that changes in proposed mechanisms, including values-based action, occurred in close temporal proximity to changes in outcomes in these studies. This probability means that evidence that the changes in the mediators preceded the changes in outcomes is difficult to measure and establish. ACT theory and evidence, outlined in Chapter 3, contends that the very act of engaging with values is reinforcing, often immediately, particularly if values-based behaviour is consciously linked to one's values at the time of action (M. Villatte et al., 2016). As previously stated, it is quite conceivable that as soon as an individual begins to mindfully connect with, and act on, their values (e.g. values of gratitude) they begin to experience more positive affect in that very minute. In fact,

values affirmation exercises have been found to result in improvements in positive affect measured within a one hour time period of the intervention (Katz et al. 2013). Therefore, an exact timeline on changes in these mechanisms would require a design that includes many closely distributed measures. Therefore, although Kazdin's (2007, 2009) timeline requirement is only supported in only a few instance in these research, it is contended that the establishment of a timeline may not be possible with the current design.

Plausibility

Finally, Kazdin (2007, 2009) identified plausibility as a key condition for establishing a mechanism of change. This refers to the explanation for what the process does and a coherent explanation for how it does it. Theoretical perspectives on how mindfulness and mindfulness interventions (including ACT and MBI interventions) influence wellbeing through values-based action were outlined in chapters 2-4. In summary, it was posited that present moment awareness and its effect on reducing habitual, automatic and impulsive processing and reactions, facilitate the recognition of one's true values (Shapiro et al., 2006), which in turn facilitates more mindful choices of behaviour consistent with values (Brown & Ryan, 2003). It was also posited that mindfulness reduces ego involvement which increases the ability of individuals to identify when behaviour is values-based and better observe the process and positive effects of acting on values (Rigby et al., 2014). As previously outlined, a small body of evidence supports the mediating role of values-based action in the relationship between MBIs (that do not include values components) and wellbeing (e.g., Carmody et al., 2009; Guadagno, 2012).

From the ACT perspective, explanations for the mediating role of values-based action in the relationship between mindfulness and wellbeing are similar to the explanations above. Greater present moment awareness facilitates acceptance of internal

experience, which reduces the likelihood of automatic behaviour in service of avoiding aversive experience, and improves connection with values, which in turn improves likelihood of values-directed action (Dahl et al., 2009) . Present moment awareness also facilitates defusion, undermining attachment to a conceptualised self, which makes choices based on values more likely (Villate, Villatte, et al., 2016). However, from the ACT perspective it is emphasised that it is more likely individuals will be able to make choices based on values if values are clear and salient, particularly when avoidant behaviour provides more short-term reinforcement (Wilson & Murrell, 2004a) This is why ACT interventions explicitly include values clarification exercises and reference to values-based actions.

Although the results of the study did not support that a focus on values was *required* for a mindfulness intervention to improve wellbeing through values-based action, results were consistent with explanations of how mindfulness could work to improve wellbeing through values-based action. It should also be noted that given the accumulative evidence that values-based action was a more robust mediator of change in the ACT intervention (outlined in Section 12.1.3), the ACT view that a therapeutic focus on values in an intervention is likely to strengthen change in values-based action also received some support. Given that the theoretical distinction between ACT and MBI is also subtle, it is perhaps not surprising that differences between groups were nonsignificant. However, overall mediation effects can be explained with a coherent explanation, satisfying Kazdin's (2007, 2009) plausibility requirement.

Overall evidence

Therefore, overall evidence from this thesis supports the contention that values-based action is a mechanism of change in the relationship between MBIs and both improved wellbeing and reduced distress. Specifically, there is consistent evidence that values-based action is a mechanism of change in the relationship between MBIs that do

not include values components and wellbeing and distress outcomes, and stronger evidence that values-based action is a mechanism of change in the relationship between ACT interventions and wellbeing and distress outcomes.

12.2 Between-group Differences

There were few significant differences between MBI and ACT groups in rates of change in variables over the intervention and the size of mediation effects from groups to outcomes. The meaning of these results are now explored in more detail.

12.2.1 Influence of common factors.

As stated in Chapter 2, it is a frequent occurrence that differences between active therapeutic treatments are non-significant (Lambert, 2013a). For example, meta-analyses of ACT RCTs found ACT out-performed TAU conditions and inactive controls, however differences in effect sizes in ACT and CBT interventions were nonsignificant (A-Tjak et al., 2015; Hacker et al., 2016). This pattern of non-significant differences between active groups was also found when comparing MBIs to CBT and BT (Khoury et al., 2013, 2015) and even relaxation training in one review (Visted et al., 2015). This pattern of non-significant differences between active treatments has been attributed to the large overlap in factors common to all therapies, estimated to be responsible for between 30-49% of change in outcomes (Cuijpers et al., 2013; Lambert, 2013b). Empirically established common factors include the impact of the therapeutic relationship and expectancy effects (Lambert, 2013), and in group-based interventions, the impacts of being part of a group (Cairns & Murray, 2013). Martin (2007) suggested that improvements in mindfulness might also be a factor common to all therapeutic interventions. With such a high level of potential overlap in therapeutic factors, it was perhaps ambitious to expect significant differences between two such similar groups (ACT and MBI) using the current statistical methods.

12.2.2 Explanations for between group differences in Negative Experiences.

Despite the influence of common factors, difference in the rate change in Negative Experiences between MBI and ACT groups approached statistical significance in Study 3. It was expected that differences between MBI and ACT groups in change in Negative Experiences would be facilitated by greater improvements in mindfulness, particularly Non-judging, due to the stronger focus on formal mindfulness practice in the MBI group. However, this explanation was not supported by results. A significant mediation effect of the MBI group on changes in Negative Experiences was identified through Non-judging ($\beta = -13, p < .01$) in Study 3, however, this was not larger than the equivalent effect of the ACT group ($\beta = -14, p < .01$). Further, the direct effect of the MBI group on Negative Experiences, while controlling for all four mediators (Values Progress, Values Obstruction, Non-judging and Acting with Awareness), was significantly larger in the MBI group than the equivalent direct effect of the ACT group. Together these results suggest that the advantage of the MBI intervention over the ACT intervention in reducing Negative Experiences was likely due to mechanisms not measured in these studies.

There are a number of possible mechanisms that may have been responsible for driving the additional change in Negative Experiences in the MBI group. Any of the potential mechanisms outlined in Chapter 2, including self-compassion, exposure, enhanced mind-body functioning, insight or reductions in repetitive negative thinking, could have been responsible for such a change. In such a short intervention, it is unlikely that the extra focus on mindfulness practice resulted in any organic changes to the brain or immunological buffering (Hölzel et al., 2011), but is possible that the focus on formal mindfulness practice had some effects in improving relaxation. In support of this, Mackenzie, Poulin and Seidman-Carson (2006) found a similar length (4 week) MBI improved relaxation and reduced burnout symptoms.

Differences between other elements of the MBI and ACT interventions could also have been responsible for driving differences in Negative Experiences. For example, the MBI group differed not only in its focus on formal mindfulness practices but also included unique components related to psycho-education about the stress response, self-compassion and mindfulness of the body or the influence of the focus of ACT on being willing to experience negative affect, while behaving in line with values (e.g., Blackledge & Hayes, 2001).

However, it is submitted that most plausible explanation for the differences in the reduction of Negative Experiences in the MBI group, compared to the ACT group, is through the increased focus on formal mindfulness practice and the connection of this to ‘exposure’. As described in Section 2.4.3, repeated exposure to a feared stimulus eventually leads to extinction of the conditioned fear response and desensitisation to fear associated with the stimulus (Öst, 1997). Formal mindfulness practice provides a vehicle for regular exposure to aversive experiences (feelings, thoughts and sensations) and the means for extinction of this association between fear and experience or desensitisation to this fear. This can also be framed as providing opportunities to practice acceptance, openness, curiosity and non-judgment of aversive experience. In support of this, a study comparing the effects of different kinds of mindfulness practices found sitting meditation to be more effective at improving Non-judgement than mindful yoga and mindful yoga to be more effective in improving wellbeing than sitting meditation (Sauer-Zavala et al., 2013).

While it was expected that the influence of exposure on outcomes would show up as a greater mediation effect of MBI on Negative Experiences through Non-judging (of inner experiences), it did not. However, as the effects of exposure are implicitly learned, that is experiential and non-verbal, it could be argued that they may not show up in self-report measures of ‘acceptance’ or ‘non-judging’. Conversely, the acceptance

focus in the ACT intervention, was much more verbal. For example, in the ACT group, participants wrote down the names of feelings and sensations that show up in specific stressful times in the Choice point exercises and these feelings and sensations were explicitly linked to acceptance processes. Therefore, it is contended that the additional change in Negative Experiences in the MBI group may have been through the mechanism of exposure.

12.3 Within-group Differences in Mediators

As touched on previously, results indicated that there were a number of within-group differences in the strength of processes that were found to mediate changes in specific outcomes. There were also a number of results that suggested specific mediators were stronger facilitators of change in one outcome compared to another.

As highlighted in Figure 10.6, the simple indirect effects of the ACT group on positive outcomes (Flourishing and Positive experiences) was significantly larger through Values Obstruction than through Non-judging. The simple indirect effect of ACT on Positive Experiences through Values Progress was also significantly larger than through Non-judging. These differences were not found in the equivalent paths in the MBI group. These results suggest that the ACT intervention not only had a strong influence on the growth of values-based behaviour, but this influence facilitated change in positive outcomes more than the ability to accept internal experience (Non-judging).

Additionally, as illustrated in Figure 10.7, Values Progress was a significantly larger mediator of change from ACT to Flourishing than it was from ACT to Negative Experiences. These differences collectively suggest a stronger influence of values-based action on positive outcomes than negative outcomes. This may have important implications for ACT clinicians in directing intervention planning. This is discussed further in the section on implications for clinical practice (Section 12.8).

In the MBI group, as illustrated in Table 10.7, Non-judging was a significantly

larger mediator of the effects of the MBI group on Perceived Stress than it was of the effects of MBI on Positive Experiences ($t(104) = 2.66, p = .009$). This result provides some evidence that Non-judging has a stronger impact on reducing negative experience, rather than increasing positive experiences. This is consistent with evidence indicating Non-judging is a strong and consistent predictor of reduced distress outcomes (Baer et al., 2008, 2006; Bohlmeijer, ten Klooster, et al., 2011; Cash & Whittingham, 2010; Hollis-Walker & Colosimo, 2011; Tran et al., 2013), but has a less inconsistent relationship with improving positive outcomes (Bohlmeijer et al., 2011; Cash & Whittingham, 2010).

12.4 Relationships Between Mindfulness and Values-based Action

Results of both Study 1 (Chapter 5) and Study 4 (Chapter 11) suggest that the relationship between mindfulness and Values Obstruction is stronger than the relationship between mindfulness and Values Progress. This is evident in the relationships between trait mindfulness and valuing processes in Study 1 and also in the time-series mediation results of Study 4 (Chapter 11) in which earlier change in mindfulness variables (T1 to T2) mediated the relationships between both ACT and MBI groups and Values Obstruction (T2 to T3), but not Values Progress (T2 to T3).

It makes theoretical sense that there would be a stronger relationship between mindfulness and Values Obstruction than mindfulness and Values Progress. Values Progress measures purposeful values-based behaviour, while Values Obstruction measures *not* acting on values because of the presence of psychological barriers (or in reverse, values-based behaviour, despite the presence of psychological barriers) (Smout et al., 2014). It is plausibly easier for an individual to act in accordance with their values mindlessly (or with a lack of mindfulness) if there are no psychological barriers to doing so (e.g. writing a thesis while in the state of flow). But if psychological barriers to values-based action arise (e.g. the presence of thoughts of imposter bias while writing a

thesis), a mindful response is more likely to facilitate continued engagement in values-based action (by helping the writer connect with values and continue to write).

12.5 Mindfulness as a Mediator

This research focused on examining if values-based action could be identified as a mechanism of change between MBIs and both wellbeing and psychological distress. However, it also measured change in mindfulness variables and sought to identify if mindfulness was also a significant mediator of change in the relationship between ACT and MBI group and outcomes. The main reason for also measuring mindfulness variables as mediators was to provide a comparison for mediation effects through values-based action.

Values-based action mediators were consistently larger than mindfulness mediators in the concurrent mediation analyses as illustrated in Figure 10.6, but differences reached statistical significance only in two instances. Values-based action was a significantly stronger mediator than Non-judging in the relationship between ACT and both Positive Experiences and Flourishing. As mindfulness variables are reasonably well-established as mechanisms of change in MBIs (Gu et al., 2015), the comparatively greater strength of values-based action as a mediator adds considerable weight to inferences that values-based action is a mechanism of change in MBIs.

There were no significant differences between group differences in changes in self-reported mindfulness over the intervention or in the size of the mediation effects from either ACT or MBI group through Non-judging or Acting with Awareness to any outcome. As previously stated, this was surprising given that the MBI group focused more on mindfulness training than the ACT group. It is possible that the brevity of the MBI intervention weakened changes in, and through, mindfulness. Josefsson et al. (2014) found no differences between changes in mindfulness and changes in relaxation over a four-week mindfulness intervention and concluded that an MBI should be longer

than four weeks to convincingly improve levels of self-reported mindfulness. However, the effect sizes for within-group changes in mindfulness reported in Study 2 in Chapter 6 (Acting with Awareness: $d = 0.60$ [MBI], $d = 0.86$ [ACT]; Non-judging: $d = 0.89$ [MBI], $d = 0.88$ [ACT]) were consistent with, or larger than, changes in self-reported mindfulness in other MBSR interventions (e.g. $d = 0.66 - 0.73$) (Klatt et al., 2009; Vollestad et al., 2011), both longer or similar in length to this RCT. Therefore, there is no evidence that the abridged length of the MBI intervention in this study was connected with the impact of intervention on mindfulness outcomes.

In summary, the results support tentative conclusions that values-based action is overall a stronger mediator than mindfulness of the effects of ACT and MBI on all outcomes.

12.6 Research Strengths

12.6.1 Comparisons of MBI and ACT.

This is the first RCT, to my knowledge, that has compared an MBI and ACT intervention. While it is well-established that values clarifying exercises improve positive outcomes (e.g. Páez-Blarrina et al., 2008) and ACT interventions result in improvements in values-based action (e.g. Ciarrochi et al., 2010; Vilardaga et al., 2011), no studies to date have compared changes in values-based action between ACT and other MBIs. The only other study found comparing an MBCT and ACT intervention was not controlled and details of results were not published or made publicly available (Renner & Foley, 2013). The studies of this thesis also establish that an MBI, which does not focus on values in the intervention, improves values-based action more than a control group and arguably as well as an ACT intervention.

12.6.2 Inclusion of two active interventions.

The design of this study, that is the comparison of two active interventions with a control group, was a strength of the research. However, it should be acknowledged

that the inclusion of the second intervention (MBI) presented many statistical and interpretative challenges. Without the inclusion of the MBI group, for example, there would have been only one statistically significant difference at baseline (in Values Obstruction) and therefore perhaps less of a necessity to re-examine the Study 2 results using the path analysis model, controlling for baseline differences. The inclusion of the MBI group also distracts from the strong results of the ACT group, which indicate that the ACT group changed more than the control group in all outcomes and that many of the within-group effect sizes from Study 2 were equivalent to a much longer MBSR interventions.

12.6.3 Overt behaviour as a mediator.

Another strength of the research was that Values Progress, although measured with self-report, was a measure of overt behaviour in the previous two weeks and thus provided an opportunity to compare the mediation effects of behavioural change with constructs linked to cognitive states (mindfulness and to some degree Values Obstruction). I am not aware of another study that has compared the mediation effects of behavioural change with cognitive variables and results suggest that the mediation effects through overt behavioural change may be as strong as, or even stronger than, mediation effects through cognitive variables.

12.6.4 Sample size and limited drop-out.

The relatively large sample size and limited drop-out rate were also strengths of this research. Although there were some ethical issues initially raised regarding the refunding of the course fee as an incentive for completing the measures and attending workshops, no problems were experienced due to this approach. Participants were well-informed of this incentive from the beginning and were offered the opportunity to partake in the course by paying the fee and not completing the measures. As this was not a money-making exercise, the course fee was refunded if a participant withdrew due

to illness or circumstances beyond their control. Any profits were donated to charity. A proposed reason for the limited drop-out was that participants were contacted periodically via email and text and encouraged to attend workshops, complete home practices and complete measures.

12.7 Research Limitations

12.7.1 Interventions.

Although a RCT is the gold standard for evaluating interventions, the design of this particular study had various limitations. First, a key limitation was that the two interventions were perhaps too similar to identify significant differences between them. However, it was perhaps also true that the two interventions contained too many differences, aside from the valuing components, to be certain that any differences between the interventions were influenced by either valuing components in the ACT group or the more intense focus on mindfulness in the MBI. For example, the MBI group also included a unique self-compassion component, while the ACT group contained a unique defusion component. The role of values in the intervention may have been more robustly inferred if the values aspect of the intervention were the only difference between interventions.

12.7.2 Timing of measurement.

As previously stated, a major limitation in the research design was linked to the timing and frequency of measurement which was not conducive to establishing time-series mediation effects. As measures were taken at baseline, post-intervention and at four weeks follow-up, it was only possible to test if changes from baseline to the end of the intervention would mediate the effects of the groups on changes *after* the end intervention. As most change in both mediators and outcome variables occurred during the intervention, it was difficult to establish temporal precedence of the mediator to the outcome. Further, based on theory and existing evidence, it is most likely that

processes, such as mindfulness and values-based action, were linked in close temporal proximity to outcomes (e.g. Brown & Ryan, 2003). Therefore, more frequent measures of proposed mediators and outcomes would have improved the design and strengthened conclusions.

The use of only two scales of the FFMQ (Non-judging and Acting with Awareness) was a limitation of the study. Although this decision was made to reduce the burden on participants, data based on the Non-reactivity scale may have been helpful for a number of reasons. Non-reactivity has been used in past studies as a measure of ‘exposure’ (e.g., Carmody and Baer, 2009) and therefore may have provided evidence supporting the conjecture that the MBI better reduced Negative Experiences due to increased exposure. Non-reactivity is also arguably a better measure of acceptance and being willing to experience emotions than Non-judgement as it could be argued that Non-judgement better measures self-criticism than acceptance.

12.7.3 Population.

Although the participants for these studies were drawn from university populations, the sample was somewhat more representative than the usual undergraduate focus, as the average age for the main study was 34 years old. However, as the population reported only moderate levels of distress, any inferences made for clinical populations should be made with caution.

12.7.4 Baseline differences.

A limitation of Study 2 was the baseline differences of some measures between groups. However, as all precautions were taken to ensure random allocation to groups, it was concluded that differences were due to the 5% chance that groups would differ. Due to the baseline differences, the analysis of Study 2 was re-visited in Study 3, and as Study 3 used a more conservative statistical approach, the results of Study 2 were weakened and overall conclusions were based on fewer significant differences between

groups.

12.7.5 Other limitations.

As highlighted in the limitations section of Study 2 in Section 6.5.5, a daily diary study occurred simultaneously during the measurement period of the RCT. This may have strengthened the change in mindfulness in both intervention groups over the course of the intervention, compared with the control group, and increased the change in values-based action in the MBI group. Another limitation was that the shortened length of the mindfulness intervention may have reduced the strength of changes resulting from the MBI intervention, compared to longer MBSR packages, as previously discussed. However, as one of the key motivations of the study was to understand the role of mindfulness exercises and practices in clinical practice, the shortened duration of the mindfulness intervention was identified as more consistent with the length and focus of mindfulness practice that occurs in one-on-one clinical interventions.

12.8 Implications for Clinical Practice

From a clinical perspective, there were two key motivations for this research. The first concerned the utility of making an explicit connection between mindfulness and values-based action in clinical practice. The second was based on an interest in whether a clinical focus on mindfulness would flow-on to improved values-based action. Results provide some insight into these questions and in doing so inform aspects of treatment planning and case conceptualisation.

Case conceptualisation or formulation has been identified as a core skill for clinical psychologists and essential to linking theory with practice (The British Psychological Society, 2011). Case formulation commonly identifies processes maintaining dysfunction, including psychological variables (e.g. rumination, cognitive fusion, experiential avoidance or thinking styles), along with unhelpful or dysfunctional behaviours (e.g. escape or avoidant behaviours, or approach behaviours), as targets for

intervention (Kuyken & Padesky, 2008; Sandoz, 2012). The clinician is encouraged to work collaboratively with clients to develop a case conceptualisation and use this as a map to design the intervention and identify therapeutic targets for change (Kuyken & Padesky, 2008). In an ACT intervention, case formulation also aims to inform understanding of the function of behaviour within context (S. C. Hayes & Strosahl, 2004). Having such a road map is arguably even more important in eclectic and blended approaches to therapy which do not have on a single underlying theory to guide practice.

A number of the results and conclusions of this thesis have important implications for clinical practice and case conceptualisation. First, an ACT approach (integrating mindfulness and values) and an approach targeting formal mindfulness training were found to be equally efficacious at improving Positive Experiences, Perceived Stress and Flourishing. Thus if a clinician is targeting change in these type of outcomes, either approach will probably be equally effective.

Second, results suggest that values-based action is a natural product of mindfulness, whether it is explicitly targeted in the intervention or not. Therefore, once again either an ACT or MBI-type intervention will likely result in significant change in values-based action. However, results also suggest that values-based action changes more in an ACT intervention than an MBI, and may be a more robust mediator of change in an ACT intervention, particularly in improving positive outcomes. Therefore, an intervention aimed primarily at improving positive outcomes, might benefit from a focus on values-based action. This perspective is consistent with findings from J. L. Villatte et al. (2015) who found greater improvements in wellbeing and values-based action outcomes when values components of an ACT intervention were targeted for change compared with an ACT intervention targeting only mindfulness components.

Third, results suggest that a formal mindfulness approach is better at reducing

Negative Experiences than an approach integrating mindfulness and values. This is also consistent with findings from the J. L. Villatte et al. (2015) study that found greater improvements in distress and non-reactivity when mindfulness components were targeted for change. Therefore an intervention aimed primarily at reducing distress and negative experiences might benefit from a focus on mindfulness practice. Or alternatively, an intervention for those suffering from high levels of distress (e.g. chronic depression or anxiety) might benefit from an initial focus on mindfulness practice and mindfulness processes, such as defusion and acceptance. This approach might precede a later focus on values and the integration of mindfulness and values as a means to also change behaviour, connect with meaning and improve wellbeing.

Fourth, an explicit connection in case conceptualisation between mindfulness and values-based action could also be helpful. Even though results from the MBI group indicate this connection is not necessary to facilitate change in wellbeing through values-based action, some focus on this connection may be helpful in providing motivation and targets for overt behavioural change. Thus, even if the practitioner prefers to build mindfulness skills with formal practice, some mention of, or focus on, the connection between mindfulness and values-based action might be worth considering to address the particular needs, skills and motivations of individuals.

Fifth, results from Study 2 and 3 suggest that the ACT group changed more quickly in Non-judging and Values Progress (by the end of T2), than the MBI group (which had not changed significantly by T2). Study 2 suggests that this is also the case for Flourishing. These results together suggest that an ACT approach might be better for time-limited interventions. If rapid improvement in Non-judging and Values Progress can be made early in treatment, it may also encourage persistence with treatment and reduce drop-out for some individuals.

Sixth, the results of this thesis could inform clinicians of the possible flow-on

effects of training clients in formal mindfulness practice in therapeutic sessions. It appears that a focus on building mindfulness skills in formal practice could result in change not only in various distress and wellbeing outcomes, through change in values-based action and mindfulness, but it could also facilitate change through other mechanisms not identified in this study (e.g. reduced worry and rumination, relaxation, exposure or other forms of emotional and behavioural regulation as highlighted in Chapter 2). Therefore it is important to consider in treatment planning and case conceptualisation the strong evidence suggesting that formal mindfulness practice also impacts change in outcomes through these other evidence-based mechanisms.

Finally, the reality of therapy is that it is often difficult to motivate clinical clients to habitually practice formal mindfulness outside of sessions. Therefore, an approach to mindfulness that encourages formal mindfulness training *and* the integration of mindfulness into daily life as informal practice or as a *choice point* for more values-based behaviour, appears to be the most pragmatic approach. This is more consistent with the ACT approach, which emphasises workability and flexibility to context, than the largely protocol-driven approach of a group-based MBI.

12.9 Future Directions

Further validation of these results is required in order to strengthen inferences that values-based action is a mechanism of change in the relationship between mindfulness interventions and both wellbeing and psychological distress. Apart from replicating the RCT with more frequent measures as a means to infer causality, future research could focus on disentangling the effects of mindfulness on values-based action by measuring: (i) the extent that mindfulness and behavioural outcomes change in an ACT intervention without the benefits of formal mindfulness practice; and (ii) the incremental influence of values interventions by comparing the effects of two identical mindfulness interventions, with and without the values component. In order to identify

how much change is due to common factors related to mindfulness, a third intervention, for example, group-based exercise, could also be compared to these interventions.

Another important area of future research concerns the differential benefits of informal compared with formal mindfulness practice. The bulk of current evidence is based on the benefits of formal mindfulness practice or a mixture of formal and informal practice. However, as an ACT approach tends to emphasize the application of mindfulness to daily life over formal practice, studies identifying the unique benefits of informal practice would be beneficial to the validation and improvement of ACT interventions and clinical practice in general. Currently evidence concerning the benefits of informal versus formal practice is sparse and results are mixed. Informal practice has been found to be more efficacious than formal practice at improving mindfulness, habit strength and rumination in a depressed population (Leung, 2015) while another study found no relationship between informal practice and depressive relapse and a dose-response relationship between formal practice and depressive relapse (Crane et al., 2014). Given the lack of consensus on this, and the huge number of possible moderators of these effects, further studies focusing on informal and formal practice effects in diverse populations would be highly beneficial to better understand their differential effects. Other statistical approaches such as mediated moderation should also be applied to ascertain if mediation effects are influenced by other variables (see: Doss & Atkins, 2006), for example, levels of distress or trait mindfulness, personality factors such as neuroticism or levels of psychological distress.

The mediators used in this study were highly overlapping. Therefore, measures of non-related mediators (such as relaxation, planning or cognitive reappraisal) should also be included in future studies to identify the source of the unexplained mediation effect of the MBI group on outcomes in this study. Dismantling studies of MBSR may also help to ascertain how much, if any, of this effect is facilitated by other elements

that were distinct to the MBI group in this study, for example, self-compassion exercises and psycho-education on the stress response.

12.10 Conclusion

This thesis aimed to investigate if values-based action was a mechanism of change in the relationship between both trait mindfulness and MBIs and wellbeing and psychological distress. This thesis provides solid initial evidence that the relationship between trait mindfulness and wellbeing can be explained partly by values-based action. It also provides evidence that MBIs (both MBI and ACT) are efficacious for improving Positive Experiences and Flourishing and reducing Negative Experiences and Perceived Stress and do this partly through change in values-based action. Further, it suggests that even when values-based action is not specifically targeted for change in a mindfulness intervention, values-based action remains a mechanism that facilitates change in wellbeing and psychological distress. However, when values components are targeted for change, collective evidence suggests that the role of values-based action as a mechanism of change in positive outcomes is strengthened.

This thesis also adds to the growing body of literature supporting the efficacy of ACT and MBI interventions for improving wellbeing and reducing distress. It also provides evidence that an ACT intervention is more effective at improving values-based action and an MBI is more effective at reducing Negative Experiences.

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Appendix A

PDF of Published Version of Study 1

Mindfulness
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ORIGINAL PAPER

The Meaning and Doing of Mindfulness: The Role of Values in the Link Between Mindfulness and Well-Being

Alison M. Christie¹ · Paul W. B. Atkins² · James N. Donald²

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Abstract The role of values-based action in facilitating change is central to Acceptance and Commitment Therapy but more peripheral in more traditional mindfulness-based interventions. This paper examined the role of values-based action in the relationship between mindfulness and both eudemonic and hedonic well-being in two samples—an undergraduate sample ($n = 630$) and a postgraduate sample ($n = 199$). It was hypothesized that mindfulness would be related to well-being indirectly through values-based action, measured as decreases in psychological barriers to values-based action and increases in values-congruent behavior. In both samples, significant indirect effects were identified from mindfulness to hedonic and eudemonic well-being through values-based action. These studies provide initial evidence that mindfulness effects well-being partly through facilitating meaningful behavioral change. The implication of this finding is that mindfulness interventions may be enhanced with an explicit focus on values clarification and the application of mindfulness to values-based behavior.

Keywords Values · Mindfulness · Well-being · Acceptance and commitment therapy · Mechanisms of change

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Introduction

Mindfulness has been consistently associated with hedonic and eudemonic well-being through cross-sectional studies, which conceptualize mindfulness as a naturally occurring trait (Brown and Ryan 2003; Keng et al. 2011), and experimental studies which focus on strengthening mindfulness through training (Khouri et al. 2013). Because of the vast literature supporting the positive effects of mindfulness, research has recently shifted focus from asking *if* mindfulness improves well-being to *how* and *why* it results in change (Chiesa et al. 2014; Gu et al. 2015; Holzel et al. 2011). This focus on the identification of mechanisms by which mindfulness effects change has become increasingly important with the exponential growth of mindfulness-based interventions and use of mindfulness tools in clinical settings. As argued by Kazdin (2007), the successful application of research findings to clinical application depends on understanding how a treatment works, which in turn enables clinicians more creative, strategic, and flexible in designing and individualizing their interventions.

Most theoretical and empirical literature examining the relationship between mindfulness and well-being posit that greater mindfulness results in improved well-being by cultivating a more objective, flexible, and non-reactive stance toward inner experience. This in turn improves emotional regulation which facilitates the application of appropriate coping skills and responses in daily life (Baer 2010; Carmody et al. 2009; Holzel et al. 2011; Shapiro et al. 2006). Most mechanisms of action researched to date have been cognitive in nature and related to either processes directly associated with the construct of mindfulness, such as present-moment awareness, decentering, body awareness, and acceptance (Holzel et al. 2011; Keng et al. 2011; Shapiro et al. 2008; Vago and Silbersweig 2012), or other cognitive processes linked to well-being or distress,

such as worry, psychological flexibility, emotional regulation, or self-compassion (Desrosiers et al. 2013; Van Dam et al. 2014). A systematic review and meta-analysis of the literature examining these potential mechanisms identified cognitive and emotional reactivity, mindfulness, rumination, and worry as having the strongest evidence base (Gu et al. 2015).

However, these literatures have generally focused upon distress reduction and cognitive mechanisms. The application of mindfulness to daily life may go well beyond reducing symptoms and avoidant and unproductive behaviors to improving contact with meaning and purpose and increasing behavior motivated and based on these attributes. Meaningful and purposeful behavior has not only been linked to better life outcomes, but more motivation to persist toward goals, especially in the face of psychological obstacles (Koestner and Losier 2002). This emphasis on the application of mindfulness to meaningful behavioral change is conceptualized in Acceptance and Commitment Therapy (ACT) as values-based action.

Values have been broadly defined in the sociological and psychological literature as guiding principles that give meaning to and guide behavior (Rokeach 1973; Schwartz and Bilsky 1987), with the majority of research focused on the classification of value schemas and identifying how these relate to human behavior (for reviews see: Braithwaite and Scott 1991; Eccles and Wigfield 2002). The ACT approach to values centers on the identification of idiosyncratic or personal values (Wilson and Dufrene 2009). The practice of living according to one's values has been called valued living or values-based action. ACT defines values as "freely chosen, verbally constructed consequences of ongoing, dynamic, evolving patterns of activity, which establish predominant reinforcers for the activity that are intrinsic in engagement in the valued behavioral pattern itself" (Wilson and Dufrene 2009, p. 66). This implies that values are constructed by the individual, not forced upon them, and motivated by the meaning inherent in the action itself, rather than external reward or a sense of obligation. For example, if compassion is a personal value, just acting compassionately in a variety of contexts would provide its own reward through the behavior, irrespective of external acknowledgment, either immediately or in the longer term (Dahl et al. 2009). From an ACT perspective, values identification and clarification are key focuses of therapy because values provide a flexible and contextual framework to guide both goals and ongoing behavior and to increase perseverance through difficult times.

Values-based action has been identified as a key component of psychological flexibility, the desired outcome of an ACT intervention (Hayes et al. 2012). Values-based action has been associated with lower psychological distress (Wilson et al. 2010), depression (Plumb et al. 2009), and anxiety (Emmons 1986) and greater quality of life (Michelson et al. 2011). Values-based action has also been found to predict

lower distress and greater hedonic and eudemonic well-being (Ciarrochi et al. 2010; Ferrisizidis et al. 2010; Smout et al. 2014).

The research literature which is most consistent with the ACT conceptualization of values-based action can be found in the field of self-determination theory (SDT; Deci and Ryan 1985). Autonomous functioning (a similar construct to values-based action) has been found to be related to greater well-being (Brown and Ryan 2003), and daily satisfaction of basic psychological needs (Weinstein et al. 2012). Koestner and Losier (2002) found that an identified motivation (e.g., based on values and goals) emerged as a better predictor of positive life outcomes and reduced psychological distress in academic and political domains than either explicit motivations (based on punishment or external reward) or intrinsic motivations (e.g., based on the pleasure of the activity itself). They theorized that a values focus to behavior provided more motivation to persist through uninteresting or difficult times to reach goals than a purely intrinsic motivation. For example, a value such as love applied to the family domain may result in some behavior based on intrinsic motivation (playing with a baby to enjoy her smiles) or identified motivation (continuing to play the baby for its stimulation or development, despite a lack of positive feedback).

There is also evidence to suggest that just affirming one's values predicts positive outcomes and improved well-being. Short-term values affirmation interventions, such as writing about important values, have been found to predict diverse positive outcomes including long-term academic achievement and perceptions of academic adequacy (Cohen et al. 2009), lower neuroendocrine and psychological responses to a stressful activity (Creswell et al. 2005), increased pain tolerance and lower pain believability (Páez-Blarrina et al. 2008), and reduced defensiveness (Crocker et al. 2008). Further, just imagining that pain was in the service of a core value has been found to increase pain tolerance (Branstetter-Rost et al. 2009) over and above increases attributed to mindfulness strategies.

ACT theory links mindfulness explicitly with values-based action through its model of psychological flexibility which is comprised of six interconnected processes (S. C. Hayes et al. 2012). Four of these are mindfulness-based processes (present-moment awareness, acceptance, defusion, and self-as-context) and two are related to values-based action (values clarity and committed action) (Fletcher et al. 2010). ACT theory posits that mindfulness improves well-being by enabling individuals to view internal verbal behavior (thoughts and feelings or interpretations of experience) more objectively, facilitating a more flexible response to experience (S. C. Hayes et al. 2012). This flexible response includes the ability to connect with positive verbal repertoires, such as values, and consciously choose values-congruent behavior (Steger et al. 2013). Other approaches have emphasized the role of

mindfulness in minimizing habitual, automatic, and impulsive processing and reactions, allowing one to recognize and choose one's true values (Shapiro et al. 2006) and choose behavior most congruent with those values and needs (Brown and Ryan 2003; Deci and Ryan 1980).

Research on the relationship between mindfulness and values-based action is sparse. Mindfulness has been found to be moderately correlated with values-based behavior (Guadagno 2012; Smout et al. 2014; Trompeter et al. 2013) in the ACT literature. Similarly, few studies have focused on valuing variables as mediators of change between mindfulness and well-being. State and trait mindfulness has been found to predict higher autonomous behavior which in turn predicted less negative affect in a daily diary study (Brown and Ryan 2003). The authors concluded that those with higher mindfulness tended to be more aware of inner experience and more mindful of their behavior. Shapiro et al. (2006) theorized a causal model in which present-moment awareness facilitated *reperceiving* (an objective stance toward conscious or internal experience) which in turn cultivated values clarification, along with self-regulation, cognitive, emotional and behavioral flexibility and exposure (or acceptance) and therefore well-being. When the model was tested, it was found that changes in mindfulness *and* *reperceiving* following a mindfulness intervention predicted lower perceived stress and psychological distress and this change was mediated through changes in values clarity (operationalized as Ryff's Purpose in Life subscale (Ryff 1989)), and cognitive, emotional, and behavioral flexibility (operationalized as Ryff's Environmental Mastery subscale), but not exposure or self-regulation (Carmody et al. 2009). Similarly, the effects of mindfulness on depression and alcohol-related symptoms were found to be mediated by *decentering* (or *reperceiving*) and values clarity (Pearson et al. 2014), operationalized by the Life Engagement Test (LET; Scheier et al. 2006). Although Purpose in Life is highly correlated with values-based action (e.g., $r = 0.59$ in the study 1 sample), the purpose and engagement in life measures differ from the values-based action because they refer to trait-like behavior (e.g., "I value my activities a lot"), while the items of the Valuing Questionnaire (Smout et al. 2014) refer to cognitions and related behavior in the past 2 weeks (e.g., "I made progress in areas of my life I care most about"). Values-based action differs from these conceptions as it "occurs at a particular moment in time and that is deliberately linked to creating a pattern of action that serves the value" (Hayes et al. 2012, p. 328).

We found only one study in which the role of values-based action was examined as a potential process of change between mindfulness and well-being. Guadagno (2012) found values-based action partially mediated the relationship between dispositional mindfulness and satisfaction with life, while psychological flexibility, self-compassion, and self-concept clarity were found to partially mediate the relationship between

dispositional mindfulness and values-based action. Following a mindfulness intervention, changes in mindfulness were related to changes in satisfaction with life, indirectly through changes in valued living.

The purpose of the present studies was to gain further evidence for the role of values-based action in linking mindfulness to well-being. Because key processes linking mindfulness and well-being to date have been psychological (a flexible, regulated, and non-reactive stance toward experience), we also included a measure of "Values-obstruction" in our model. While this construct measures psychological processes similar to established processes of change (e.g., being caught up with difficult thoughts and feelings and being on autopilot), it also links these processes to the absence or retardation of values-based action in the past 2 weeks (e.g., "I spent a lot of time thinking about the past or future, rather than being engaged in activities that mattered to me"). Thus, we hypothesized that mindfulness would be related to eudemonic and hedonic well-being indirectly through both values-progress and values-obstruction. We replicated our model on two separate samples, using various measures of hedonic and eudemonic well-being and mindfulness. Given the difference in mean age between the two samples (study 1: $M = 20$; study 2: $M = 34$), and the potential confounding effects of associations between age and gender and values-based action and well-being (Ferssizidis et al. 2010), we included age and gender as covariates in both studies (Wunsch 2007).

Study 1

Method

Participants

Participants were $n = 630$ undergraduate students enrolled in psychology courses at the of Adelaide recruited for the validation study of the Valuing Questionnaire (Smout et al. 2014) in 2011. Participants were primarily female (68.5 %), young ($M = 20.4$, $SD = 4.5$), and Caucasian (68 %) or Asian (21.6 %).

Procedure

Participants were recruited via the school website and received course credit for their participation and completed the survey online.

Measures

Cronbach's alphas for all measures are displayed in Table 1.

Table 1 Descriptive statistics and zero order correlations between predictor and outcome variables and Cronbach's alphas of all measures

	<i>N</i>	<i>M</i>	<i>SD</i>	α	1.	2.	3.
1. MAAS	597	56.71	11.85	0.88	–		
2. Values-progress	623	17.18	6.32	0.87	0.44	–	
3. Values-obstruction	623	12.00	6.73	0.88	–0.50	–0.55	–
Satisfaction with life	602	22.52	6.83	0.89	0.36	0.62	–0.53
Positive affect	602	31.36	8.22	0.91	0.40	0.68	–0.51
Negative affect	602	22.32	7.98	0.89	–0.34	–0.28	–0.58

All correlations are significant to $p = 0.001$

Mediators Values-based action was measured using the Valuing Questionnaire (VQ; Smout et al. 2014), a 10-item scale measuring two factors of values-based action, Values-progress (the extent to which people felt they lived their values) and Values-obstruction (extent to which psychological barriers interfered with enacting values). Items of Values-progress tap into behavior in the past 2 weeks, e.g., “I made progress in areas of life I care most about”, and beliefs about behavior, e.g., “I felt like I had a purpose in life.” Values-obstruction measures both psychological barriers to values-based action, e.g., “difficult thoughts, feelings or memories got in the way of what I really wanted to do” and “I spent a lot of time thinking about the past or future, rather than being engaged in activities that mattered to me.” The VQ scales have been found to be stronger predictors of well-being and mindfulness than similar measures including the Personal Values Questionnaire (PVQ; Ciarrochi et al. 2006) and Valued Living Questionnaire (VLQ; Wilson et al. 2010). Values-obstruction correlated at $r = -0.65$ with the Acceptance and Action Questionnaire II (AAQ-II; Bond et al. 2011), which also measures the inability to pursue valued behavior in the face of psychological barriers.

Predictors Mindfulness was measured with the Mindful Attention Awareness Scale (MAAS; Brown and Ryan 2003), a 15-item instrument that measures attention to and awareness of present-moment experience and acting with awareness in daily life using a 6-point scale. The MAAS has strong psychometric properties and has been used extensively as a measure of mindfulness (Khoury et al. 2013).

Outcome Variables Eudemonic well-being was measured with the Satisfaction With Life Scale (SWLS; Diener et al. 1985) which measures subjective well-being with five statements rated on a 7-point scale. Hedonic well-being was measured using the Positive and Negative Affect Scales (PANAS; Watson et al. 1988) which consist of 10 positive and 10 negative affect statements forming two subscales. Participants

were asked to rate the extent to which they had experienced each affect in the past week on a 5-point scale.

Covariates As both age and gender have been found to predict values-based action and well-being (Ferssizidis et al. 2010), we included age and gender as covariates.

Data Analysis

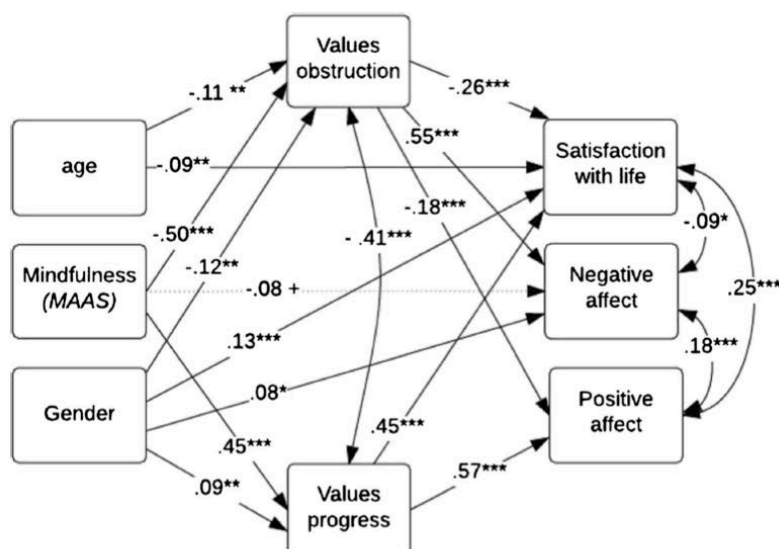
Path analysis was conducted with Mplus 7.4 (Muthen and Muthen 2015) using maximum likelihood (MLM) estimation. MLM estimation was chosen because it corrects for non-normality in the data, indicated by a scaling correction factors for models >1.00 (Byrne 2012). All models were “just identified,” meaning there were no degrees of freedom to assess fit. R^2 squared values were reported as a means to compare the variance explained by the model in each variable. As we were primarily interested in the role of values-based action in the link between mindfulness and well-being, we also report the indirect effects of mindfulness on well-being through Values-progress and Values-obstruction (Hayes 2009).

Results

Seven multivariate outliers ($z > 2.58$) were removed; however, some deviations from normality remained as indicated by a scaling correction factor >1.00 for the model. Missing data were less than 5 % for any one variable and missing completely at random (MCAR) according to Little's MCAR test ($p = 0.934$). ML estimation allows participants to be included in the analysis even if data is missing. Table 1 contains descriptive statistics, correlations between key variables, and Cronbach's alphas of scales. Age was significantly correlated with MAAS ($r = 0.09$, $p = 0.037$), and gender (being female) was significantly associated with greater Values-progress ($r = 0.08$, $p = 0.052$) and Satisfaction with life ($r = 0.17$, $p < 0.001$), and less Values-obstruction ($r = -0.08$, $p = 0.045$).

The model, outlined in Fig. 1, tested the relationship between mindfulness (MAAS) and well-being through Values-progress and Values-obstruction. We adjusted for the effects of gender (0 = males; 1 = females) and age on the mediators and outcome variables to allow more accurate replication in study 2, which was based on an older sample. The R^2 statistics indicated that the model explained 50 % of variance in Positive affect, 32 % in Negative affect, 46 % in Satisfaction with life, 21 % in Values-progress, and 26 % in Values-obstruction. As outlined in Fig. 1, model parameters were in expected directions. As outlined in Table 2, significant indirect paths were estimated from mindfulness to Satisfaction with life and Positive affect through Values-obstruction and Values-progress, and through Values-obstruction to Negative affect. Direct effects were non-significant. Indirect paths indicated that as mindfulness increases by 1 SD, Values-progress

Fig. 1 Standardized (XY) direct effects of model 1. Only significant paths are included and paths that are significant to $p < 0.10$ comprised of *light broken lines*. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$



increases by 0.45 SD and Positive affect and Satisfaction with life increase by 0.20 and 0.25 SD, respectively, *through* Values-progress (adjusting for the influence of age and gender). Similarly, when mindfulness increases by 1 SD, Values-obstruction decreases by 0.50 SD, and Negative affect decreases by 0.27 SD, and Satisfaction with life and Positive affect increase by 0.13 and 0.09 SD, respectively, *through* Values-obstruction (adjusting for the influence of age and gender).

Age negatively predicted Values-obstruction but unexpectedly it also negatively predicted Satisfaction with life. Non-standardized betas also indicated that being female was associated with *less* Values-obstruction ($B = -1.58$), and *more* Values-progress ($B = 1.35$), Satisfaction with life ($B = 1.84$), and Negative affect ($B = 1.35$), compared with males.

As a path analysis model assumes no measurement error, the results were compared with a structural equation model (SEM) which included fully latent variables. The full SEM

model resulted in effects which were consistent with the path analysis model, although indirect effect sizes were generally slightly larger in the latent model. We chose to present a path analysis model, rather than a full SEM model, because of issues with the latent model in study 2 (outlined in study 2). Thus, to keep a consistent approach across study 1 and study 2, and enhance comparability, we used a path analysis approach. Direct and indirect effects for the latent SEM version of model 1 can be found in the [Supplementary materials](#).

Discussion

The results supported the hypothesis that mindfulness would be related to well-being partly through values-based action. Together, Values-progress and Values-obstruction accounted for most of the relationship between mindfulness and well-being. An indirect relationship between mindfulness and the positive outcome variables (Positive affect and Satisfaction

Table 2 Standardized (XY) direct and indirect effects, standard errors, and probability values for model 1

	SWLS		Negative affect		Positive affect	
	β (SE)	p	β (SE)	p	β (SE)	p
From MAAS						
Via values-progress	0.20 (0.02)***	<0.001	0.02 (0.20)	0.319	0.25 (0.03)***	<0.001
Via values-obstruction	0.13 (0.03)***	<0.001	-0.27 (0.03)***	<0.001	0.09 (0.02)*	<0.001
Direct effects	0.05 (0.04)	0.251	-0.08 (0.04)	0.070	0.05 (0.05)	0.138

β standardized beta, SE standard error, SWLS satisfaction with life scale

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

with Life) was identified through both Values-progress and Values-obstruction, while the indirect relationship from mindfulness to Negative affect was identified through Values-obstruction only.

Study 2

To validate results from study 1, the path analysis model was replicated using a second sample and alternate measures of mindfulness and well-being. In this study, mindfulness was operationalized by two subscales from the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al. 2006), *Acting with awareness* (a measure of attention/awareness) and *Non-judging of inner experiences* (non-judging). We used only two of the five FFMQ scales to reduce participant burden. Acting with awareness was selected as it is a similar measure to the MAAS used in study 1, sharing five of its eight items with the 15-item MAAS scale. Both Acting with awareness and Non-judging were selected because they have been found to be the most reliable of the FFMQ scales in predicting well-being and negative psychological distress (Baer et al. 2006, 2008; Bohlmeijer et al. 2011; Cash and Whittingham 2010; Hollis-Walker and Colosimo 2011; Tran et al. 2013). Based on the above, it was further hypothesized that both Acting with awareness and Non-judging would predict well-being and this relationship would be partly explained through lower values-obstruction and higher values-based action.

Method

Participants

Participants were 199 postgraduate (coursework and research) students (73 % female) aged 18–60 years ($M = 34$, $SD = 11$, mode = 23), and 71 % Caucasian and 29 % Asian.

Procedure

Participants were enrolled in a mindfulness and resilience course at three Australian universities and completed an on-line survey which included all measures 1–3 weeks prior to the commencement of their course.

Measures

All measures were reworded to past tense, where relevant, and participants asked to rate agreement in the past month. Cronbach's alphas for each scale are in Table 3.

Predictor, Mediator, and Covariates Mindfulness was measured using two subscales of the FFMQ (Baer et al. 2006)—Acting with awareness (e.g., “When I did things, my mind

wandered off and I was easily distracted” and “I found it difficult to stay focused on what was happening in the present”) and Non-judging of inner experience (e.g., “I made judgments about whether my thoughts were good or bad” and “I disapproved of myself when I had irrational ideas”). Consistent with study 1, the Values-progress and Values-obstruction subscales of the Valuing Questionnaire (Smout et al. 2014) were used to measure values-based action and age and gender were included as covariates.

Outcome Variables Eudemonic well-being was measured using the Flourishing scale (FS; Diener et al. 2009), an 8-item measure measuring self-reported success in important areas predicting well-being including relationships, competence, self-esteem, purpose, and optimism. Hedonic well-being was measured with the Scale of Positive and Negative Experience (SPANE; Diener et al. 2009), which uses six items to produce a score for positive feelings and experiences (Positive experiences) and six items for negative feelings and experiences (Negative experiences). It measures positive and negative emotions (e.g., joy and anger), but it also measures more general feelings (e.g., pleasant and unpleasant) and positive and negative states (e.g., engagement, flow, and interest).

Data Analyses

The approach replicated that of study 1 using Mplus 7.4 (Muthen and Muthen 2015) and robust MLM estimation to test path analysis models. The main difference from study 1 was that two mindfulness variables were modeled—Non-judging and Acting with Awareness. Because the purpose of the second study was a comparison with study 1, we also ran a model with only Acting with awareness as a predicting variable.

Results

There were no missing data, severe violations of assumptions, or extreme outliers. All correlations were significant and in expected directions (see Table 3). Age was significantly correlated with Values-obstruction ($r = -0.22$, $p < 0.001$), Acting with awareness ($r = 0.17$, $p = 0.04$), and Non-judging ($r = 0.29$, $p < 0.001$). Gender (being female) was not associated with any variables in this sample.

The model, outlined in Fig. 2, tested the relationships between mindfulness variables (Acting with awareness and Non-judging) and well-being variables (Positive experiences and Negative experiences and Flourishing) through Values-obstruction and Values-progress. We once again adjusted for gender and age by regressing these variables on exogenous variables in the model. The R^2 statistics indicated that the model explained 35 % of variance in Positive experiences,

Mindfulness

Table 3 Descriptive statistics, Cronbach's alphas, and correlations between predictor and outcome variables

	<i>M</i>	<i>SD</i>	α	1	2	3	4
1. Values-based action	18.71	5.22	0.81	1			
2. Values-obstruction	15.51	5.62	0.75	-0.49***	1		
3. Act with awareness	22.10	5.89	0.92	0.37***	-0.67***	1	
4. Non-judging	23.40	7.65	0.94	0.30***	-0.52***	0.53***	1
Flourishing	41.09	7.92	0.89	0.72***	-0.55***	0.34***	0.34***
Positive experiences	20.38	3.99	0.89	0.52***	-0.42***	0.20**	0.20**
Negative experiences	17.83	3.81	0.79	-0.39***	0.51***	-0.43***	-0.45***

Positive experiences positive subscale of SPANE, *Negative experiences* negative subscale of SPANE

*** $p < 0.001$; ** $p < 0.01$; α = Cronbach's alpha

35 % in Negative experiences, 56 % in Flourishing, 15 % in Values-progress, and 49 % in Values-obstruction. As outlined in Fig. 2, all paths were in expected directions.

As outlined in Table 4, all indirect effects from mindfulness to outcome variables through mediators were significant except for the two direct paths from Acting with awareness and Non-judging through Values-progress to Negative experiences ($p = 0.06$ and $p = 0.120$, respectively). Direct effects were all non-significant, except the indirect effect from Non-judging to Negative experiences.

Once again, results were checked against a full SEM model with latent variables. The sizes of indirect effects was similar with two key exceptions. The indirect effect from Acting with awareness through Values-obstruction to Positive experiences was larger ($\beta = 0.45$, $SE = 0.21$, $p = 0.037$), compared with ($\beta = 0.18$, $SE = 0.05$, $p < 0.001$) in the path analysis model. Also, the direct effect from Acting with awareness to Positive experiences was larger and significant ($\beta = 0.41$, $SE = 0.20$, $p = 0.040$) in the SEM model. The key difference, however, was that many paths in the fully latent model were non-significant, though they had similar or larger effect sizes

compared with the path analysis model. This was attributed to a combination of reduced power in the full SEM analysis due to a smaller sample size (compared with study 1), and the relatively low reliability of the Values-obstruction variable ($\alpha = 0.75$) in this sample. It was therefore decided to report the path analysis models and provide details of the fully latent models in the [Supplementary materials](#).

We also ran a model (model 2b) in which Acting with awareness was the sole predicting variable to allow a more accurate comparison with model 1 in study 1 which included the MAAS scale as the sole predictor. As previously stated, Acting with awareness contains five items from the MAAS. The R^2 statistics indicated that the model explained about the same, or slightly less, amounts of variance in each exogenous variable: 35 % of variance in Positive experiences, 31 % in negative experiences, 56 % in Flourishing, 13 % in Values-progress, and 45 % in Values-obstruction. The only differences between the two models in terms of statistical significance of paths was that in model 2b, the indirect effect from Acting with awareness to Negative experiences, was significant to $p = 0.03$ (while in model 2, it was significant to

Fig. 2 Standardized (XY) direct effects of model 2 including Acting with awareness and Non-judging as predictor variables. Only significant paths are included and paths that are significant to $p < 0.10$ comprised of light broken lines. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, + $p < 0.10$

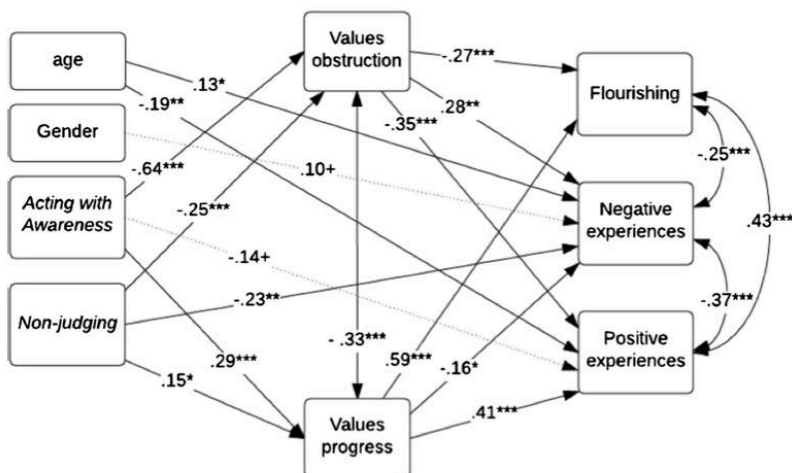


Table 4 Standardized (XY) direct and indirect effects, standard errors, and probability values for model 2

	Flourishing		Negative experiences		Positive experiences	
	β (SE)	<i>p</i>	β (SE)	<i>p</i>	β (SE)	<i>p</i>
From Acting with awareness						
Via Values-progress	0.17 (0.05) ***	<0.001	-0.05 (0.03)	0.060	0.12 (0.03)**	0.002
Via Values-obstruction	0.14 (0.04) ***	<0.001	-0.15 (0.05)**	0.003	0.18 (0.05) ***	<0.001
Direct effects	-0.03 (0.06)	0.597	-0.08 (0.09)	0.347	-0.14 (0.09)	0.093
From Non-judging						
Via Values-progress	0.09 (0.04)*	0.043	-0.02 (0.02)	0.120	0.06 (0.03)*	0.049
Via Values-obstruction	0.07 (0.02)**	0.002	-0.07 (0.03)*	0.012	0.09 (0.03)**	0.003
Direct effects	0.02 (0.06)	0.734	-0.23 (0.08)*	0.004	0.02 (0.08)	0.844

 β standardized beta, SE standard error*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

$p = 0.06$). Consistent with model 2, all direct effects in model 2b were non-significant. See [Supplementary materials](#) for path estimates for model 2.

Discussion

The results of study 2 support the hypotheses that mindfulness, operationalized as both acting with awareness and non-judging, would be associated with both eudemonic and hedonic well-being, partly through the effects of values-based action (Values-progress and Values-obstruction). Providing evidence for replication, the indirect paths from Acting with awareness to well-being variables were very similar in size and reliability to those from MAAS to well-being variables in study 1, despite the use of different measures of eudemonic and hedonic well-being. Like in study 1, an indirect relationship from mindfulness (operationalized as both Acting with awareness and Non-judging) to Negative experiences was identified through Values-obstruction, but not through Values-progress.

Compared with model 2, model 1 from study 1 explained more variance in Positive affect (50 % compared with 35 % in Positive experiences in study 2), in Values-progress (21 % compared with 15 %), but less in the measure of eudemonic well-being (46 % in Satisfaction with life compared with 56 % of the variance in Flourishing in study 2) and Values-obstruction (26 % compared with 49 %). The variance explained in Negative affect/experiences was about the same (32 % compared with 35 %) in both samples.

General Discussion

The aim of these studies was to explore the role of values-based action as a potential mechanism by which mindfulness is related to subjective and eudemonic well-being, given the importance of values-based action in the ACT model. Consistent with the hypothesis, mindfulness measures (MAAS, Acting with awareness and Non-judging) were related to eudemonic and subjective well-being partly through

values-based action. For most paths, the indirect relationship from mindfulness and well-being through values-based action was stronger than the direct relationship and the direct relationship was non-significant. The exception to this was the direct path from Non-judging to Negative experiences which was significant and stronger than the indirect effects through values-based action.

A key outcome replicated across both studies was that mindfulness influenced Negative affect and experiences more strongly and reliably through Values-obstruction than through Values-progress. Conversely, Positive affect/experiences and eudemonic well-being was influenced through both Values-progress and Values-obstruction in concert. This finding suggests that there might be two distinct pathways through values-based action whereby mindfulness contributes to well-being. Mindfulness is more likely to contribute to reducing negative outcomes by helping people deal with the inevitable difficulties they encounter when seeking to act in valued directions (e.g., fear of failure or worry about potential loss). To the extent that mindfulness helps people manage these difficult experiences, they are less likely to experience negative affect. Correspondingly, mindfulness is likely to contribute to increasing positive affect and well-being by helping to both deal with psychological barriers to values-based action, as described above, and enhance a capacity to notice opportunities to act in the direction of one's values (Values-progress). And when one is able to act in accordance to what is meaningful to them, they are more likely to cultivate meaningful relationships, feel competent, optimistic, increase positive affect, and be more satisfied with life.

Another key outcome of the study was that values-based action emerged as a stronger predictor than mindfulness of most measures of well-being. This has implications for therapy because like other knowledge structures, values and therefore values-based action, are more likely to be enhanced through attention and reinforcement (Verplanken and Holland 2002). Thus, values clarification exercises, such as those found in ACT protocols, may prove efficacious as an additional component to a wide range of therapeutic interventions, as well as being an adjunct to mindfulness-based

therapy or instruction. Our findings suggest this approach may be particularly important for interventions aimed at optimizing well-being.

Further research should consider how these findings relate to other key measures of psychological distress. It should also consider models including more established cognitive-based mediators of change from mindfulness to well-being and distress, such as emotional regulation and self-compassion, alongside values-based action to determine their relative contributions to pathways to well-being.

Limitations

This was a cross-sectional study and therefore we cannot therefore assume our results reflect causality. However, a vast literature suggests that a causal pathway from mindfulness to well-being is more likely than the reverse. For example, Guadagno (2012) found a mindfulness intervention resulted in improvements in values-based action, which partially mediated the relationship between improvements in mindfulness and increases in satisfaction with life. It is still unknown if increases in mindfulness cause increases in values-based action or the reverse, or if they develop simultaneously. Identifying causality is clearly a focus for future research and we are currently collecting longitudinal experimental data to test these associations over time. Results do, however, confirm that mindfulness is related to values-based action and much of the relationship between mindfulness and well-being can be accounted for by measures of values-based action.

Now that the positive relationship between mindfulness and well-being is well-established, there has been increasing attention paid to the active processes whereby mindfulness exerts its positive effects. Researchers have identified mediators including self-compassion and emotional regulation (Van Dam et al. 2014), cognitive and emotional non-reactivity (Gu et al. 2015) and cognitive reappraisals, and reduced rumination (Desrosiers et al. 2013). Our research is the first to demonstrate that acting on, or making progress towards, one's values, and being able to manage obstacles to acting on values, explains a considerable portion of the relationship between mindfulness and well-being. This finding has both research and practical significance. For researchers, our findings support Brown and Ryan's (2003) perspective that mindfulness facilitates the ability to actively choose autonomous, values and needs-based behavior rather than to react in habitual ways. For clinicians working within an Acceptance and Commitment Therapy framework, this evidence supports the positive association between ACT processes—present-moment awareness, acceptance, and values-based behavioral change—and improvements in well-being. For those working primarily with other mindfulness-based therapies, our results suggest that integrating a focus on values clarification and

acting in line with values may enhance the effects of mindfulness-based interventions upon well-being.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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Appendix B

Supplementary Materials for Published Paper for Model 1

The following material was included in the published version of the paper as Supplementary material and is available online. Figure B1 outlines the direct effects for the fully latent model equivalent to the path analysis in Model 1. Table B1 outlines the indirect effects for the latent model.

The fit criteria was assessed as acceptable based on multiple fit indices as recommended by Hoyle and Panter (1995): the chi-square (χ^2) statistic, Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Standardized Root Mean Square Residual (SRMR). The latter three indices were chosen because unlike χ^2 , they are not influenced by deviations from multivariate normality (Hu & Bentler, 1998, 1999). Cut offs indicative of a reasonably good fit as recommended by Kline (2005) are $CFI > 0.90$, $RMSEA < .06$ and $SRMR < .09$.

The fit of the fully latent model was acceptable: $X^2(1240) = 2775.60$, $p < .001$, $RMSEA = 0.05$ [CI 90: .04, .05], $CFI = .91$, $SRMR = .05$, after correlating the residuals of the following item pairs: Values Progress items 4 with 5 and 6 with 1, Values Obstruction items 1 with 6 and 10, MAAS items 5 with 1 and 4 and 3 with 2; PANAS items 7 with 20, 8 with 11, 6 with 13 and 3 with 9. The R^2 statistics indicated that the model explained 64% of variance in Positive affect, 45 % in Negative Affect, 60% in Satisfaction with Life, 33 % in Values Progress and 37% in Values Obstruction.

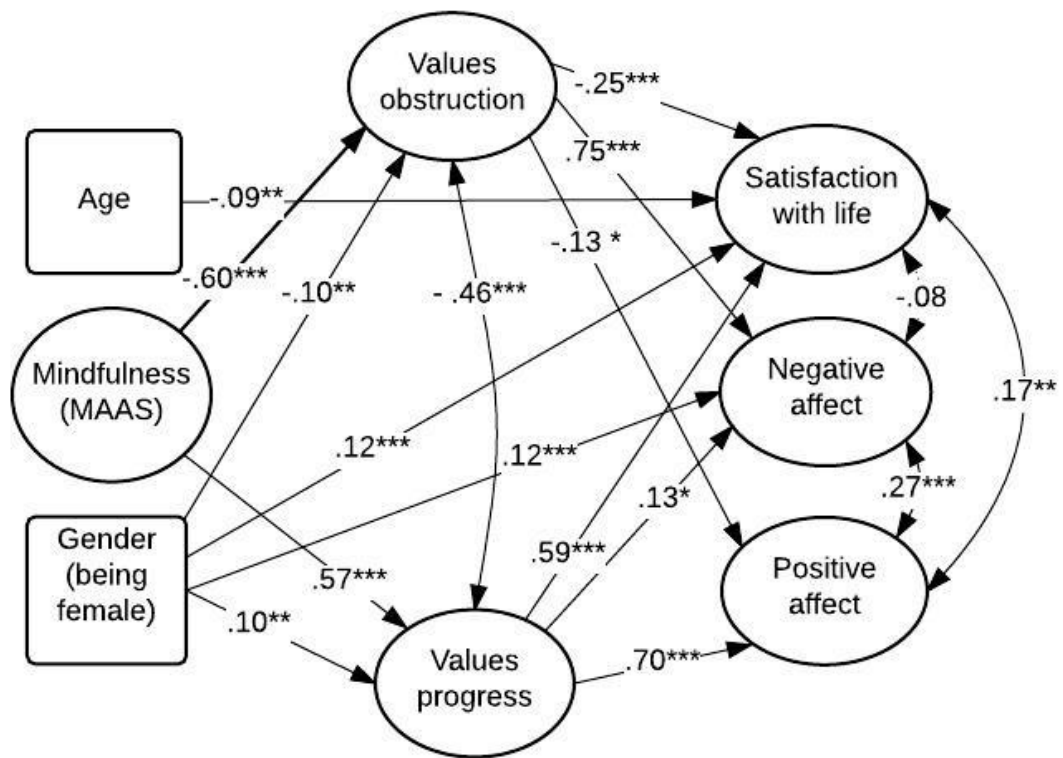


Figure B1. Standardized (XY) direct effects of latent SEM Model 1. Circles indicate latent variables. Only significant paths are included. * $p < .05$, ** $p < .01$, *** $p < .001$, + $p < .10$.

Table B1

Indirect Effects for the Latent SEM Model Equivalent to Model 1

	SWLS		Negative Affect		Positive Affect	
	β (SE)	p	β (SE)	p	β (SE)	p
From MAAS						
via Values Progress	.33 (.03) ***	.<.001	-.08 (.03)*	.021	.40 (.04) ***	<.001
via Values Obstruct	.15 (.03) ***	.<.001	-.45 (.05) ***	<.001	.08 (.03) **	.013
Direct effects	-.04 (.05)	.417	-.001 (.05)	.982	-.02 (.04)	.667

Note. *** $p < .001$, ** $p < .01$, * $p < .05$. β = standardized beta; SE = Standard error.

Appendix C

Supplementary Materials for Published Paper for Model 2

Figure C1 illustrates the direct effects for the fully latent model equivalent to the path analysis Model 2. Table C1 outlines the indirect effects. The fit of the fully latent model was acceptable: $X^2(1581) = 1390.69, p < .001$, RMSEA = 0.05

[CI 90: .05, .06], CFI = .90, nSRMR = .07, after correlating the following sets of residuals: Values Progress items 4 with 5, Values Obstruction items 6 with 1, Acting with Awareness items 8 with 3, 20 with 17, 14, and 23, and 23 with 14, and Flourishing items 8 with 3.

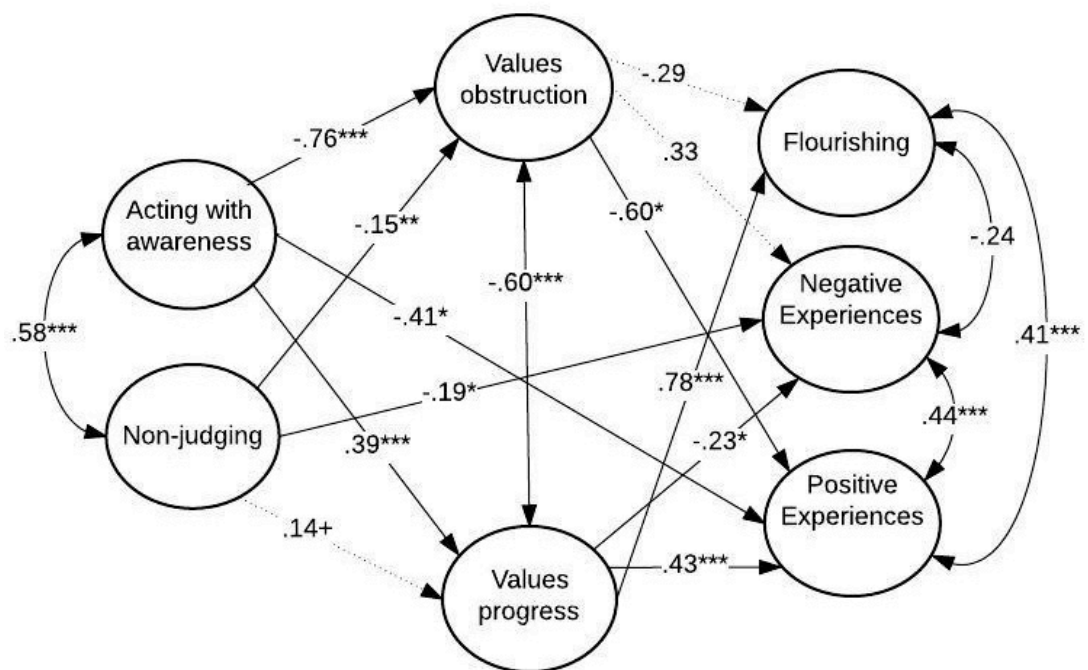


Figure C1. Standardized (XY) direct effects of latent SEM Model 2. Non-significant paths with large effect sizes are included to allow comparisons with the path analysis model. Paths from age and gender are not included in the diagram for simplicity.

$p < .05$, $^{**} p < .01$, $^{***} p < .001$, $^+ p < .10$

Table C1

Indirect and Direct Effects for the Latent SEM model Equivalent to Model 2

	<u>Flourishing</u>		<u>Negative Experiences</u>		<u>Positive Experiences</u>	
	β (SE)	<i>p</i>	β (SE)	<i>p</i>	β (SE)	<i>p</i>
<i>From Acting Aware</i>						
Via Values Progress	.30 (.06) ***	.<.001	.09 (.05)*	.057	.17 (.05) ***	.001
Via Values Obstruct.	.22 (.14)	.115	-.25 (.18)	.169	.45 (.21)*	.037
Direct effects	-.12 (.12)	.349	-.03 (.17)	.850	-.41 (.20)*	.040
<i>From Non-judging</i>						
via Values Progress	.09 (.05)	.084	-.03 (.02)	.140	.05 (.03)	.088
via Values Obstruct.	.05 (.03)	.108	-.05 (.04)	.237	.09 (.05)	.092
Direct effects	-.02 (.05)	.706	-.19 (.07)	.009	.002 (.08)	.981

Note. β = standardized beta; SE = Standard error. *** $p < .001$, ** $p < .01$, * $p < .05$.

Appendix D

Supplementary Materials for Published Paper for Model 3

Model 3 is identical to Model 2 in the main paper except that it excludes the *Non-judging* variable. Figure D1 shows standardized direct effects and Table D1 the standardized indirect effects.

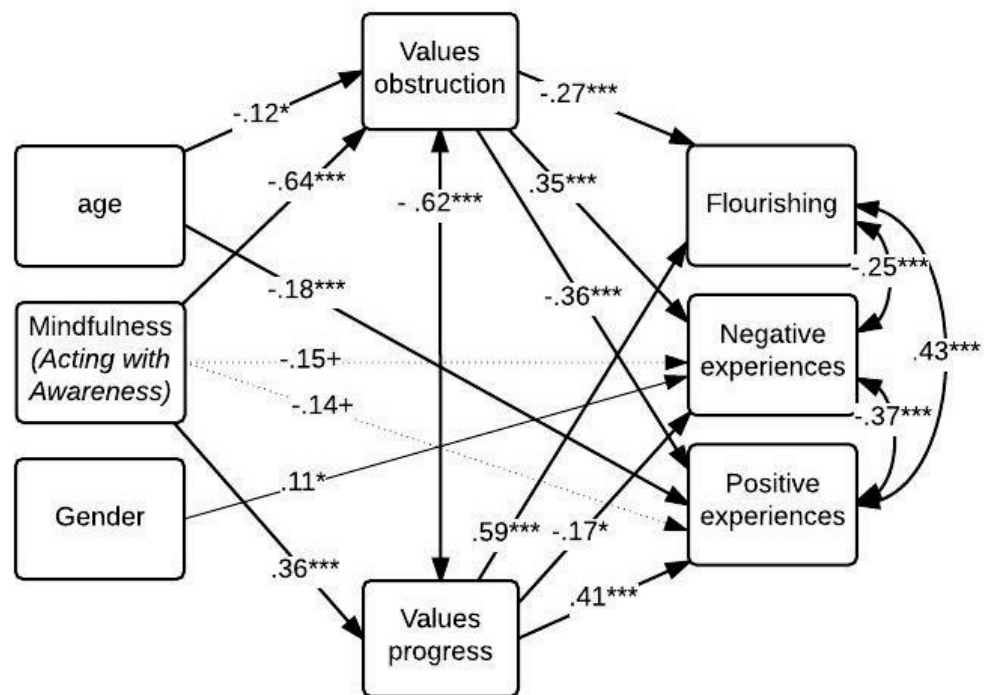


Figure D1. Standardized (XY) direct effects for path analysis Model 3 (with the Non-judging variable removed). Only significant paths are included and paths that are significant to $p < .10$ comprised of light broken lines. * $p < .05$, ** $p < .01$, *** $p < .001$, + $p < .10$

Table D1

Standardized (XY) Indirect Effects for Model 3.

	<u>Flourishing</u>		<u>Negative Experiences</u>		<u>Positive Experiences</u>	
	β (SE)	<i>p</i>	β (SE)	<i>p</i>	β (SE)	<i>p</i>
From Act-aware						
Via Values Progress	.21 (.04)***	<.001	-.06 (.03)*	.030	.15 (.04)***	<.001
Via Values Obstruct.	.18 (.04)***	<.001	-.22 (.06)***	<.001	.23 (.06)**	<.001
Direct effects	-.03 (.06)	.655	-.15 (.08)	.081	-.14 (.08)**	.079

Note. β = standardized beta. *** p < .001, ** p < .01, * p < .05.

Appendix E

RCT Protocols

Table E1

MBI Protocol: Session 1

Content & Materials
Welcome and introduce trainers – background and expertise
Format & Ground rules Describe the basic format, ground rules and content of the training • Three sessions for the training (important to attend each session) • Home practice is very important to success – workbook provided • This is skill training, not therapy Research is comprised of three online surveys and 4 blocks of daily check-in (SMS); any problems or difficulties with it? - Completing daily check-in is essential to research but extremely helpful to create a self-reflection habit – check if there were any issues with it. Format: informal, yet we are following a protocol. Some instruction, but mostly exercises and group and pair discussions focus on experiences using mindfulness. Ground rules - no obligation to share any information you would rather keep private - important that information remains confidential and not discussed outside the room: - is everyone happy to abide by that?
Introductions Participants to introduce themselves - Name - Motivation for participating in this course
Stress audit In worksheet provided, list 5-10 situations that you perceive to be current stressors in your life, and rate each (1-10). - 1 = not very stressful; 10 = extremely stressful - When you describe the situation / event, try and be as specific as possible. We'll return to this sheet later, so you'll need to remember what each situation you describe is! - Also, try and include a range of stressors (both mildly and strongly stressful). - Remind participants that they can list any of the stressors they responded to in the "Daily check-ins" the previous week, or the first survey, if that's relevant. Key learning points:

- Clarity on current stressors in participants' life and their intensity.

Mind-body connection and the stress response

Overview of the stress response; plus a brief introduction to mindfulness.

SHOW SLIDES 4-6

- Intro to the stress response (or flight-or-fight response)
- The key point is that this process is automatic. It doesn't distinguish between the form of the stressor.
- If we detect a threat to our safety / wellbeing, this response kicks in.
- Just think of the last time you had these kinds of symptoms. Where were you? What were you doing? Where was the stressor?
- In most situations, however, the stress response (fight or flight response) is dysfunctional.
- Brief introduction to mindfulness.

Key learning points:

- The stress response is automatic.
- It functions the same way, whether the stressor is physically present or not.
- Mindfulness has been found to inhibit the stress response.
- A definition of mindfulness – intention; attention; attitude

Raisin eating exercise

Guided mindful eating of a raisin (5 mins)

We're now going to try our first mindfulness exercise. It's a mindful eating exercise. I'll guide you through the exercise, which only takes a few minutes, and we can discuss it afterward.

Please help yourself to one of the tiny food items in the bowl, and let it sit for a moment in the palm of your hand.

During the exercise, I'm going to simply ask you to use all of your senses to explore this object, first paying attention to the feel and look of this item and then being very aware of its taste and texture.

First of all, see if you can become aware of the slight feel of this object that is sitting there in the palm of your hand...

Now pick up the object in the tips of your fingers, and notice any changes in colour as it catches the light in the room. Focus on this object as if you've never seen anything like it before. Bring some curiosity and interest to the object.

Noticing the feel and texture of the object as you hold it there in the tips of your fingers...

If thoughts pop up during this exercise just acknowledge these thoughts, let them be, and return your awareness to your object.

Give your object a little squeeze to get a sense of its internal texture...

Recognise that this object is unique. There's none other quite like it in the world, as far as we're aware.

Now bringing the object up to your nose; noticing whether it has any particular smell.

And now placing the object in your mouth, on your tongue, but without biting into it. Simply notice any sensation of having this small object resting on your tongue. Perhaps noticing if your mouth has begun to salivate in anticipation. Your job here is to simply pay attention to the sensations you're experiencing right now.

Now, staying fully aware of the sensations, take one slow bite into the object, becoming fully aware of any taste it releases into your mouth... Just noticing the taste...

And take a second bite and notice if the taste changes in any way.

Now go ahead and slowly chew the object, noticing the movement and feeling in your jaw and teeth as you chew.

When you are ready, feel free to swallow the small pieces of your object, all the time noticing the physical sensations in your mouth and throat.

Finally just sitting here for a moment, noticing any aftertaste this object has left in your mouth. Just being aware of your current experience. Paying attention to what's happening for you here and now.

And whenever you're ready, slowly opening your eyes and coming back into the room.

Debrief in pairs (5 mins)

- “What did you notice as we did the exercise?”
- “What kinds of thoughts and feelings showed up?”

Whole-of-group review of the exercise (5 mins):

- “What was it like to do the exercise?”
- “What did you notice?”
- “What stood out to you?”
- “What do you think the purpose of that exercise was?”
- “What would it be like to do other activities in your life in a similar way?”

Key learning points:

- There is much in our life that we miss due to being on ‘automatic pilot’
- The mind wanders very often – this is natural and is not a problem
- Mindfulness is about noticing when our mind wanders off and gently bringing back to what we wish to attend to

Selecting one activity to do mindfully

- Select one routine activity they would be willing to perform with great awareness over the week and tell partner about it (perhaps keep to senses)
- Write this down in the work book on page 3
-

BREAK

Attitudes and attention

- Briefly explain the distinction between “informal” and “formal” mindfulness

practice.

- We're now going to dig a bit deeper into mindfulness practice.
- We are now going to focus on the "attitude" aspect of mindfulness, followed by the "intention" and "attention" aspects.

SHOW SLIDES

Introducing the 5 attitudes of mindfulness.

1. *Beginner's mind*. This means having a fresh, open and curious approach to our experience.
2. *Acknowledgement*. This involves recognising and validating things as they are, without seeking to change them.
3. *Non-judgement*. This involves not placing labels or comments over our experience; cultivating impartial observation of whatever we're experiencing.
4. *Non-striving*. This involves not grasping, clinging or seeking to achieve anything in particular or be anywhere other than where we are.
5. *Self-compassion*. This involves cultivating love for yourself, as you are, without self-blame or criticism.

Attention & intention.

One of the first things we notice when we learn mindfulness is that the mind wanders. A wandering mind is very useful. It enables us to think of possible future outcomes, learn from the past and interpret the present. But a wandering mind, if left unchecked, can also cause troubles. It catastrophises, judges and misinterprets. It also draws us out of the present moment.

Mindfulness practice is about noticing this. Not stopping the flow of thought, but instead, connecting with the space or awareness in which we actually see what's going on. So when we practice mindfulness in this course, we will be practicing noticing the movements of the mind and then consciously directing it to where we'd like it to go. It's like gym training for the mind.

Key learning points:

- Mindfulness involves cultivating a certain attitude to our experience, such as a 'beginner's mind', non-judgement, and self-compassion
- Mindfulness is about being gentle with our mind when it wanders; and making a choice about what we wish to attend to in any given moment

Mindfulness of breath

Introduction to mindful breathing

Some people find it helpful to distinguish between formal (egg, sitting meditation) and informal (egg, eating, walking) practice. In this course, we'll be doing both. We're now going to try a formal mindfulness practice. This will be a chance to experiment with some of the concepts we just covered. And before we start this practice, I'd encourage you to take a 'light' approach to this...

In this exercise, we'll be attending to the breath. When we're practicing mindfulness, we're always directing our attention to something. The breath is a handy object for practice, as it's always present (hopefully, at least!!), and it's a relatively clear and immediate sensation for most people. When we attend to the breath, we don't need to analyse it, think about it, or figure it out. We're just paying attention, with kindness.

Start by once again taking a moment to establish the posture.

Sitting balanced and upright, but not tense. Just notice the whole body, sitting in the chair.

If there are any obvious sensations in the body, just bringing the attention to these.

Not trying to change or fix anything.

Just noticing what's there..

Then when ready, bring the attention to the breathing.

Observing it wherever you feel it most strongly.

It may be in the nose, in the back of the mouth, the throat, in the chest, or in the belly.

Just allowing the attention to rest wherever it most naturally notices the breathing.

Not trying to change or control the flow of breathing.

Just noticing what it's like to breathe, with a beginner's mind.

You may notice the slightly cooler air with the in-breath, and the warmer air with the out-breath. You may notice other sensations.

You may notice that the mind has wandered away from the breath. When you notice this, simply acknowledge where your attention went and then gently bring the attention back to the breathing.

Resting the attention with the movement of each breath.

Without judgement, just watching the breath ebb and flow like waves in the sea.

Then when you're ready, gently coming out of the practice. Allowing the eyes to open if they've been closed. And turning the attention outward...

Review.

Group discussion on **(5 mins)**:

1. What did you notice in that practice?
2. Did you find that any of the 4 attitudes of mindfulness were present during the practice? If so, which ones?
3. What did you notice about the mind?

Key learning points:

- The breathing can be a helpful 'object' of mindfulness practice, as it is always present, and we can quite easily direct our attention to it
- We are not trying to 'control' our experience with mindfulness practice – sometimes we'll feel calm and peaceful after a practice, but not always.
- Not trying to control or force the mind when it wanders. Bringing attention to distractions can weaken their impact...

STRETCH

Reacting vs responding to stress

Introduce towards vs away moves in response to pleasant and unpleasant sensations.

SHOW SLIDES

One of the most basic responses we have as humans is to avoid things which are unpleasant and seek things that are pleasant. This can be physical as well as psychological. Often, the way we respond to unpleasant experiences doesn't serve us very well. For example, avoiding having a difficult but important conversation with a partner or colleague. Similarly, habitually seeking pleasant experiences (egg, food or drugs) can bring its own problems, such as addiction, and are often a response to an unpleasant experience (egg, drinking after a tough day at work).

One of the major benefits of mindfulness practice is to bring choice into this process.

We're not saying that we should seek out unpleasant and avoid pleasant experiences. But rather, we're attempting to shed light on how well our movements toward pleasant things and away from unpleasant things serves us. Mindfulness practice can help us to "be with" rather than react to both pleasant and unpleasant experiences; and then make a choice about how to respond. And in this way, build our resilience.

Are there any questions about this?

OK, so we're now going to try another brief mindfulness practice. I'd invite you to sit comfortably in the chair and gently close your eyes.

Now I'll ask you to turn your attention to the sensations in your body. Just noticing any obvious sensations in the body...

Now as you scan over the body, just notice if there are any unpleasant sensations present for you. It may be a tight back or shoulders. Tightness in the head. Are there any unpleasant sensations right now? If there aren't, just acknowledge that - there's no need to create them - and allow your attention to rest with whichever sensations are most obvious to you.

If there are unpleasant sensations, I invite you to gently bring your attention to these. Like a curious explorer, bringing your attention to these sensations as best you can. What do you notice? Is it possible to allow the attention to rest there? If it's not, that's fine too. In this practice, we're at least as interested in our response to any unpleasant sensations as we are in the sensations themselves. Can you notice your response?

Next, I invite you to bring the attention to any pleasurable sensations. It may be warmth in the body; relaxed muscles; comfort in the chair. Just bringing attention to any obviously pleasant sensations. And again, if nothing is obviously pleasant, just let the attention be with whichever sensations are most obvious to you. So again, with an attitude of curiosity and a 'beginner's mind' I invite you to just rest the attention with these sensations. Also notice your response to them. Do you feel any attraction to the experience? You may not, and that's fine. But the point here is to begin to notice our reaction to our experience as much as the experience itself (in this case a pleasant one).

This basic process can be applied to psychological events in our life. Thoughts, desires, fears, memories, etc. We're often drawn toward pleasant ones and try to avoid the unpleasant. Through this simple practice, we've started to learn a skill that can be useful in helping us to cope with more challenging experiences in our life; and to make

conscious choices about how to respond.

As we conclude this practice, I invite you to thank yourself for taking the time to practice this exercise. And with a sense of acceptance of whatever was experienced in this practice, gently open your eyes and come back into the room.

Break into pairs

- So how did we find this?
- What was it like to “be with” both pleasant and unpleasant experience?

Group review

- How did this compare with the breathing exercise?
- What was it like to notice pleasant and unpleasant sensations?

Key learning points:

- As humans, we have a tendency to avoid unpleasant experiences and seek pleasant ones
- Mindfulness enables us to have greater choice about how we respond to both pleasant and unpleasant experiences

Re-cap of session + preparing for home practice

Home practice:

SHOW SLIDES

1. Formal mindfulness practice: Sitting breath or pleasant / unpleasant experiences practice (once per day). Identify times of the day you can realistically complete this practice.
2. Informal practice: doing a routine activity mindfully.
3. Informal mindfulness practice: Identify 1 stressful issue and practice, noticing a) what thoughts / feelings show up and b) the way you respond, and how well this serves you (p. 9).

Setting up environmental cues (stickers, post-its, diary notes, etc.).

Mindful check-in

Brief guided sitting mindfulness practice to close (optional)

Table E2**MBI Protocol: Session 2**

Description
SESSION 1
Welcome - Session Overview (SHOW SLIDE) - Today we are going to look more deeply at the stress response and how mindfulness can help us with this - We are also going to look more deeply into thoughts and how we can relate to them more effectively; and perspective taking. - - But first, let's try a practice...
Introduction to the STOP exercise SLIDE Just like a page of writing would make no sense without punctuation marks, so our lives can often feel non-stop and at times lose their sense of clarity or purpose. One activity runs into the next and there is no space. We end up feeling tired and unfocused. We're now going to practice a short "mindful punctuation mark" that can help to break up our day and create a sense of space and purpose between activities. It's called the STOP exercise. 1. Stop. 2. Take a breath. 3. Observe. 4. Proceed. We can use this at home, university or work, and just see where it is useful. It may be before driving, before going to sleep, or before a meal. During the remainder of the course, we'll practice STOPs at different points to end and begin sessions. Key learning points: - The STOP exercise is useful for calming and focusing the mind either between activities or when facing something challenging
Review of home practice Discuss in pairs: 1. Formal and informal mindfulness practice, and 2. enablers / barriers to practice <i>Refer to your practice log to identify key barriers and enablers. Perhaps make some notes now, if you forgot to do this during the past fortnight.</i>

Show SLIDE

Then larger group review.

- Who practiced MP3s everyday, 3-5 times, 0-3 times?
- What were the barriers to practice? Brainstorm...
- What was it like to do a routine activity mindfully?
- What were the barriers to doing this? What was it like to do this??

Fill in one enabler to formal and informal (routine) practice into workbook

- On p. 5 of your workbook.
- We'll come back to stressful events later on in the session
- Brief discussion of chosen enablers (only if time).

Key learning points:

- Clarification of what is working and what is not in participants' mindfulness practice
- Learning from peers' experiences with their practice
- Identifying strategies / approaches to enhance individuals' practice going forward

Recap of Session 1

- -Mindfulness diagram (three-fold definition of mindfulness)
- -Attitudes of mindfulness
- -Mind wandering (puppy analogy)

Now we are going to explore formal mindfulness practice a little further...

Exploring formal mindfulness with the body scan

Last session, we did a formal mindfulness practice, where we noticed the breathing. Today, we are going to extend that practice and spend time noticing different parts of the body (including the breathing). We call this the body scan.

The body is a handy object of mindfulness practice, as its sensations are very immediate to us. But really, we could choose any object for our practice. Sounds, a physical object, etc.

We're also going to notice the mind and when it gets entangled in thoughts and feelings, and what it's like to accept them and disentangle from them... This is a really key part of the practice. As we do this, we're not trying to change our thoughts or fight with them. When they come, they come; we're just noticing. When they go, they go; we're just noticing...

Body scan

Start by sitting comfortably with your eyes either gently closed or half open, with a soft gaze.

Just notice your body, sitting here. Now I'd invite you to bring your attention to your feet. Notice the pressure of your feet against the floor. Notice the sensations of the shoes and socks against the feet. How is the temperature? Are some parts warmer

than others? Like a curious scientist, noticing the different sensations in the feet.

Next, shift the spotlight of your attention to your lower legs and ankles. Are there any obvious sensations there? Maybe tightness; maybe warmth... Some sensations may be pleasant. Others may be unpleasant. Just noticing both, as best you can.

Next, I invite you to bring the attention to your knees. What do you notice there? Notice any obvious (or perhaps less obvious) sensations...

From there, bringing the attention up to your upper legs. Any obvious sensations there...

As we do this, the mind will be wandering. When we notice we've gone off, just notice where the mind has wandered too. If it's something that grabs your attention, like a distracting sound or bodily sensation, just notice it... Then when it is no longer holding your attention, gently bring yourself back to, in this case, the upper legs.

Now bring the attention up to the hips and groin area. Not worrying if there are no strong sensations... Whatever you notice – however strong – is fine.

Now bringing your attention up to the lower back. You may notice some tightness there. Noticing the different muscles supporting the torso.

And from there, moving to the stomach. You may notice emptiness or fullness. The movement of the belly with each breath...

Again, not worrying if the mind wanders off. Just noticing where it's gone, not trying to engage with or stop the thought. Just acknowledge the thought or distraction, and when you're ready, gently guiding your attention back.

Now from the stomach, moving to the upper back and shoulders. You may notice tightness there... Or not...

Next, moving the spotlight of your attention to your upper arms and elbows....

And now the lower arms...

Hand and fingers... What's the temperature like in the fingers? Notice any sensations of touch against the lap or other fingers...

Now bringing the attention up to the back of the neck. The base of the skull... The ears... Up over the back of the head to the top of the head.... Down to the face... The cheeks... The eyes and eye sockets... The mouth and tongue...

And noticing the breathing... The rising and falling of the diaphragm...

Now expanding awareness to include the whole body. From head to toe... Being present...

And when you're ready, gently bringing this practice to a close. Letting the eyes open.

Whole group review and discussion

- What was it like to shift your focus so acutely on one part of the body after

another?

- What was it like to not resist or fight with thoughts & distractions?

Key learning points:

- Many of the ways we generally try to handle our mind and its thoughts are not very effective, and can even make our situation worse
- The key is mindfully accepting the mind's thoughts and gently directing our attention to where we wish it to be

BREAK

Noticing stress as sensations in the body plus thoughts

Introduction

Last session, we were introduced to the human tendency to move toward pleasant and away from unpleasant experiences.

SHOW SLIDE

Over the past 2 weeks, we have practiced noticing our moves toward and away in response to stress and unpleasant experiences, and how well these served us. We are now going to briefly review this.

- In pairs, discuss your response to daily stressors, including what it was like to respond mindfully and enablers and barriers to mindful responding.

Today, we are going to delve into this a bit further. We are in particular going to explore unpleasant sensations and our tendency to move away from these (and perhaps lunge for a pleasant experience to compensate), and how well these things serve us.

No-one likes unpleasant feelings. Our natural tendency is to move away from them. Just like putting your hand on a hot-plate. We want to move away. But with emotions and thoughts, we cannot do this. We have very little control over when they come and when they go. We carry them around with us. So trying to block them out or get rid of them isn't a very smart strategy.

SHOW SLIDE

One way of looking at unpleasant experiences is as a combination of physical sensations and thoughts. We also talk about emotions, but these can be viewed as being a combination of an (often involuntary) bodily sensation and a series of thoughts.

By coming to experience stress as just a combination of physical sensations and thoughts, it can be less threatening for us. We can learn to be OK with unpleasant feelings. We may find that by relating to stress in this way, our experience of stress changes.

Any questions on this?

Now, we're going to try an exercise where we reflect on a recent stressful event and

try to notice how this stress shows up in our body and in our thoughts. We're going to relate to our stress in a new way. If you'd prefer not to recall a stressful event, you can recall an event that had a positive impact on you, and that is fine as well.

Body chart and stress recall

Draw an image of yourself on page 2 of your hand-out. We'll identify areas in our body where stress shows up for you.

To start with I'd invite you to sit comfortably in the chair and close your eyes, as this may make the exercise easier for you.

Next, I'd ask you to recall a recent stressful event. If you'd prefer not to recall a stressful event, you can recall an event that had a positive impact on you, and that is fine as well. But if you're comfortable recalling a recent stressful event, I'd invite you to choose one that holds some emotional significance for you; that impacted you in some way.

I invite you to go to that situation in your mind. What happened? Where were you? What was your role in the event? Who else was there? Run through the event or situation in your mind... How did you respond? How did this event make you feel?

What were you thinking at the time? What thoughts were running through your head?

Now I invite you to turn your attention to your body. Where in the body do you notice this stress showing up now? It may be a tightness in the throat, butterflies in the stomach, tension in the chest or head. Just notice where in the body the stress shows up.

Then I invite you to shade in these areas on the figure you've drawn.

Next, I'd ask you to write down (as speech bubbles) the things you were thinking as you experienced this situation.

Now briefly look at what you've written and drawn on the page. Also you might notice any thoughts or commentary coming to mind now. Just noticing that, as best you can.... Not trying to stop the thoughts or change them.

OK, great, now just coming back into the room...

Review in pairs

This was an exercise in which we tried a different way of relating to a stressful (or perhaps positive) experience. In pairs, I'd invite you to discuss:

1. What it was like to write down thoughts and notice body sensations?
2. Whether the event feels less or more threatening (or positive), following the exercise?

Review in whole group

- What was it like to notice body sensations?
- What was it like to write down thoughts?
- What effect did the exercise have on our experience of stress?

Guided practice noticing stress as sensations and thoughts

OK, so now we're going to try a brief mindfulness practice where we just notice our body sensations and thoughts...

So again I'd invite you to sit comfortably with your eyes closed.

And again, I invite you to recall a recent stressful event. It may be the same event you recalled in the previous exercise, or it may be something different; either is fine. And if you'd prefer not to recall a stressful event, you can recall a recent pleasurable event.

And I'd ask you to recall the details of your chosen situation: when it happened; who was there; what they did; what they said; what you did; how the situation ended (if it did); and how the situation made you feel.

And once again, I'd invite you to notice the parts of your body where you feel sensations associated with this event. Perhaps tightness in the throat; butterflies in the stomach; tension in the head or face; warmth in the belly or arms. Just notice wherever you feel obvious sensations in the body.

And notice of these sensations, which one is most strong for you.

Now I'd invite you to gently bring your attention to this sensation. Not trying to change it or make it go away, just bringing your awareness to this sensation, like a curious scientist studying this for the first time. What is it like to notice this sensation? Where is it strongest? Maybe notice the edges of the sensation.... Maybe softening into the middle of the sensation. Is the sensation changing in intensity? Is it moving within the body at all?

Not worrying when judgment comes in. They will; that's the mind's job... Letting them come and pass by as they want to...

With an attitude of kindness and acceptance, gently exploring this sensation...

Letting the breathing be natural... With each breath, bringing the attention to this part of your body...

And if the sensation disappears, that's fine. Just letting the attention rest with the part of the body where you last felt it.

And now bringing this exercise to an end, and gently opening the eyes...

Whole Group Review

- How did we find this exercise?
- What was it like to explore the sensation like a curious scientist?
- Did we notice thoughts and judgments? What was it like to let them come and go as they want to and not engage them?
- How helpful might an exercise like this be in our daily lives?

Home practice

Turn to page 5 and at the top of the page, write a description of an ongoing stressful

event that you would like to bring mindfulness to.

Guided tai-chi.

Now we're going to try a moving mindfulness practice. We spend lots of time moving, walking, carrying, cleaning, lifting, etc. We can learn to bring mindfulness to the different activities of our life. We'll now try a 'formal' moving mindfulness practice, but hopefully you'll see how it can be generalised to other parts of your life.

Noticing the body standing. The pressure of the feet on the floor. Touch of clothes on the skin. Movement of air across the face and hands...

Standing shoulder width apart, knees slightly bent, breathing naturally.

Guide participants through the "Hand strokes the clouds" exercise

Noticing the weight shift...

Tension and relaxation...

Breathing in and out...

Watching the movements of the body as a whole...

SLIDE

This applies to any activity we do where we're moving / using the body.

Informal mindfulness practice: selecting a routine activity

Think of one routine activity you wish to bring mindfulness to over the next 3 weeks. It may be the same activity or a new one. Write it into your workbook.

Perspective taking:

SHOW SLIDE –DANCE FLOOR

One metaphor is being on a **dance floor** (say at a party or wedding), versus viewing the dance from a balcony. On the dance floor, we're dancing. On the balcony, we're watching the dance; we're still a part of it, but we're not 'in' it. We hear and see the dance, but we're not dancing. The dance hasn't changed, but our view of the dance has.

Any questions about this?

As we learn mindfulness, we may notice thoughts, feelings and sensations that we have never been aware of until now. We can notice these things as they show up, and also notice them as they weaken and disappear. And in all of this, there is something which notices these movements; but isn't affected by them. You might think of this as being the perspective from which we view thoughts, feelings and sensations.

Connecting with this sense of perspective can be helpful. When all is changing and shifting around us, this perspective or vantage point doesn't change. It is sometimes referred to as an awareness or an observing self. Acknowledging this can be very helpful in mindfulness practice.

Guided mindfulness of sensations, thoughts and feelings + review

We're now going to try and exercise where we notice sensations, thoughts and emotions just coming and passing. A bit like sitting on the bank of a river, watching our experiences float by. This can be very helpful in connecting with the observer self.

I'd invite you to begin by sitting comfortably in the chair. Spine balanced and upright, to help you stay awake. You can have the eyes closed or if you'd prefer, half open with a soft gaze.

Start by being aware of the body and mind, and whatever is being carried within you – perhaps feelings or thoughts from the previous sessions, or whatever has been going on for you recently.

Simply allow and acknowledge whatever is within you and just let it be, without any form of analysis or evaluation.

Gradually shift your attention to you breathing - breathing normally and naturally...

As you breathe in, be aware of breathing in; as you breathe out, be aware of breathing out...

Just being aware of breathing and focusing awareness on either the tip of the nose or the abdomen. If focusing on the tip of the nose, feel the touch of air as you breathe in and out. If focusing on the abdomen, feeling the belly expanding with each inhalation and contracting with each exhalation....

Just living life one inhalation and exhalation at a time. Breathing in, breathing out, watching each breath appear... and disappear.

Now gently withdraw attention from the breath and bring it to the world of sensations in the body. Observing without any aversion or grasping, just acknowledging the many different sensations as they change from moment to moment... and let them be...

There may be areas of tightness or pain that call your attention. If that's the case, just acknowledge these, perhaps bringing your attention to them... With an attitude of acceptance and kindness. Not trying to change your experience in any way...

Now turn your attention to listening, observing all sounds without preference for or aversion from anything particular.

Notice obvious as well as more distant, subtle sounds. Just allowing them to come... and pass.

Now gently shift attention from awareness of sounds to awareness of the mind – to thoughts and emotions. Just acknowledging any thoughts or feelings that may be present right now. Not engaging with any particular thought or feeling, just noticing them coming.... and passing on when they want to. Like lying in a field, watching the clouds above drift past...

You may find yourself completely caught up in a thought. When you notice this, don't judge or berate yourself. Simply acknowledge that even this awareness is a way of returning to the present moment.

If you notice any mental commentary about this practice, just notice that too; include

this in your awareness...

Very gently now, withdraw awareness from mental events and bring your attention to the present moment itself as the primary object of attention.

Choiceless awareness invites you to become mindful of whatever is arising in each present moment. Whether sensations of touch, sound or smell, or thoughts and emotions.

Just sit back and observe whatever is arising in the moment... a bit like climbing up to the balcony, watching the dance below you. There are all the dancers, coming and going as they want to (which are your thoughts, feelings and sensations)... and then there is you: the watcher.

Just watching the unfolding of experience... Moment by moment.

As we bring this practice to an end, thank yourself for taking the time to practice in this way. Then gently opening the eyes.

SHOW SLIDE

Whole group review (5 mins)

- What was it like to observe thoughts and feelings as well as the physical sensations?
- What was it like to just watch our experience?

Key learning

- Noticing thoughts and emotions can be liberating and gives us space to choose our response

Home practice:

SHOW SLIDES

1. Formal mindfulness practice: Sitting breath or pleasant / unpleasant experiences practice (once per day, using MP3s).
2. Informal mindfulness practice: doing a routine activity mindfully.
3. Ongoing stressful issue: Choose one ongoing stressful issue to practice bringing mindful awareness to. Noticing the sensations in your body; noticing what it's like to respond mindfully (e.g., practicing the STOP)

Enablers to practice

Hand-out (5 mins):

- List your main enablers to both the formal and informal practices.
- Brainstorm and list what steps you might take to build your enablers (using stickers, diary reminders, etc.).

Table E3**MBI Protocol: Session 3**

Workshop 3
Welcome Today we're going to take stock of where we are at and plan for how we wish to take mindfulness practice forward in our lives. We'll also look at self-compassion as a tool to help deal with difficult experiences. Practice buddies One way that can help with this is via a buddy system. Having a buddy can help with motivation, support and accountability in your practice. But some people may prefer to practice alone, which is fine too. There's an app, which we'll introduce you to shortly, which allows you to share your practices and support on-another. - Hands up who would be interested in having a practice buddy. - Hands up who would be interested in the practice app (it's called Headspace – some people might already have it) For those interested in partnering up, find a buddy now. Maybe someone you know or work with. Or someone you've got to know over the course. And if you'd rather not buddy up, that's completely fine of course, too. If some people want to form a group of 3, that's fine too. But we'd suggest maximum group size of 3, otherwise it can become a bit unwieldy.
Summary slide: Mindfulness home practice - Formal practice - Informal practice - Mindfulness of a stressful event
Discussion – Formal & informal home practice Formal practice Written reflection (p. 2) and discussion in pairs (with your buddy): what the <i>barriers and enablers</i> were to doing formal practice. Focus on: 1. Getting into the chair (planning, environmental, competing priorities, motivation etc.) 2. Once you are in the chair (motivation, distractions, thoughts / emotions, tiredness, etc.) Group discussion • Sharing comments / questions from the group. Review – formal practice - Who found getting into the chair the main barrier? Who found practicing once in the chair the major challenge?

- What were the main kinds of barriers to practice? What were some enablers that worked?

Review – informal practice (routine activity)

Discussion in **pairs (with your buddy)**: what the *barriers and enablers* were to doing informal practice.

Group discussion

- Sharing comments / questions from the group on enablers and barriers to mindfulness practice.

Choose another informal mindfulness practice

- In workbook, write down a routine / daily activity to wish to perform mindfully going forward
- Get a few volunteers to say their chosen activity...
- What did you choose and why?

BREAK

Short STOP Practice

- Energy-changer after the break.

Mindfulness and stress - recap

Last session, we looked at a few dimensions of how mindfulness can help us deal with challenging situations. Here's a recap.

SHOW SLIDES...

- Stress can be experienced as body-sensations and thoughts.
- Noticing and accepting the unpleasant bodily sensations that come with stress. Becoming less reactive to and more accepting of these...
- Analogy of the dance-floor – perspective-taking
- The STOP exercise

Written reflection on the one on-going stressful activity you identified for mindfulness practice last session.

- What challenging situation did I choose
- Describe one time you *responded mindfully* to this situation and what it was like to do this, plus the consequences; and
- One time you *responded unmindfully* and what it was like to do this, plus the consequences.

Paired discussion of the above.

Group discussion

- What was it *like* to respond unmindfully; what was it like to respond mindfully?

- What were the consequences of both approaches?
- When you did not respond mindfully, what might have been getting in the way? (i.e., thoughts, feelings, etc.).

On page 4, identify **ANOTHER ongoing stressor**. Reflect on what a mindful response would look like in this situation. **Write it down**. Describe what an outsider would 'see' if they saw you responding mindfully in relation to this issue.

Stress audit review (if time)

Now we are going to generalise our findings over the past 3 weeks, to our experiences over the whole course. We're going to come back to our overall stress levels (or levels of engagement / focus, if stress is less of an issue for you).

Rate your stress again on p. 2 from Session 1 workbook.

- Reflect on your rating and why it changed the way it did over the course (or didn't).
- Hands up who thinks their stress levels went down over the training? Who thinks it went up?
- If it went down for you, what do you attribute this to? Acceptance? Stepping onto the balcony?? If there was ONE main cause, what would it be?

Key learning points:

- Insight into how mindful vs. unmindful responses to stressful or challenging experiences can make a big difference to the outcome and our sense of well-being
- Clarifying potential ongoing barriers and enablers to responding mindfully to challenging situations
- Developing insights into the impacts of mindfulness on issues identified at the beginning of the course as being stressful

Mindfulness and self-compassion

Self-compassion has been described as having three core elements (Neff, 2003):

1. Noticing suffering in oneself;
2. Being kind to oneself in the presence of suffering;
3. Knowing that suffering is a part of being human.

Self-compassion meditation exercise

Start by sitting comfortably in the chair. If you're happy to, gently let the eyes close. Relax.

In this exercise, we're going to recall a potentially difficult thought or situation, and use this in the exercise.

I'd like you to think about something you commonly tell yourself – a sentence perhaps – and just turn your attention to it. For example, "I'm not taking enough responsibility" is

one that comes up often for me and causes me trouble / stress.

Think about the situations where this sentence shows up for you.

Now notice what shows up in your body as you do this.

Then describe the sensations in the body that come with the emotion (e.g., tight, tingling, cold, hot). Just describe the sensations in your mind.

Now, see if you can notice this sensation in the body, and try and soften around it. See if you can relax a bit of the feeling of tightness or pressure. Soften around the edges of the emotion in the body.

Then recognising how difficult it is to be feeling like this. All of us, very often, feel painful emotions. Feeling difficult emotions is a natural part of being a human. There's nothing wrong with it at all. It's perfectly natural. So comfort yourself at how it is to be feeling this. It's OK; it's part of our common human experience.

Then see if you can allow the sensation of the emotion to be there. You're safe right now, in this moment. There's no danger; your body is experiencing an emotion, that's all. See if you can just allow the feeling to be there, as it is.

Don't try to make it go away... But don't try and hold onto it if it is fading...

Just allowing these emotions and sensations to stay as long as they want to, and go whenever they want to.

You may notice the sensations softening a bit...

Now I'd like you to broaden your awareness, to take in the whole body. From head to toe... all the movement... breathing. Just let your awareness rest in your physical presence – with a sense of kindness and acceptance.

Then, when you're ready, gently open your eyes and slowly turn your senses out.

Review

- Who found it easy to think of a negative sentence?
- Who noticed a sensation in the body?
- What was it like to bring kindness to our experience?

Research evidence

Self-compassion has been associated with:

- Lower anxiety, stress, depression and shame
- Increased life satisfaction, happiness, gratitude & optimism
- Better romantic relationships...
- More motivation to learn and grow
- More personal accountability and responsibility
- More forgiveness of others and the ability to take their perspectives
- Less carer burnout in care-giving roles (e.g., teaching, nursing, etc.).

By being kind to ourselves, we're in a much better position to respond to the needs of

others.

Key learning

- Often, we are our own harshest critic
- Self-compassion brings kindness and self-acceptance to our experience, however difficult

Going forward post-course

Show SLIDES with mindfulness groups, books, courses and apps.

- Working with your buddy.
- Joining a meditation group.
- Ulysses contract?

NB: Show promo **videos** for Headspace, Smiling Mind and Mindfulness App.

Complete reflection & commitment page & **discuss** with buddy / partner.

Any questions??

Key learning points:

- Clarification of ongoing practice priorities and commitment to realistic and time-bound goals

Final Comments

Everyone to say briefly what they got from the course... In 2 sentences. If there was ONE thing that really stands out to you, what is it? What has changed for you?

OR: Do this in groups of 3-4 (not your buddies – someone new) for 5 mins... Then hear a few responses from the whole group...

Administration

- Reminder about the post-course survey and daily check-ins...
- **Final brief practice (if time)**

Table E4**ACT Protocol: Session 1**

Content and Materials
1. Welcome, introduce trainers – background and expertise
Introductions to training: format and content Describe the Basic Information about, and Format and Content of the Training Research - three online surveys and 4 blocks of daily check-in (SMS) - Daily check-in for research but helpful for course. Training - three sessions - home practice - Workbook Format - informal, yet we are following a protocol - Instruction, exercises, discussions and questions Ground rules - no obligation to share - important that information remains confidential - SLIDE Research evidence (briefly) <i>Google scholar search results in 19,700 references from 2012 to present (compared with 1,720 from 1990-1995)</i>
Participant introductions /Expectations for training SLIDE • Name, work/study • Why you want to do this course Facilitators Reinforce - Ask if others relate to content shared - Start to acknowledge experience with ACT language (e.g. notice)
Introducing the Two Skills Diagram SLIDE: Two skills diagram

- Brief explanation of skills slide; mindfulness and values based action
- Brief explanation of present moment awareness, noticing and untangling from thoughts and instead focusing on values (what is important to you).
- This diagram is an overview of the entire training
- Combining them has consistently shown to improve well being and behavioural effectiveness
- Go through in more detail as we progress.

Introduction to Mindfulness

- **SLIDE** Definition: highlight components of mindfulness – intention, attitude and attention
- Opposite of autopilot
- **SLIDE:** Paying attention to what? – Stage metaphor (all experience is like actors on a stage, what we see, hear, taste, touch and feel, along with internal experience. We can bring mindfulness to one of these things, like a spot light on the stage, or on lots of things like the house lights.
- We can pay attention mindfully to anything. We encourage to pay attention when it is important for us to do so.
- Gym metaphor (formal practice is like going to the gym, we can practice to strengthen our mindfulness muscles. We strengthen them so we can be mindful in daily life. So we can do formal practice and we can just be mindful in daily life.
- Ask for any questions?

Present moment awareness training

Start with some **basic mindfulness skills: present moment awareness**

- Ability to contact the present moment is fundamental to development of mindfulness and values based action

Sultana exercise (example script)

- Please join me in a mindful eating exercise. I'll guide you through this and we can discuss it after
- Please help yourself to one of the tiny food items in the bowl and let it sit on the palm of your hand

Transcript: The Raisin Exercise

Now what I would like you to do is focus on one of the objects and just imagine that you have never seen anything like it before. Imagine you have just dropped in from Mars this moment and you have never seen anything like it before in your life.

Throughout this exercise, all sorts of thoughts and feelings will arise. Let them come and go, and keep your attention on the exercise. If you realise that your attention has wandered, briefly note what distracted you, then bring your attention back to the sultana.

Take hold of the sultana. First look at it as if you're a curious scientist who has

never seen such a thing before. Notice the shape, the colour, the different shades of colour, the parts where light bounces off the surface, the contours, the pit where the stalk was attached.

Notice the weight of it in your hand and the feel of the skin against your fingers: its texture and temperature.

Raise it to your nose and smell it. Notice the aroma.

Raise it to your mouth and pause for a moment before biting into it. Bring your attention to what is happening inside your mouth: notice the salivation around your tongue and the urge to bite into it.

*Now slowly **bite it in half (keep the other half in your hand)**, noticing your teeth breaking through the skin and sinking into the flesh and the sound that makes, and the sensation of sweetness on your tongue. Notice your teeth meeting, and the feel of the sultana falling onto your tongue, and the urge to chew it and swallow it.*

Chew it slowly, noticing the taste and texture. Notice the movement of your jaws, the sound that chewing makes, the sensation of the flesh breaking down. Notice how your tongue shapes the food. Notice your urge to swallow – and as you do swallow, notice the movement in your throat, and the sound it makes.

And after you've swallowed, pause and notice the way the taste gradually disappears from your tongue. Notice your growing urge to eat the remaining half.

Now eat the rest of the sultana in the same way.

Discussion Sultana Exercise

SLIDE: Discussion

- discuss in pairs
- What did you notice about the sultana?
- What did you notice about your ability to pay attention?
- Where you able to notice your thoughts?
- What was the purpose of this exercise?

Groups discussion: *Would anyone like to share your experience?*

Key points

- Distinction between autopilot and present moment awareness
- a realisation of how **many** activities we perform with little consciousness
- enhancing present moment awareness can **transform** the experience of that activity
- Start to notice thoughts taking your attention

Select one routine activity for mindfulness

SLIDE: Select one routine activity they would be willing to perform with great

awareness over the week

- Write this down in the work book on page 3

SLIDE: suggestions of mindful activities

Ask for examples of chosen activity or discuss with partner

- - instructors should reinforce activities that are habitual and specific

BREAK (10 minutes)

Brief Body and Breath Awareness

- Link present moment awareness of the sultana to awareness of bodily sensations
- *E.g. Of course, you won't always have a raisin handy to bring yourself into the present, but you will always have your body and breath, we can bring the same qualities to our body.*
- Introduce the idea of a "formal" practice

TRANSCRIPT FOR BODY AND BREATH AWARENESS (example only)

Adopt an upright posture with back straight and dignified but not too rigid, spine infuse with energy. Close eyes or focus downward

Bring mindful attention to sensations in the feet and toes..... Notice any tingling or throbbing in your feet or toes;noticing whether different part of your feet feel warm or colder than other parts; noticing the sensations of the feet encased in your shoes; exploring any areas of pressure in the soles of the feet where they contact floor.... Just noticing any sensations, without judgement ...

Now put the spotlight of your attention to your hands and fingers. Just noticing without judgment whatever sensations are there at this moment to be noticed. Exploring with gentle curiosity and interest any tingling or throbbing in the hands or fingers; noticing the position and temperature of your hands and fingers Notice how easy it is to drift away into thoughts and lose awareness of the current physical sensations. If your mind distracts you with stories or thoughts, just notice those thoughts and gently bring attention back to your feet. If other things distract you, just notice the distraction, and gently bring attention back to your feet

Shift attention to your stomach noting the sensations and movement in the tummy with each breath. etc.

Breathing

Bring your attention to your breathing. Follow the air as it comes in through your nostrils and goes down to the bottom of your lungs. Then follow it as it goes back out again. Follow the air, as if you're riding the waves of your breathing. Notice the air moving in and out of your nostrils ... how it's slightly warmer as it comes out, and cooler as it goes in. Notice the gentle rise and fall of your rib cage. Notice the gentle rise & fall of your abdomen (belly)

Fix your attention on one of these areas, whichever you prefer: on the breath moving in and out of the nostrils, on the rising & falling of the ribcage, or the rising & falling of the abdomen (belly). Keep your attention on this spot, noticing the movement - in and out – of the breath Watching one breath at a time.

Whatever feelings, urges or sensations arise, whether pleasant or unpleasant, gently acknowledge them - as if nodding your head at people passing by you on the street. Gently acknowledge their presence, and let them be. Allow them to come & go as they please, and keep your attention on the breath.

Whatever thoughts, images, or memories arise, whether comfortable or uncomfortable, simply acknowledge them and allow them to be. Let them come & go as they please, and keep your attention on the breath.

From time to time, your attention will become distracted by thoughts or feelings. Each time this happens, notice what distracted you, then bring your attention back to the breath. No matter how often your attention “wanders off” - whether a hundred times, or a thousand - your aim is simply to note what distracted you, and bring your attention back to the breath.

No matter how often your attention wanders, gently acknowledge it, note what distracted you, and gently bring your attention back to the breath.

If you find a sound or body sensation becomes so strong that you can’t stay with the breath, because it pulls you away so strongly, then let your attention to that sound or body sensations. Listen to it or feel it, until it no longer holds your attention or stops. At that point go back to the breathing. The simplicity of your anchor, the breath.

We’ll try this for 2 minutes in silence.

Bring your attention back to your whole body.

When you are ready, bring yourself back to the room and open your eyes

Body and Breath group discussion

Back in Group; Trainer asks “What did you notice during this brief exercise?”

Summarise points (if not already noted after previous exercise)

- Mindfulness practice be a formal or informal practice; formal is more powerful in developing psychological muscles
- Thoughts and feelings can also be observed (do more of that next session) ok
- The mind wanders and that is normal

SLIDE: a word on the wandering mind

- A wandering mind is a little like a dog on a walk
- It wanders off and that is normal and can be very useful.
- But if left unchecked, it can cause trouble for us.
- Worry, rumination ... and spending our time trying to get rid of these!
- Mindfulness practice is about noticing the mind’s movements and consciously directing our attention to where we would like it to be; it’s not about trying to

stop thoughts
Part 2: Values
Two skills diagram: Values SLIDE 2 skills diagram - you've taken first step to practising strengthening our present moment awareness - you've started to notice your thoughts a little as well - Now we move on to the second part of the content: values - Values are goals with a difference
Introduction to values Introduce a practical definition of values from an ACT perspective What do we mean by values? SLIDE: Definitions from slide - The personal strengths or qualities a person most wants to express in his or her life and daily patterns of action - Values are our heart's deepest desires for the way we want to interact with and relate to the world, other people, and ourselves. They are leading principles that can guide us and motivate us as we move through life - Values can be guides to daily actions but also reignite our sense of purpose, meaning, motivation and effectiveness What we can do - Qualities we can act on - They are not feelings because we often have little control over our feelings. I might feel upset with my partner but I can still choose to act in a loving way. - They are not what we want from others. I might desire to be loved, but I can't control this or act upon it directly.
Values are not goals SLIDE: Compass Metaphor Choosing a direction like west Goals are like landmarks to aim for but I can never reach West - As long as I head west, each step has meaning. I take this step and it is meaningful and this one. Do you see what I am getting at? Point: they are a guide for our direction, decisions SLIDE: Why values - Infuses daily life with a sense of purpose, life direction and meaning

- Guides life goals and daily actions
- Help to navigate us through challenging times and provide guidance for important decisions
- Being guided by values means our actions will be less influenced by our sometimes “unhelpful” thoughts, feelings, moods and habits

Values clarification

This exercise is to provide you with an introduction to clarifying your values

SLIDE: Defining values:

- It is helpful to ask yourself these questions (from slide) e.g. What is truly important to me
- Or sometimes to look at specific domains – e.g. health, relationships etc.

Values clarification – Card sorting task

SLIDE Card sort

- Provide each person with the cards.
- *Divide the cards into three piles and identified top 5 values – write them on the booklet on page 6*
- For those who finish early, talk about your values with a partner

Group discussion

- Would anyone care to share their thoughts on this exercise?
- Was this energising or slightly confronting?
- Did you use domain focus or general focus for choosing values?

Values based actions

We all have values and can make them clearer, but what is important is using them in our daily life: values based action.

- How can I manifest this value in my life?

SLIDE: Values based actions

1. How: Infusing an everyday action our values (making the mundane meaningful)
For example, instead of going through the motions, infuse the actions with values. Playing with children (boredom might arise, desire to do something else, frustration). However, we can choose to bring our parenting values to the play. (nurture, curiosity, presence, teaching).
2. What: Choosing an action based on values, rather than acting on autopilot (often this involves avoiding short-term discomfort)
3. I can choose to respond to my husband’s actions of not getting me a cup of tea by ignoring him for a day and ruminating, yelling at him or I can choose to act like the person I want to be in my relationship. That might be to be honest,

it might be to let it go, it might be to get him a tea next time; it might be to be assertive and let him know how I am feeling

A value such as appreciation of beauty can be expressed in 1. Doing mundane things such as putting out the washing or walking;

A value such as love of learning might help you to choose to talk to your tutor about a problem rather than following your automatic response to run away.

Values Personal Reflection

Values based actions

To help identified values based actions, select one of your values and look at the table on page 7

Note down some specific examples of value-consistent behaviours/ actions:

SLIDE: table from workbook (How I have expressed this value in past and ways I can express it in the future)

1. Examples of how you have already expressed this value in your recent actions - any specific behaviours/ actions you have engaged in that that have helped to bring this value to life?
2. Examples of how you'd like to express this value in your actions; any specific behaviours/ actions you would like to engage in that would help to bring this value to life?

Select one or two and write on page 8. These are what we will work on for home practice.

SLIDE: Home practice

Home practice 1: Values

Write at least one valued action to perform over the next week and record experience on sheet. The aim is:

1. to notice what it is like deliberately to take actions that are guided by a personal value
2. To become aware of any internal barriers that actually or almost interfere with values directed actions
3. *practice being mindful when you engage in these actions*

Record your experiences on the following page of this handout

Home Practice 2: Mindfulness – Practice mindfulness of breathing at least 3 times over the next two weeks - provide recordings on CD and website; identify one activity to do mindfully.

Record you experiences in the mindfulness diary.

Home Practice 3:

Also, do one routine thing, more mindfully (also record details on your sheet).

Record your experiences in the mindfulness diary

More you do the better**Environmental reminders**

How will you remember to do these things?

- We have some reminders here, e.g. silicon wristbands can remind you of your values-based actions or to take a mindful breath.
- Stickers can be placed at places or on phones to remind you of your practice.
- You can write your values on the dog tags
- Use sticky notes...
-

Demonstrating program rationale: Two pieces of paper technique**SLIDE: 2 skills diagrams**

Reiterate two skills - show how they are related

- Our daily actions and behavioural effectiveness are influenced by different things. On the one hand, we have our values.
- On the other hand, we have a whole bunch of internal stuff to contend with – our frequently changing thoughts, feelings, and moods that might show up at any moment. Often this has a strong influence on our behaviour
- We want to be more mindful of both our values and our internal stuff.
- If we can notice this coming up, we are more likely to be able to make choices in line with our values.

Anyone have any comments or questions about what this training is about?

Mindful Tree exercise

Small exercise to do any time during day to connect and ground yourself mindfully

SLIDE: Mindful Tree Practice

1. ROOTS: Stop

Ground yourself by pushing your feet into the ground and noticing this sensation.

2. TRUNK: Become aware.

Take a deep breath in. Notice the air flowing into your body and out again. Notice what you are experiencing in your body – your sensations, feelings and thoughts.

3. BRANCHES: To what matters.

Now you have some perspective, **do** what helps. Is it in keeping with my values and principles? What is best for me and most helpful for this situation?

Review

- Any questions or comments if time

Table E5**ACT Protocol: Session 2**

Content and materials
Mindfulness Practice Short mindfulness exercise: attending to body and breath
Welcome back Today we focus more on mindfulness of internal experience (thoughts and feelings) and how this can have improved values based action Preview of content <u>SLIDE: Today</u> What we will do: • Review home practice • Add a few mindfulness skills – thoughts and feelings • Introduce a way to bring it together more with Choice point
Home practice review (Mindfulness practices – Formal and Informal) <u>SLIDE: Home practice slide</u> - Just so I can gauge ... how many people managed to do practices 2 and 3 (1 was values and we look at that later) - Who found the informal easier/who found formal harder? <u>In pairs discuss</u> - Your experiences with practice; guided by questions on PP (Did you do the practice, discuss any observations) - If you come up with ideas on how to overcome barriers, jot them down on page 2 of your workbook. Group discussion: • Talk about barriers that stopped doing practice • Anything that helped do practice? • Did you find yourself being more mindful in daily life?
Exercise: daily mindfulness Choose another routine activity <u>SLIDE: Mindfulness in daily life</u> Exercise: Choose another routine activity else to practice over the next three weeks.
Mindfulness summary

SLIDE: Two skills diagram

- reiterating two skills

SLIDE: Mindfulness definition review**SLIDE: Summary of mindfulness**

- Why be mindful (to be more present in lives and untangle from psychological barriers to give us more choice in our lives)
- How to develop mindfulness _ formal, informal practices and applying it to daily life.

Passengers on the bus metaphor

Metaphor to help explain link between mindfulness and thoughts and feelings

SLIDE Cartoon of bus**Example transcript**

- It is like we are the drivers of the bus and you know which way you'd like to go; but we are not alone on the bus; We have various passengers, some pleasant and some not so pleasant. Some downright awful and critical and others who influence you more subtly.
- So as you drive along, you might choose to go in a new direction. And when that happens, some of the passengers might not be so happy.
- One might come up and yell in your ear "What do you think you're doing? It is dangerous that way, people will think you're crazy? You're not a good enough driver to take that route!"
- **(Illustrate fusion)** And sometimes you listen to that passenger and believe them and decide not to pull off in that direction. The passenger then goes and sits down (another might pipe up – What an idiot listening to that guy!)
- Then another one comes and just leans all over you and you feel hot and uncomfortable – another one says "You really can't go on feeling like this; wait until your stronger"
- **(challenge thoughts)** Next time the passenger comes, you might **argue** with them. "I'm not a failure; what about the other things I have done? "It doesn't mean you can do this? And you might get drawn into that argument; in the meantime, you need to pull over (or you're not watching the road). You might defeat them this way, put them in their place, but they come back and you get tired and pull over
- **Block them out** – Another thing you try is to block them out. Pretend you can't hear them (go - la, la, la, la) – if you don't hear what they say, they can't hurt you. But your tongue gets tired and you are exhausted with the battle.

(acceptance) another way to respond may be acceptance. Be aware that you have these passengers on the bus – because you're human – and just let them do their thing. Notice them and keep driving.

Aims

- The person driving bus is to some extent distinct from thoughts and feelings

- Some passengers can have an unhelpful influence on the drivers behaviour
- Struggling to remove unhelpful passengers is unlikely to be successful
- The passengers often have a subtle influence over the driver's actions
- We can keep moving in valued directions despite the thoughts and feelings

SLIDE Summary of points

- Mindfulness allows a new perspective on unhelpful thoughts
- It is not about getting rid of them – but noticing them so we can respond more skillfully
- As soon as I am mindful of my passengers, and see them as passengers, I can treat them differently
- New perspective on thoughts

The Nature of Thoughts

Introduction to defusion: Why is this happening?

We want to be like the guy who keeps driving. But why is this happening to us? Are we crazy?

SLIDE: The judgment machine

- *Aim is to communicate that the human mind is very good at comparing, judging, evaluating, criticising, problem solving and anticipating things will go wrong.*
- The human mind; a wonderful tool evolved to keep us out of danger (so we are constantly predicting it and looking out for what is going wrong) - lots of it is negative (that is why we are told to think positive)
- Problem is we get tangled up in its output and are actions are controlled by it and forget we are a human experiencing thought; FUSED with thoughts
- Also avoid them

SLIDE: Ways we deal with thoughts

- **Be drawn into and tangled up with them** (believe them, pull over with bus, join them)
- **Avoid them:** sometimes helpful, takes a lot of energy and often ways of avoiding thought take us away from our values and goals (e.g. drinking or eating to avoid uncomfortable feelings) – e.g. don't think about an elephant!
- **Challenge/fight them** – Can also be helpful sometimes but also takes energy and there can be a tendency to be drawn into the content
- The mindful way is to just **to notice** thought for what it is and choose not to get tangled up in it

Introduction to mindfulness of thoughts

Let's do an exercise to help us start to look more objectively at our thoughts, by being mindful of our thoughts...

Leaves on a stream practice – viewing thoughts as thoughts
Explanation

- This exercise asks you to watch your thoughts for a few minutes
- Take the stance of a curious and dispassionate observed noticing passing thoughts
- Ask you to imagine a stream with leaves floating down it
- When you notice a thought arise, I want you to see if you can observe it and put it on a leaf and watch it go by
- Sometimes you will be sucked into the content of your thoughts and lose this perspective of being an observer; This will be normal

SLIDE: LEAF

Instruction

- Close eyes, picture a stream. The stream has trees around it leaves can be seen floating by on the stream
- When you notice thought arise, in your mind, put it on a leaf and watch it drift off
- Some will appear as words, some might be images, other might be vague impressions; no matter what it is, put it on a leaf and watch it drift off
- No need to control your thoughts, just witness them as thoughts
- You might find yourself thinking – I have no thoughts, then put that one on a leaf.
- Sometimes you'll get sucked into the content of your thinking and lose the observer perspective. When that happens, just take a second to acknowledge it and notice the next thought that arises.
- practice being aware of the flow of your minds activity...
- You may notice thoughts about this exercise "I can't do this", and that is just then next thing to put on the leaf. ...

You might drift off into your thoughts regularly, that is okay. As soon as you are aware of this, reassume the role of the observer ...

Discussion in pairs or groups of three

Group discussion point

- Might be difficult to identify thoughts, but when they are strong and demanding in your life they won't be so difficult to notice
- This is an exercise designed to show that you can notice thoughts arise and let them go.

Personal thought barriers

Going to look at some of your thought barriers now, particularly those that push you around or get in the way of the person you would like to be, or your goals.

SLIDE: common thought barriers

- e.g. a "should"; versions of "I'm not good enough"

Exercise

- Write down some of your most unhelpful thoughts – those that get in the way of values based actions (on page 6)
- We will then use these to practice some defusion techniques

Defusion introduction and practice

Some techniques on how to defuse from unhelpful thoughts

Choose a thought that elicits a strong emotion and your fuse with.

- Stay away from content that is very distressing, related to trauma.

Defusion techniques – I’m having the thought that

- Focus for a moment on your most unhelpful thought and notice its impact; if one is very painful, you might want to start with one that is not so painful.
- Put the thought into a short sentence: For example, “I am fat and ugly”; “I can’t do anything right”, “This is a stupid course”
- Say it over and over and really buy into it; notice how you feel

SLIDE: Defusion/untangling from thoughts

- Now say “I’m having the thought that “
- Now say “I notice I’m having the thought that ... “
- Now notice if it has the same impact on your feelings – the same draw ...

Discussion

- What was your experience of your thoughts before and after?
- Main thing is to learn to see thoughts as thoughts
- Check if people feel more distance from thoughts

Provide another example of defusion – e.g. “singing thoughts” as defusion and using humor to defuse.

Table E6**ACT Protocol: Session 3**

Content and materials
Opening mindfulness practice (breath then notice three things feel (sensations), hear and see)
<u>Workshop content</u> <u>SLIDE: Today</u> • Focus is on what you have been doing and how you can continue • Review of practice in past weeks • Little deeper into mindfulness (resilient self) • Look at how goals relate to values -
<u>Summary and review of skills</u> <u>SLIDE: Two skills diagram</u> - review skills on diagram and how we have used them - relation between mindfulness and values <u>SLIDE: summary of mindfulness practices</u> 1. Formal practice – Builds mindfulness muscle, habitual time out 2. Doing daily activities mindfully (practice and opportunity to be present in life, infuse daily activities with values) 3. Mindful check in – choice point, mindful tree (time out, centering) <u>SLIDE: Defusion and Acceptance Review</u> - Brief review of defusion and acceptance - Summarise acceptance - passive vs. active (putting up with vs. acceptance)

Review of home practice

Home practice discussion

- In pairs discuss home practice Mindfulness, defusion and acceptance skills.
- Mindfulness home practice
- Choice point use and values based action (although this can also be discussed later during the values section)

Discuss in pairs

Discuss experience of using skills in pairs.

Group discussion

- Ask for volunteers to talk about experience
- Reinforce flexible use of skills
- Connection between mindfulness and values
- If Choice point is discussed here: Were you aware of toward or away choices?
- Discuss when you chose to move toward values based actions.
- Discuss when you chose to move away
- What was the result of your choices?
- Did you actively defuse unhelpful thoughts or accept emotions?

BREAK

Observer self /self as context

Introduce Observer self as the place from which we can notice our experience. Explain metaphor of chess board to highlight how defusion and the observer self helps us become more resilient in face of experience.

Chess board metaphor (example transcript below)

1. place the chessboard on the floor in the center of the group
2. place the various white and black chess pieces on the board, explaining that they represent various experiences, thoughts, and feelings participants have had.
3. ask participants to give us **examples** of “good” and “bad” thoughts and feelings. As they call these out, we take a chess piece and place it on the board to represent that thought or feeling.
4. We use the pieces to depict the **struggle** between “good” and “bad” thoughts, feelings, and so on, and to point out that there’s **no actual winning of this game**. That is, just as **history is additive** (we can’t erase our histories, our traumas), this board extends endlessly in all directions as an infinite plane, and as we go about life we are continuously picking up new experiences (demonstrated by adding pieces to the board).
5. **We don’t want the black pieces.** Sometimes we devote our lives to trying to get rid of these pieces that can’t actually be gotten rid of!
6. We then ask, since it clearly isn’t fruitful to engage in this battle that can’t be won, **if there is any other way to approach it?**

7. **What if you weren't the content of those good and bad pieces?** Keeping with this metaphor, **is there anything else you could be besides the chess pieces?**
8. Well, you could be the player. You could try to move these pieces around in an effort to win. (Moves the pieces around on the board a bit.) However, you can see that doesn't really change things—**the player is still caught up in the game.** We know that doesn't work. Which piece of yours has been successfully removed?
9. Can you think of anything else you can be besides the pieces or the players?
Chessboard
10. We try to have clients come up with the idea of being the chessboard, we might pick up the chessboard and hold it in front of them at eye level, for example. Once they come up with the idea of being the board, we go on to emphasize several important points:
11. **Notice how you would still have all the pieces but be free to go where you want to go. (We walk around balancing the board at this point.)** What else do you notice about the board? (We rap our knuckles against the board.)
12. **It's strong and solid.** Yes, it is whole. Are the pieces the board? yes
13. **the board is in contact with the pieces.** It is aware of the pieces ... It experiences the pieces. Is it invested in the game? Does the board care who wins? So from this space, from the place of being the board, can you see how it can hold all the pieces, experience them and yet not be them?

SLIDE: Man with chess board on head

Key points in metaphor and discussion:

- Observer self – the place where humans observe their experience which is stable.
- We can have a different relationship with our thoughts
- **Resilient place:** stable place to observe constantly fluctuating inner experiences

Observer Self Meditation

“This concept is difficult to explain so let's experience it with a practice ...”

Self as context exercise (example transcript)

- I want you to close your eyes and get comfortable ... Notice your breathing ... Notice your weight in the chair ... Notice any sounds you might be picking up in the room ...
- Now think of an experience you had this morning—it doesn't matter what it was, just go with the first thing that pops up in your mind. Now, thinking of this experience, see if you can remember what was going on around you at the time ... What were you doing? ... Where were you? ... Was there anyone else around you, or were you alone? ... Can you remember some thoughts you were having? ... What were you feeling?
- Now I want you to think of something you experienced last week. Perhaps a

conversation with a friend, some task you accomplished ... It doesn't matter what it is, just whatever comes to mind. Raise your finger to let me know when you have it ... Good. Now see if you can remember what was going on at that time ... What were you seeing around you? ... Can you remember some thoughts you had at the time? ... What feelings can you recall having? ... Can you remember any sounds you might have been hearing? ...

- **Can you see that the person having that experience last week is you ... the same "you" that had the experience this morning?** It is the same person who is hearing various sounds and having various thoughts and feelings right now. There is a you there that remembers that event from last week, the same you that remembers what happened this morning, the same you that is hearing me say this right now.

- Let's follow this out further. Go back now to something that you can remember experiencing last year. Take your time ... Just think of something you experienced then Again, can you remember being in that situation? ... Can you remember what you were seeing around you ... the sound of your voice if you were speaking to anyone? ... What you were thinking at the time? ... Can you remember any of the emotions you were having? ... Look around the memory and really see what was there, observe what you were experiencing ... As you see this memory, **notice that it is the same you** having this memory as the you that had a memory from last week and this morning. A continuous you, a you that is sitting here right now doing this exercise with me.

- Take a moment to notice what it is that you are feeling in this moment. See if you can describe it to yourself. Also notice that you have felt many, many emotions. Almost too many to list. Notice that your emotions at times have been high and that at times they have been low ... Observe that you have had excitement and joy and sadness and anxiety ... Notice that within these emotions you have experienced different levels of intensity ... sometimes a great deal of anxiety, sometimes just a little, sometimes you have been laughing, and sometimes only smiling. Your emotions have been complex and difficult to describe, and then sometimes easy, not so complicated. As you notice all of these emotions, **notice who is noticing: a you that has felt it all.** A you that knows that these emotions come and go and come and go again. A you that is larger than your emotions.

And now let's take a look at one last place; your thoughts. Take a moment to notice that you are thinking ... Notice that the things you think now may not be the things that you thought some time ago. Your thoughts have grown in complexity. You know things now that you didn't used to know, and you may have forgotten things you had once learned. Your mind is full of thoughts, shifting, refocusing, learning, remembering—thoughts are coming and going all the time. As you notice your thinking, once again notice who is noticing ... There is a you there that experiences your thoughts and yet is not your thoughts. A you that is larger than any single thought. There is a you that is sitting here now, the same you that had those memories, the same you that plays those roles, the same you that is aware of your body, your emotions, and thoughts. A you that is larger than these things, an observer you—a continuous sense of you that stretches across all of these experiences and is larger than these experiences.

Observer Self Discussion

Discussion in group (or pairs then group if time)

- Any comments on that experience?
- Did you contact something different than from other exercises?
- Can use this as a resilient place to step outside of your experience when it is overwhelming

Key points

To experience and reflect on the observer self – an unchanging and safe place from which we can observe our experience.

Review of values and Choice Point

Values summary

SLIDE: Values clarity and values based action – summary of workshop content and approaches

Session 1

- Card sort – identified five core values (the sort of qualities I would like to bring to my life)
- Identified actions based on these values

Session 2

Choice point model

1. Choosing actions based on values (rather than autopilot) or escaping short term discomfort, or
2. Infusing everyday actions our values (making the mundane meaningful) – bringing this quality to the mundane (a kiss, a personal interaction, working on the environment)

Today A brief look at how values can be connected with goals

Discussion:

- Invite questions, comments and experiences of values based action and use of Choice point.
- Elicit examples of how mindfulness and values can work together.

Linking goals and values

Looking back Reflection

The following reflection is designed to help you start to help you link your goals, purpose and values together.

Transcript example

Close your eyes. Imagine it is now 10-15 years in the future. You are taking the time to reflect back on the past 10-15 years. I'm going to ask you to reflect back on your life – particularly your achievements and over the past 10 or 15 years and why they are important to you.

First I want to ask you to choose one life domains to use for this reflection and we will choose another later. It might be your achievements in terms of your Intimate relationships, social relationships, parenting, community contribution, work or career, spiritual life or personal growth, physical care and health, creativity, leisure and play or self kindness. Just pick two areas that stand out for you.

Thinking about the first area. Can you identify your achievements in this area? What you are most proud of... Try and identify tangible achievements you might be able to reflect on. These might be your current goals or even vague ideas right now. Identify one or two of the most important things you would have wanted to achieve, looking back over the past 10-15 years. For example, if you chose community contribution, maybe you would have liked to set up an NGO or established a community garden. If your domain is family, maybe your achievement would be to have two well adjusted 5 year olds, or own a house...

Now thinking about those achievements, I want you to reflect on the following questions. Why are these things important to you? You might reflect here on your own needs, you values, purpose in life. What does this achievement mean for you and for others, your contribution to the world?

For example, if your achievement involves getting an academic post, this may be important because it will provide you with financial stability and a way to contribute to caring for the environment or others though research, or mentoring others. If your achievement is having some kids, why is this important? To practice values of love and caring, to install a love of learning or maybe to be part of a close unit of people, caring for them and being cared for.

Now I invite you to select another domain...

Intimate relationships, social relationships, parenting, community contribution, work or career, spiritual life or personal growth, physical care and health, creativity, leisure and play or self kindness.

Once again, reflect on your achievements in this area. What you would have liked to accomplished by this time. What are you most proud of? What would other people have seen you do. We are looking for tangible outcomes here. /

And again, reflect on why this is important. If your achievement is travelling the world, why is this important? Maybe you value adventure, spontaneity or curiosity? Maybe you want to learn about other cultures or contribute to them in some way.

SLIDE Goals and values (worksheet)

- Take some time to write down what came to mind in your work book on page 5 (just do columns 1 and 2)

- Give examples on PP
- Now consider column three. Can you pull out your values? The things you can always act on; things you can do now as you are journeying toward your goals.

SLIDE – Reflection domains (if needed by group)

Discussion

- Did the same values come up for you as in the card sort?
- What was it like to consider values and goals together?
- What emerged as being most important.

Key points

- Values can guide our goals; goals can guide us in our everyday values

Reflection and Commitment

As we near the end of the course, this section is designed to help you reflect on what you have learned and make commitments to continue some of the practices that were helpful.

SLIDE Reflection and Commitment Sheet

- Encourage you to continue to practice skills and use tools; analogy of saw – it is only useful if it is sharp

- Encourage you to make a commitment for a weekly reflection time. Start by using this form but move on to your own way of doing it.

Are you doing the practice you intended to do? Which values are important to you? What are your goals?

Take some time to fill this in now (if time in session)

Resources for the future

SLIDE: Where to from here

- Explain the workshop was based on ACT
- ACT companion – write values and revisit them
- Buddies with Headspace App
- Other resources

Personal reflections from the course

Everyone to say briefly what they got from the course... In 2 sentences. If there was ONE thing that really stands out to you, what is it?

Appendix F
Consort Checklist

Section/Topic	Item No	Checklist item	Reported on page No/ section
Title and abstract			
	1a	Identification as a randomized trial in the title	81
	1b	Structured summary of trial design, methods, results, and conclusions (for specific guidance see CONSORT for abstracts)	N/A
Introduction			
Background and objectives	2a	Scientific background and explanation of rationale	6.1
	2b	Specific objectives or hypotheses	6.2
Methods			
Trial design	3a	Description of trial design (such as parallel, factorial) including allocation ratio	6.3.2
	3b	Important changes to methods after trial commencement (such as eligibility criteria), with reasons	N/A
Participants	4a	Eligibility criteria for participants	6.3.1
	4b	Settings and locations where the data were collected	6.3.1
Interventions	5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered	6.3.3
Outcomes	6a	Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed	6.3.5

	6b	Any changes to trial outcomes after the trial commenced, with reasons	N/A
Sample size	7a	How sample size was determined	6.3.6
	7b	When applicable, explanation of any interim analyses and stopping guidelines	N/A
Randomisation:			
Sequence generation	8a	Method used to generate the random allocation sequence	6.3.2
	8b	Type of randomisation; details of any restriction (such as blocking and block size)	6.3.2
Allocation concealment mechanism	9	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned	6.3.2
Implementation	10	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	6.3.2
Blinding	11a	If done, who was blinded after assignment to interventions (for example, participants, care providers, those assessing outcomes) and how	6.3.2
	11b	If relevant, description of the similarity of interventions	6.3.3
Statistical methods	12a	Statistical methods used to compare groups for primary and secondary outcomes	6.3.6
	12b	Methods for additional analyses, such as subgroup analyses and adjusted analyses	6.3.6
Results			
Participant flow (a diagram is strongly recommended)	13a	For each group, the numbers of participants who were randomly assigned, received intended treatment, and were analysed for the primary outcome	6.3.2
	13b	For each group, losses and exclusions after randomisation, together with reasons	6.3.2
Recruitment	14a	Dates defining the periods of recruitment and follow-up	6.3
	14b	Why the trial ended or was stopped	NA
Baseline data	15	A table showing baseline demographic and clinical characteristics for each group	Table 6.2

Numbers analysed	16	For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups	Fig 6.1
Outcomes and estimation	17a	For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval)	Table 6.5
	17b	For binary outcomes, presentation of both absolute and relative effect sizes is recommended	N/A
Ancillary analyses	18	Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing pre-specified from exploratory	N/A
Harms	19	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)	N/A
Discussion			
Limitations	20	Trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analyses	6.5.5
Generalisability	21	Generalisability (external validity, applicability) of the trial findings	6.5
Interpretation	22	Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence	6.5
Other information			
Registration	23	Registration number and name of trial registry	Not registered
Protocol	24	Where the full trial protocol can be accessed, if available	6.3.3
Funding	25	Sources of funding and other support (such as supply of drugs), role of funders	N/A

Appendix G

Advertisement for Workshops

Mindfulness & Resilience Course

Are you feeling **stressed** or **overwhelmed**? *Are the demands of daily life getting to you?* Would you like **a more balanced life** and **improved well-being**?

If so, you are invited to sign up for the **Mindfulness and Resilience** course being run at the ANU between August and November, 2014.

The course is designed for professionals and tertiary students suffering from stress, and includes 3 x 3 hour interactive workshops.

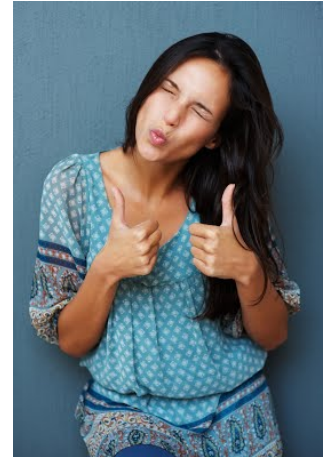
You'll learn about:

- New ways to reduce stress and enhance performance;
- Handy mindfulness tools to help you achieve balance and perspective in your life;
- Using mindfulness to bounce back from difficult setbacks in your life and work.

Places are limited to 30 participants per session and the course is being offered at a discounted rate of \$100. However, if you complete the surveys associated with this course, **you'll receive a full refund!**

Registration

If you would like to register, please go to our website at goo.gl/3FpMCC before **Sunday 27th of July**. On registration you will be randomly allocated to one of three groups. Courses are held on Saturdays (Group 1: 9 August, 23 August and 13 September; Group 2: 9 August, 23 August and 13 September; and Group 3: 25 October, 8 November and 29th November)



Appendix H

Participant Information Sheets

The final approved participant information sheets for groups 1 and 2 (experimental groups) and group 3 (control group) are attached in the following pages. These were emailed to participants and information also preceded the online survey content. Consent was provided in the form of a checkbox.

H1: Participant Information Sheet for Control Group

Participant Information Sheet (Group 3)

Project Title: Mindfulness, values and coping with stress

Researchers:

This research is being undertaken by Alison Christie (a 2nd year Doctor of Clinical Psychology candidate with the School of Psychology, ANU) and James Donald (a 2nd year PhD candidate with the Crawford School of Public Policy, ANU).

General Outline of the Project:

Description:

- This research aims to measure the effects of your participation in the Mindfulness and Resilience course, details of which are outlined on the course website at <https://sites.google.com/site/mindfulnessforchange/>.
- It assesses the effects of two different mindfulness-based interventions on a number of measures of well-being, coping and behavioural change. Through this research, we are hoping to improve our understanding of whether, when and how mindfulness training influences well-being, values-directed action and how people cope with stress.
- As you have been randomly selected for the Group 3, **you will receive the training after the other participants, but be asked to complete the some of the surveys at the same time they do.**
- Data will be collected in three ways: 1) 3 x 10-20 minute surveys, completed 12 weeks, eight weeks and one week prior to your training; 2) one 10-15-minute interview in the week prior to the training; and 3) a 1 minutes 'daily check-in' survey, completed daily over 4 x 5 day blocks over the course of the training.

Participants: Participants in the courses are 160 postgraduate university students from the ANU, University of Canberra, Macquarie University, Sydney University and other Australian universities. Some participants may also be undergraduate students or working professionals. Participants will need to have daily access to a web enabled phone or email.

Use of Data and Feedback: The data from this research will be used in the doctoral theses of Alison Christie and James Donald. It may also be used in conference and published research papers. Participants will be emailed a summary of research outcomes.

Participant Involvement:

- **General** This research requires participation in the Mindfulness for Resilience course. This course is available for a fee of \$100. **Group 3 participants will not have to pay this fee until a week before training commences. Those who complete the research components will not be required to pay this fee.**

- To participate in the course you will also need online access.
- **Voluntary Participation & Withdrawal:** Participating in this research project is **voluntary** and you may, without penalty, decline to take part or withdraw from the research at any time without providing an explanation, or refuse to answer a question. If you do withdraw, your data will be destroyed.
- **What will participants be asked to do?** This research involves three components: 1) online surveys, 2) daily “check-in” surveys and 3) interviews. **The course fee will be waived for participants who complete the 3 x 10-20 minute surveys (component 1).** There is no reward for completing the other components of the research (however, completing these elements would be expected to improve outcomes). The three components are now explained:
 1. *Online Surveys:* This involves completing three online surveys - 12 weeks, eight weeks and one week prior to the training, respectively. Each survey will take approximately 10-20 minutes to complete. The surveys will ask you to recall a recent stressful event and reflect on how you responded to it. They also ask you to rate yourself on measures such as mindfulness, perceived stress, coping ability, well-being and academic achievement.
 2. *Daily check-in:* Over the course of the training, participants will be asked to complete a ‘daily check-in’ survey in which they rate stressful events and how they handle them. The daily check-in involves answering 12 short multiple choice questions and will take approximately 1 minute to complete. Participants will receive a SMS reminder at the end of each working day containing a link to an online survey. If participants do not have a web-enabled phone, they can elect to receive the reminder and link via email.

Participants will be asked to complete their daily check-in over 4 x 5 day blocks. The first 5-day block (i.e., 5 daily check-in entries) will take place one week before the mindfulness training commences. The second block will occur the week following the first training session. The third block will be the week following the second training session. The final block will be the week following the final training session. The daily check-in surveys are an integral part of the training course. They enable participants to track their responses to difficult situations, over time, via the online survey tool. The SMS will be sent at 5pm and you will have until 10am the next day to complete the check-in measure.
 3. *Interview.* There are two *optional* interviews. In the week immediately prior to the mindfulness training program, participants will be invited to participate in a phone interview. The interview involves recalling a major life setback and reflecting on how you dealt with it and what you learned

from it. This interview will be conducted via phone and take 10-15 minutes to complete. Subject to participants' consent, the interviews will be recorded on an audio file for analysis, but not transcribed. Researchers will measure non-verbal cues, such as pitch and length of response.

For the second interview, participants may be contacted by the researchers for an interview based on their responses to the surveys and daily check-in. This interview will focus on participants' experience of the course and the application of mindfulness skills to everyday life. Subject to participants' consent, the interviews will be recorded on an audio file and transcribed for analysis.

- **Location and Duration:** The course will be run at ANU with details of each workshop time and date listed on the course website. We estimate that:
 - the surveys will take a total of 30-60 minutes to complete (10-15 mins x 3 surveys);
 - the daily check-in will take a total of 20 minutes to complete (1 minute x 4 5-day blocks) and
 - the setbacks interview will take 10-15 minutes to complete and 20 minutes for the training de-brief interviews.
- Altogether, we anticipate that a total of 50-80 minutes of participants' time will be needed to complete the above components.
- **Incentives:** Individuals in Group 3 who complete 100% of the survey items (component 1), will not be required to pay for their course.
- The incentives paid to research participants will be funded with the money raised through the \$100 course fee. Any money raised through the course fee (and not returned to participants) will be used to pay legitimate course expenses (e.g. coffee, stationary and petrol for facilitators). Any fund remaining after these expenses are paid will be donated to the Black Dog Institute, which is dedicated to improving the lives of people with mood disorders through research, clinical expertise and national education programs.
- **Risks:** There is a small risk that either the mindfulness training or the post-training interviews may result in psychological discomfort for individuals who have experienced trauma, psychosis or those who are psychologically vulnerable. This risk will be mitigated in the following ways:
 - The pre-training survey will screen participants for psychological vulnerability. Participants deemed to be potentially at risk from the program will be contacted by Alison Christie in her capacity as a provisional psychologist. If the participant is deemed to be vulnerable to ill effects from the workshop, she/he will be referred to the ANU Psychology Clinic or University of Canberra Psychological Clinic for

treatment. If the individual is deemed suitable for participation he/she will be supervised by Alison during the workshops to ensure any harm is minimised or issues that arise can be dealt with appropriately.

- Individuals will be advised that mindfulness sometimes results in uncomfortable thoughts and feelings. Dealing with these will be an integral part of the course.
- Participants who wish to access psychological support at any time during the training can do so. Details of counselling services are: at ANU, First Floor, Building [18], North Road, ANU Campus (ph: 6125 2442); at UC, Building 1, Level B 1 Kirinari Street, Bruce ACT 2617 (ph: 6201 2351).
- **Implications of Participation:** This research aims to add to our understanding of the effects of mindfulness training on coping with stress, wellbeing and values-based action, and may be used in published research articles to this end. All participant information will be de-identified prior to analysis, meaning that there are no personal implications (eg, access to employment or medical care), beyond the effects of the training course itself, from participating in this research. As such, declining to participate in the research will not have adverse personal effects.

Exclusion criteria:

- **Participant Limitation:** Participants deemed to be potentially at risk from the program will be contacted by Alison Christie in her capacity as a provisional psychologist. If the participant is deemed to be vulnerable to ill effects from the workshop, she/he will be referred to an appropriate agency, and may be excluded from participating in the training.

Priority will be given to higher degree research students as participants in this research. Depending on interest among HDR students, graduate and undergraduate students may be included, as well as working professionals.

Confidentiality:

- **Confidentiality:** Only the two researchers (Alison Christie and James Donald) will have access to the data provided by participants and identity of participants, as far as the law allows. Participant data will be identified (name, email address and mobile phone number) so that the researchers can send the participants texts and emails over the period of the research. This information is required for participation in the study.

Following the conclusion of the training program, personal information (name, email address and mobile phone number) will be destroyed and all participants' data de-identified. Any data published from this research will be completely confidential and de-identified.

The facilitators of the mindfulness workshops will be audio recorded to allow an ANU supervisor to check the quality of delivery. Participants will not be identified in this recording.

Data Storage:

- **Where:** Identified data will be collected on the Qualtrics online data based and stored on ANU's secure password protected server (at the Psychology School and the Crawford School) on encrypted external drive. Access to files stored on these servers is password protected.
- **How long:** During the analysis and write-up phase of the project, the data will be de-identified. Per the ANU's *Policy on Responsible Practice in Research* (clause 4.4) this data will be stored for at least five years following publications arising from the research.
- **Destruction of Data:** At the end of the training program, personal information (name, email address and mobile phone number) will be destroyed. De-identified data will be stored on the ANU's secure servers indefinitely.

Queries and Concerns:

- **Contact Details for More Information:** For further requests for information or queries regarding the study participants should contact the researchers, Alison Christie (alison.christie@anu.edu.au; 0403 755113) or James Donald (james.donald@anu.edu.au; 0405 562 8056). Participants may also contact Dr Paul Atkins (paul.atkins@anu.edu.au), research supervisor to Alison Christie and James Donald.
- **Contact Details if in Distress:** Participants who wish to access psychological support at any time during the training can do so by contacting the ANU Counselling Service (ph: 6125 2442); of the University of Canberra Counselling Service (ph: 6201 2351) or calling Lifeline (24 hours) on 131114

Ethics Committee Clearance:

The ethical aspects of this research have been approved by the ANU Human Research Ethics Committee (Protocol: 2013/352). If you have any concerns or complaints about how this research has been conducted, please contact:

Ethics Manager
The ANU Human Research Ethics Committee
The Australian National University
Telephone: +61 2 6125 3427
Email: Human.Ethics.Officer@anu.edu.au

You will be required to indicate that you have read and understood this information prior to completing the first survey. This information will be repeated on the survey website along with a consent checkbox.

H2: Participant Information Sheet for Experimental Groups

Participant Information Sheet (Groups 1 and 2)⁹

Project Title: Mindfulness, values and coping with stress

Researchers: This research is being undertaken by Alison Christie (a 2nd year Doctor of Clinical Psychology candidate with the School of Psychology, ANU) and James Donald (a 2nd year PhD candidate with the Crawford School of Public Policy, ANU).

General Outline of the Project:

Description:

- This research aims to measure the effects of your participation in the Mindfulness for Resilience course, details of which are outlined on the course website at <https://sites.google.com/site/mindfulnessforchange/>.
- The study assesses the effects of two different mindfulness-based interventions on a number of measures of well-being, coping and behavioural change. Through this research, we are hoping to improve our understanding of whether, when and how mindfulness training influences well-being, values-directed action and how people cope with stress.
- Data on these measures will be collected in three ways: 1) a 10-20 minute survey, completed once before and twice after the training; 2) a one minute 'daily check in' survey, completed daily over 4 x 1 week blocks; and 3) two optional post-training interviews.

Participants: Participants in the courses are 160 postgraduate university students from the ANU, University of Canberra, Macquarie University, Sydney University and other Australian universities. Some participants may also be undergraduate students or working professionals. Research participants will be expected to have daily access to a web enabled phone or email.

Use of Data and Feedback: The data from this research will be used in the doctoral theses of Alison Christie and James Donald. It may also be used in conference and published research papers. Participants will be emailed a summary of research outcomes.

Participant Involvement:

General: This research requires participation in the Mindfulness for Resilience course. This course is available for a fee of \$100. The money raised by charging this fee will be used to provide cash payments of \$100 to those who also participate in this research. Please note that you can participate in the course and choose *not* to participate in the research. To participate in the course, you will also need online access. Information regarding refunds is available on the course website.

⁹ Group 1 was the MBI group and Group 2 the ACT group

Voluntary Participation & Withdrawal: Participating in this research project is **voluntary** and you may, without penalty, decline to take part or withdraw from the research at any time without providing an explanation, or refuse to answer a question. If you do withdraw, your data will be destroyed.

What will participants be asked to do? Your participation in the research involves attendance at the Mindfulness and Resilience course and three research components: 1) surveys, 2) daily check in surveys and 3) interviews. **Participants who complete the surveys and the daily check in (components 1 and 2) will receive a \$100 payment as an incentive for participating in this research.** The three components are now explained:

4. *Online Surveys:* This involves completing one pre-training survey, a second survey immediately following the final training session, and a third survey 4 weeks after the final training session. Each survey will take approximately 10-20 minutes to complete. The surveys will ask you to recall a recent stressful event and reflect on how you responded to it. They also ask you to rate yourself on measures such as mindfulness, perceived stress, coping ability, well-being and academic achievement.
5. *Daily check-in:* Over the course of the training, participants will be asked to complete a 'daily check-in' survey in which they rate stressful events they encounter and how they handle them. The daily check-in involves answering 12 short multiple choice questions and will take approximately 1 minute to complete. Participants will receive a SMS reminder at the end of each working day containing a link to an online survey. If participants do not have a web-enabled phone, they can ask to receive the reminder and link via email.

Participants will be asked to complete their daily check-in over 4 x 5-day blocks. The first 5-day block (i.e., 5 daily check-in entries) will take place one week before the mindfulness training commences. The second block will occur the week following the first training session. The third block will be the week following the second training session. The final block will be the week following the final training session. The daily check-in surveys are an integral part of the training course. They enable participants to track their responses to difficult situations, over time, via the online survey tool. The SMS will be sent at 5pm and you will have until 10am the next day to complete the check-in measure.

6. *Interviews.* Following the mindfulness training program, participants will be invited to participate in two *optional* interviews. The first interview involves recalling a major life setback and reflecting on how you dealt with it and what you learned from it. This interview will be conducted via phone and take 10-15 minutes to complete. Subject to participants'

consent, the interviews will be recorded on an audio file for analysis, but not transcribed. Researchers will measure non-verbal cues, such as pitch and length of response.

For the second interview, participants may be contacted by the researchers for an interview based on their responses to the surveys and daily check-in. This interview will focus on participants' experience of the course and the application of mindfulness skills to everyday life. Subject to participants' consent, the interviews will be recorded on an audio file and transcribed for analysis.

Location and Duration:

The course will be run at ANU with details of each workshop time and date listed on the course website. We estimate that:

- the surveys will take a total of 30-60 minutes to complete (10-20 mins x 3 surveys);
- the daily check-in will take a total of 20 minutes to complete (1 minute x 5 days x 4 week-long blocks); and
- the interviews will take 10-15 minutes for the setbacks interview and 15 minutes for the training de-brief interviews.
- **Altogether**, we anticipate that a total of 65-80 minutes of participants' time will be needed to complete the above components.

Incentives: Participants will receive a \$100 incentive payment (course refund) for completing:

- 100% of the surveys (component 1);
- 80% of the daily check-in entries (component 2)

No payments will be given if these conditions are not met.

- Payments will be made into participants' nominated bank account.
- The incentives paid to research participants will be funded with the money raised through the \$100 course fee. Any money raised through the course fee (and not returned to participants) will be used to pay legitimate course expenses (e.g. coffee, stationary and petrol for facilitators). Any fund remaining after these expenses are paid will be donated to the Black Dog Institute, which is dedicated to improving the lives of people with mood disorders through research, clinical expertise and national education programs.

Risks: There is a small risk that either the mindfulness training or the post-training interviews may result in psychological discomfort for individuals who have experienced trauma, psychosis or those who are psychologically vulnerable. This risk will be mitigated in the following ways:

- The pre-training survey will screen participants for psychological vulnerability. Participants deemed to be potentially at risk from the program will be contacted by Alison Christie in her capacity as a provisional psychologist. If the participant is deemed to be vulnerable to ill effects from the workshop, she/he will be referred to the ANU Psychology Clinic or University of Canberra Psychological Clinic for treatment. If the individual is deemed suitable for participation, he/she will be supervised by Alison during the workshops to ensure any harm is minimised or issues that arise can be dealt with appropriately.
- Individuals will be advised that mindfulness sometimes results in uncomfortable thoughts and feelings. Dealing with these will be an integral part of the course.
- Participants who wish to access psychological support at any time during the training can do so. Details of counselling services are: at ANU, First Floor, Building [18], North Road, ANU Campus (ph: 6125 2442); at UC, Building 1, Level B 1 Kirinari Street, Bruce ACT 2617 (ph: 6201 2351).

Implications of Participation: This research aims to add to our understanding of the effects of mindfulness training on coping with stress, wellbeing and values-based action, and may be used in published research articles to this end. All participant information will be de-identified prior to analysis, meaning that there are no personal implications (e.g., access to employment or medical care), beyond the effects of the training course itself, from participating in this research. As such, declining to participate in the research will not have adverse personal effects.

Exclusion criteria:

Participant Limitation: Participants deemed to be potentially at risk from the program will be contacted by Alison Christie in her capacity as a provisional psychologist. If the participant is deemed to be vulnerable to ill effects from the workshop, she/he will be referred to an appropriate agency, and may be excluded from participating in the training.

Priority will be given to higher degree research students as participants in this research. Depending on interest among HDR students, graduate and undergraduate students may be included, as well as working professionals.

Confidentiality:

Confidentiality: Only the two researchers (Alison Christie and James Donald) will have access to the data provided by participants and know the identity of participants, as far as the law allows.

Participant data will be identified (name, email address and mobile phone number) so that the researchers can send the participants texts and emails over the period of the research. This information is required for participation in the study.

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The facilitators of the mindfulness workshops will be audio recorded to allow an ANU supervisor to check the quality of delivery. Participants will not be identified in this recording.

Data Storage:

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Appendix I

Compliance Documentation

I1: Adherence Scale for Delivery of ACT Group

Session/Week: 1-3
Date Rated: 6/2/16

Facilitators: Alison Christie/James Donald
Rater: Monique Wilson

Scale for Rating Therapist's Adherence to ACT Treatment Protocol *

ACT Items	
1) Values & Goals - Discussion of client's values and goals	1 2 3 4 5
**2) Mindfulness - Mindfulness can be a practice and applied to daily life - Self as context/mindfulness of self as separate from language	1 2 3 4 5
3) Willingness/Acceptance - Experiential acceptance - Exploration of feelings/sensations - Mindfulness of current experiences - Out of session acceptance skills practice	1 2 3 4 5
4) Deliteralisation/Defusion - Deliteralization/defusion - Feelings/thoughts <u>DO NOT</u> lead to actions - Self as context/mindfulness of self as separate from thoughts/feelings/sensations	1 2 3 4 5
5) Committed Action - Making and keeping commitments to valued activities	1 2 3 4 5

Anti-ACT Items	
6) Challenging Cognitions - Changing content of thoughts - Substituting positive thoughts	1 2 3 4 5
7) Experientially Avoidant Change Strategies - Avoid or control - Reassurance in order to reduce experience	1 2 3 4 5
8) Cognitive Therapy Rationale	1 2 3 4 5
9) Thoughts and Feelings Cause Action	

- Feelings/thoughts lead to action - Relate improvement to cognitive change	1 2 3 4 5
Global Rating of Adherence	
15) Overall Adherence to Project Manual	1 2 3 4 5
16) Overall Competence of Trainer	1 2 3 4 5

RATE FOR FREQUENCY AND EXTENSIVENESS:

A rating of:

Would indicate:

1 = not at all:

The variable never explicitly occurred.

2 = a little:

The variable occurred at least once (and may have occurred a few times) and was not addressed in an in-depth manner.

3 = somewhat:

The variable occurred several times and was addressed at least once by the trainer in a moderately in-depth manner.

4 = considerably:

The variable occurred with relatively high frequency and was addressed by the trainer in a moderately in-depth manner.

5 = extensively:

The variable occurred with great frequency and was addressed by the trainer in a very in-depth manner.

For the frequency and extensiveness of ratings, the starting point for rating each item on the scale is "1." The rater should assign a rating of greater than "1" only if he/she hears examples of the behavior specified in the items. The rater should be careful not to start rating from the midpoint ("3") out.

I2: Adherence Scale for Delivery of MBI Group

Session/Week: 1-3
Date Rated: 6/2/16

Facilitators: James Donald /Alison Christie
Rater: Monique Wilson

Scale for Rating Therapist's Adherence to ACT Treatment Protocol *

ACT Items	
1) Definition of mindfulness - Intention, attention & acceptance	1 2 3 4 5
2) Present-moment awareness - Noticing sensations, thoughts and emotions in the present-moment - Engaging with each moment, not acting on automatic pilot, using the mind's natural curiosity	1 2 3 4 5
3) Acceptance and compassion - Not trying to control or get rid of unwanted thoughts and feelings - Experiencing stress as bodily sensations and thoughts - Cultivating self-compassion and acceptance of difficult thoughts and feelings	1 2 3 4 5
4) Perspective-taking - Viewing experiences as an 'impartial observer' 'Stepping back' from sensations, thoughts and feelings and viewing these as just sensations, thoughts or feelings.	1 2 3 4 5
5) Formal and informal mindfulness Committing to practicing and regularly reviewing practice of mindfulness of every-day activities, and daily 'formal' sitting mindfulness meditation exercises	1 2 3 4 5

Anti-ACT Items					
6) Challenging Cognitions					
- Changing content of thoughts	- Substituting positive thoughts				
7) Experientially Avoidant Change Strategies					
- Avoid or control	- Reassurance in order to reduce experience				
Global Rating of Adherence					
15) Overall Adherence to Project Manual					
16) Overall Competence of Trainer					

RATE FOR FREQUENCY AND EXTENSIVENESS:

A rating of:

Would indicate:

1 = not at all:

The variable never explicitly occurred.

2 = a little:

The variable occurred at least once (and may have occurred a few times) and was not addressed in an in-depth manner.

3 = somewhat:

The variable occurred several times and was addressed at least once by the trainer in a moderately in-depth manner.

4 = considerably:

The variable occurred with relatively high frequency and was addressed by the trainer in a moderately in-depth manner.

5 = extensively:

The variable occurred with great frequency and was addressed by the trainer in a very in-depth manner.

For the frequency and extensiveness of ratings, the starting point for rating each item on the scale is "1." The rater should assign a rating of greater than "1" only if he/she hears examples of the behavior specified in the items. The rater should be careful not to start rating from the midpoint ("3") out.

I3: Competence Scale for Delivery of ACT Group

6/2/16
Act & Mindfulness
Mason Christie
James Donald

ACT and Mindfulness-only competence rating scales

Competence: Trainers' Style/Approach Inquiry Attitude

Inquiry	Trainers' ability to elicit and respond to both verbal and nonverbal feedback (this may be demonstrated through eliciting reactions to exercises, asking open questions, validating the clients' experience and summarizing/making reflections).	1 2 3 4 <u>5</u> Low High
Attitude	Trainers' ability to model and embody the spirit of mindfulness (respond to participants in a way that is curious, focused in the present moment, and nonjudgmental/accepting of whatever participants bring up).	1 2 3 4 <u>5</u> Low High
Use of key questions	The overall extent to which the trainers used key questions in eliciting discussion about exercises and home practice: (1) Highlighting the participant's raw experience in the moment, for example: What did you experience in this exercise? What body sensations did you experience during the exercise? Making a distinction between thoughts, feelings, and body sensations. (2) Distinguishing from typical way of experiencing things: How is this different from how you usually experience things / how you usually respond? (3) Relationship to purpose of program: How does it relate to building resilience? <u>not used</u>	1 2 3 <u>4</u> 5 Low High
Clarifying expectations	The extent to which the trainers address and clarify ideas and misconceptions about mindfulness (e.g., "I'm not doing it right"; "I'm just in a different zone when I practice"; "This practice is great because it makes me feel so relaxed and blissful").	1 2 3 <u>4</u> 5 Low High

Competence: Overall Therapist Performance

- How would you rate the overall quality of the training?

1	2	3	4	<u>5</u>
Not Satisfactory	Mediocre	Satisfactory	Good	Excellent
- How would you rate the ability of the trainers to work as a team?

1	2	3	4	<u>5</u>
Not Satisfactory	Mediocre	Satisfactory	Good	Excellent
- How would you rate the ability of the trainers to keep the sessions focused and on topic?

1	2	3	4	<u>5</u>
Not Satisfactory	Mediocre	Satisfactory	Good	Excellent
- Please rate the overall quality of delivery of the meditation exercises.

1	2	3	4	<u>5</u>
Not Satisfactory	Mediocre	Satisfactory	Good	Excellent

Source: Adapted from Chawla et al., 2012.

I4: Competence scale for Delivery of MBI Group

Not including group

6/2/16
Mindfulness
James Donald
Alison Christi

~~ACT~~ and Mindfulness-only competence rating scales

Competence: Trainers' Style/Approach Inquiry Attitude

Inquiry	Trainers' ability to elicit and respond to both verbal and nonverbal feedback (this may be demonstrated through eliciting reactions to exercises, asking open questions, validating the clients' experience and summarizing/making reflections).	1 Low	2	3	4	5 High
Attitude	Trainers' ability to model and embody the spirit of mindfulness (respond to participants in a way that is curious, focused in the present moment, and nonjudgmental/accepting of whatever participants bring up).	1 Low	2	3	4	5 High
Use of key questions	The overall extent to which the trainers used key questions in eliciting discussion about exercises and home practice: (1) Highlighting the participant's raw experience in the moment, for example: 'What did you experience in this exercise? What body sensations did you experience during the exercise? Making a distinction between thoughts, feelings, and body sensations.' (2) Distinguishing from typical way of experiencing things: How is this different from how you usually experience things / how you usually respond? (3) Relationship to purpose of program: How does it relate to building resilience?	1 Low	2	3	4	5 High
Clarifying expectations	The extent to which the trainers address and clarify ideas and misconceptions about mindfulness (e.g., "I'm not doing it right"; "I'm just in a different zone when I practice"; "This practice is great because it makes me feel so relaxed and blissful").	1 Low	2	3	4	5 High

Competence: Overall Therapist Performance

- How would you rate the overall quality of the training?

1	2	3	4	5
Not Satisfactory	Mediocre	Satisfactory	Good	Excellent
- How would you rate the ability of the trainers to work as a team?

1	2	3	4	5
Not Satisfactory	Mediocre	Satisfactory	Good	Excellent
- How would you rate the ability of the trainers to keep the sessions focused and on topic?

1	2	3	4	5
Not Satisfactory	Mediocre	Satisfactory	Good	Excellent
- Please rate the overall quality of delivery of the meditation exercises.

1	2	3	4	5
Not Satisfactory	Mediocre	Satisfactory	Good	Excellent

Source: Adapted from Chawla et al., 2012.