University of Nevada, Reno

Evaluating a Prototype Acceptance and Commitment Training
Web-Based Prevention Program for Depression and Anxiety in College Students

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ABSTRACT

Depression and anxiety disorders are prevalent among college students. Innovative, cost-effective approaches are needed to help prevent the incidence and worsening of these problems. Initial feasibility research with a prototype web-based program based on Acceptance and Commitment Therapy called ACT on College Life (ACT-CL), which currently includes two modules targeting values and acceptance, indicated it may be a promising approach for preventing depression and anxiety among college students. The current feasibility study compared the ACT-CL prototype to an active control website providing basic education on depression and anxiety disorders in a randomized controlled trial with 228 undergraduate college students using a universal prevention design. Assessments were conducted at baseline, post intervention and 1- and 3-month follow up. Results indicated significantly lower user engagement and satisfaction ratings with the ACT-CL prototype relative to the control website and initial pilot trial. Analyses with both the intent to treat sample and program completers only generally found no differences between condition over time on outcome and process measures, although in a few instances the control condition outperformed ACT-CL. Subgroup analyses did not identify any consistent results indicating ACT-CL was more or less effective or usable in any subgroup of students. Psychological flexibility processes were predictive of outcomes at baseline and of changes in outcomes over time. A pattern of results suggested that the more users engaged in the ACT-CL program the more they improved on psychological flexibility processes. Possible explanations for low program engagement and satisfaction ratings for the ACT-CL prototype and lack of treatment effects are explored including website design features, sample characteristics, and other methodological factors. Overall, these results suggest that the existing components of a prototype version of ACT-CL do not outperform an active control website and that some website features may reduce user engagement and satisfaction.
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CHAPTER ONE: INTRODUCTION

Depression and Anxiety Disorders in College are Prevalent and Costly

Depression and anxiety disorders are common among college students (Blanco et al., 2008; Eisenberg, Gollust, Golberstein & Hefner, 2007; Kessler, Berglund et al., 2005). In a large scale epidemiological study, Kessler and colleagues (2005) estimated the lifetime prevalence of psychological disorders for individuals between 18 and 29 to be 52% for any psychological disorder, 21.4% for a mood disorder and 30.2% for an anxiety disorder. Another epidemiological study with 2,904 college students from 2001 to 2002, found that almost one half of all college students have had a diagnosable psychological disorder in the past year, with approximately 10.62% having had a mood disorder and 11.94% having had an anxiety disorder in the past year (Blanco et al., 2008). Similarly, a web-based survey of 1,181 undergraduate students found that approximately 15.6% of students screened positive for current depression and/or anxiety disorders (Eisenberg et al., 2007).

College represents an important developmental period and mental health problems that occur during this time can have long lasting consequences. Depression and anxiety disorders can have harmful effects on functioning across many important life domains including education, work, physical health, and social relationships (Eisenberg, Golberstein & Hunt, 2009; Kessler, Walters & Forthofer, 1998; Kessler, 2003; Kessler & Frank, 1997; Seeley, Kosty, Farmer & Lewinsohn, 2011; Simon, 2003). Suicide is one of the leading causes of death among college students (Jed Foundation and National Mental Health Association, 2002). Furthermore, mental health problems occurring in college can persist throughout an individual’s life. For example, research has found that the risk of experiencing a depressive episode increases to 50% with one prior episode and to 70% with two or more episodes (Cassano & Fava, 2002). Another study found that approximately 60% of college students with one or more psychological disorders at baseline continued to have one or more disorders two years later (Zivin, Eisenberg, Gollust &
Golberstein, 2009). The prevalence and costs of depression and anxiety disorders in college highlights the need for effective prevention programs.

**There are Unique Benefits for Implementing Prevention Programs in the College Context**

College is a particularly promising setting to implement depression and anxiety prevention programs. College provides an opportunity to access a significant proportion of adolescents and young adults as approximately 70% of high school graduates immediately enroll in 2- or 4-year schools (US Department of Education, 2011). A unique setting is available where health-related services, including prevention programs, can be integrated with education, extracurricular activities, social life, and residence, as all of these aspects of living are centralized within a single institution.

Students attending college are particularly apt for prevention programs as this represents a difficult transition period where they meet many challenges in areas such as academics, relationships, and having increased autonomy. Students of college-age may also be particularly capable of understanding program concepts and applying them in their life, which may help to explain the observation that depression prevention programs tend to be more effective for older adolescents than younger individuals (Stice, Burton, Bearman & Rohde, 2009).

Finally, preventing the onset of depression and anxiety disorders among college students is particularly important given the challenges facing college counseling centers. A recent survey of counseling center directors found that many counseling centers are encountering an increase in demand for services from more severe and complex cases, while simultaneously having significantly limited resources to meet current needs (Gallagher, 2009). Prevention programs could potentially reduce the demand on counseling centers, increasing their capacity to provide adequate care to those in need.
The Possible Practical Benefits of a Universal Prevention Approach

A number of prevention programs have been developed over the past few decades. These programs have typically focused on applying cognitive behavioral skills that have been found to be helpful in treatment to the prevention of specific psychological disorders or clusters of disorders. Empirical support has generally been found for the efficacy of these prevention programs in reducing the onset of depression and anxiety disorders as well as the severity of symptoms (Christensen et al., 2010; Fisak, Richard & Mann, 2011; Neil & Christensen, 2009; Stice et al., 2009; Teubert & Pinquart, 2011; Zalta, 2011).

Prevention programs can be distinguished between universal (e.g., targeting individuals in the population broadly), selective (e.g., targeting individuals with particular risk factors), and indicated programs (e.g., targeting individuals with early symptoms of the disorder; Mrazek & Haggery 1994). Some reviews of the literature suggest selective and indicated programs produce larger effect sizes on prevention outcomes relative to universal prevention approaches (Stice et al., 2009; Teubert & Pinquart, 2011). This may be attributable to factors such as floor effects on measures of depression and anxiety and less motivation among low-risk individuals to participate in interventions. However, targeting at-risk students in indicated/selective approaches poses significant implementation challenges. There are resource costs and logistical issues related to efficiently implementing a screening and ensuring students complete the assessment (Thaker et al., 2008). Those students who are selected may feel stigmatized in being invited to participate in such a program (Rapee et al., 2006). Screenings can also create liability issues for schools, who may be placed in a position where they have identified students at risk for problems, including possibly suicidality and homicidality, without any direct contact per se and with the potential that such students will not follow up with services they are referred to. Furthermore, no screening assessment will be perfectly accurate in identifying students at risk and some students who may benefit from participation in a prevention program will be excluded (Dadds et al., 1997).
Universal prevention provides an alternative in which the difficulties associated with screening and selection of at-risk students is avoided. Rather, the notable challenge in universal prevention is how to provide such a program to larger numbers and a broader range of students, an issue which we will address in the sections that follow. If such a cost effective approach was made possible, universal prevention could significantly increase the reach of students receiving services. Even if the preventive effect size is lower with a universal approach, the number of students being impacted is much larger and contributes to a greater overall public health impact. In addition, such a program may produce other positive behavioral outcomes of key importance to students and institutions (i.e., relationship functioning, prosociality, academic success).

There are Promising but Mixed Results with Universal Prevention for Depression and Anxiety Disorders

Reviews of the literature indicate that universal prevention programs for anxiety, and to a lesser extent depression, can be efficacious although they tend to produce small effect sizes (Fisak et al., 2011; Neil & Christensen, 2009; Stice et al., 2009; Teubert & Pinquart, 2011; Zalta, 2011). Meta-analyses of anxiety prevention studies have consistently found significant small effect sizes favoring universal prevention approaches relative to control conditions with Hedge’s g values ranging from .12 to .29 when aggregating results from between 6 to 29 universal prevention trials depending on the meta-analysis (Fisak et al., 2011; Teubert & Pinquart, 2011; Zalta, 2011).

Results have been more mixed for universal prevention of depression. One meta-analysis of depression prevention randomized trials examined effect sizes for 25 universal prevention interventions, finding no significant effect size on outcomes at post ($r = .04$) but a small positive effect size at follow up assessment points ($r = .06$) (Stice et al., 2009). Another meta-analysis of 6 universal depression prevention studies evaluating the Penn Resiliency Program found a
significant positive effect size at 12-month follow up (Glass’s $d = .19$), but not at post or 6-month follow up (Brunwasser et al., 2009). A review of school-based prevention programs for children and adolescents identified 16 universal prevention studies for depression and anxiety, finding positive effects at post for 11 of the studies (Cohen’s $d = .31 – 1.37$) and negative effects at post for 5 studies (Cohen’s $d = -.21$ to -.28) (Neil & Christensen, 2009).

These meta-analyses have also compared effect sizes between universal and indicated/selective approaches, with reviews of anxiety prevention studies finding no significant difference in effect sizes (Fisak et al., 2011; Zalta, 2011) or greater effects for indicated/selective approaches at post but not follow up (Teubert & Pinquart, 2011). In the case of depression prevention, a meta-analysis found that selective/indicated prevention produced greater effect sizes at both post and follow up, with universal depression prevention having no significant effect size at post and only a small effect size at follow up (Stice et al., 2009).

There has been limited research evaluating universal depression and anxiety prevention approaches specifically with college students (Reavley & Jorm, 2010), but initial results from RCTs with college students are promising (Brathwaite & Fincham, 2007; 2009; Cukrowicz & Joiner, 2007; Steinhardt & Dolbier, 2008). These results provide some evidence that universal depression and anxiety prevention approaches can be effective in a college setting, while acknowledging that universal prevention programs, particularly those targeting depression, are challenging to design.

**There are Barriers to Implementing Current Prevention Programs in College**

Despite the need for depression and anxiety disorder prevention and the potential availability of such programs, there is an ongoing challenge in implementing evidence-based programs across college campuses. This may be attributable to some critical mismatches between available prevention programs and the college context.
One issue is that students are at risk of developing a range of psychological problems during the college years including depression, anxiety, substance use, personality and eating disorders (Blanco et al., 2008). Yet, the majority of prevention programs are targeted towards specific disorders or a relatively narrow range of disorders. Implementing the range of disorder-specific programs needed to meet the mental health needs of students would be complex and incur significant costs and staff time on schools’ already limited budgets and resources. In addition, it would be burdensome for already stressed students to participate in a number of prevention programs and could increase the rates of non-compliance with interventions.

Many of the existing prevention programs are conducted in a multi-session, face-to-face format (e.g., depression prevention programs frequently range between 6 and 15 group sessions; Munoz et al., 2010). Conducting such programs require substantial financial and staff resources from a school, particularly when considering universal approaches targeted to an entire student body. Compounding this issue, it is unclear how best to train and supervise staff in conducting prevention programs to ensure adequate fidelity and competence, but solutions are likely to place a further burden on school resources. This is especially relevant given the limited resources available at universities for mental health efforts (Gallagher, 2009).

Another barrier is that treatment seeking tends to be relatively low among college students (Hunt & Eisenberg, 2010). One large scale epidemiological study found that despite the high prevalence of depression and anxiety disorders, only 34.11% of those with a mood disorder and 15.93% of those with an anxiety disorder sought treatment in the past year (Blanco et al., 2008). Similarly, studies have found that less than half of university students who were seriously considering suicide reported receiving professional help (Drum, Brownson, Denmark & Smith, 2009) and approximately 90% of those who commit suicide were not seen at a college counseling center (Gallagher, 2006). Intervention participation rates are likely to be even lower in the
broader student body in which many are not experiencing significant distress, particularly when programs are time intensive and require attending scheduled in-person groups.

Overall, this suggests that innovative prevention programs are needed that target a range of disorders, are easy to implement, and have minimal barriers for student participation. The importance of these factors has also been highlighted in a number of recent reviews on depression and anxiety disorder prevention (Cuijpers, van Straten, Warmerdam & van Rooy, 2010; Dozois, Seeds & Collins, 2009; Feldner, Zvolensky & Schmidt, 2004; Munoz et al., 2010).

**Transdiagnostic Web-Based Prevention Programs and the Needs of Colleges**

One particularly promising approach is to implement transdiagnostic web-based prevention programs (Cuijpers, van Straten et al., 2010; Dozois et al., 2009). These programs would provide a means of disseminating prevention programs while bypassing many of the barriers to implementation that exist within the college context.

Web-based programs have several advantages for implementation, relative to face-to-face interventions (Cuijpers, van Straten et al., 2010; Munoz et al., 2010). Such interventions can be provided in an automated format, thus reducing/eliminating the need to train staff and the burden on staff resources to conduct such interventions, while simultaneously increasing the capability of disseminating a program across one or more schools. Thus, the costs of delivery of web-based interventions are relatively low for institutions, despite the increased potential for students to get access to the program. Such an approach greatly increases the feasibility of universal prevention approaches with a broader segment of the student body. Furthermore, web-based interventions allow for the consistent application of evidence-based treatments without concerns regarding adherence and competence, which may be problematic with face-to-face interventions and require substantial training and supervision to correct for.
Web-based interventions also reduce several of the barriers students encounter for participating in prevention programs. As a web-based program can be accessed at any time and from relatively anywhere, participation is more convenient and can conform to a student’s busy schedule. These interventions are quick and easy for students to access, potentially increasing students’ exposure to these programs and reducing the lag between initial program recruitment and subsequent participation. This stands in contrast to participation in face-to-face programs, where there is typically a significant lag between first learning about and signing up for a program and then subsequently participating. The delays and extra effort required to participate in face-to-face programs may lead to lower participation and retention rates. The anonymity and confidentiality provided by web-based interventions may also reduce barriers related to stigma towards help seeking, a commonly cited reason for students not engaging in face-to-face interventions (Cuijpers, van Straten et al., 2010; Hunt & Eisenberg, 2010).

Web-based formats can also enhance students’ engagement in prevention programs. The use of multimedia, including audio, graphic, video and interactive delivery formats, can increase students’ interest and attention to program materials (e.g., Danaher et al., 2006; Strecher et al., 2008). These formats provide additional modes of intervention and ways to interact with content including audio-guided exercises, behavioral modeling with vignettes, visual metaphors representing key therapeutic concepts, interactive mastery exercises to assist students in practicing newly acquired skills, assessments to refresh and reinforce important information, self-monitoring, and gaming formats. Program content can be targeted to specific student features (e.g., gender, level of motivation, level of distress) and tailored based on specific user responses throughout the program. Skills generalization can be promoted by further prompting and checking in on students’ application of program materials throughout their day or in particular settings. Students’ use and responses to specific intervention content can be monitored and used to inform customized content delivery and individualized feedback. In addition to increasing engagement, customization can
also increase the efficiency of content delivery as materials are targeted to a user’s needs. These features of web-based interventions may serve to increase engagement as well as the acceptability and potentially the efficacy of an intervention.

The high degree of comorbidity between depression and anxiety disorders (Kessler, Chiu, Demler & Walters, 2005; Preisig, Merikangas & Angst, 2001; Seeley et al., 2011) and the identification of many common risk factors across disorders (Dozois et al., 2009; Garber & Weersing, 2010) highlights the potential for transdiagnostic interventions. Implementing a transdiagnostic approach has further advantages as it provides a means for preventing both depression and anxiety disorders within a single program by targeting shared risk factors (Dozois et al., 2009). This provides colleges and universities with a means for implementing prevention programs for a variety of mental health problems, while avoiding the complexity and costs associated with conducting multiple programs. Furthermore, this approach limits the participation burden on college students, which could increase participation and compliance rates.

Transdiagnostic Web-Based Prevention Programs are Feasible with College Students

Some web-based programs have been found to be effective for treating and preventing depression and anxiety disorders (Christensen et al., 2010; Cuijpers, Donker et al., 2010; Zalta, 2011). A meta-analysis by Cuijpers, Donker and colleagues (2010) found that guided self-help interventions more generally are as effective as face-to-face interventions for treating depression and anxiety disorders. Another meta-analysis of anxiety prevention trials found there were actually larger effect sizes for self-guided prevention programs (e.g., web-based, bibliotherapy) relative to face-to-face interventions on general anxiety symptoms (Zalta, 2011).

Research has also found that transdiagnostic programs targeting the prevention of anxiety and depression are feasible and can help prevent the onset and severity of both problems (e.g., Brathwaite & Fincham, 2007; 2009; Callear et al., 2009; Cukrowicz & Joiner, 2007; Dobson et al.,
However, it is important to note that in many cases the results are mixed with several outcomes not reaching statistical significance between conditions (e.g., Calear et al. 2009; Dobson et al., 2010; Roberts et al., 2003; Seligman et al., 2007).

Recently, a series of studies have found promising results specifically examining the impact of web-based transdiagnostic programs with college students for the prevention of depression and anxiety disorders (Brathwaite & Fincham, 2007; 2009; Cukrowicz & Joiner, 2007; Schmidt et al., 2007). Two randomized trials by Brathwaite and Fincham (2007; 2009) examined the efficacy of ePREP, a web-based prevention programs focused on relationship skills as a means of preventing depression and anxiety disorders as well as a range of other problems, with college students in a romantic relationship. Brathwaite and Fincham (2007) compared ePREP to a web-based CBASP intervention and an education control condition with a sample of 91 undergraduate students. Results indicated that ePREP and CBASP both produced significant and equivalently lower levels of anxiety, depression, and aggression relative to the education control condition at eight week follow up. Brathwaite and Fincham (2009) similarly found in a subsequent randomized trial comparing ePREP to an education control condition with 77 undergraduate students, that participants in the ePREP condition demonstrated lower levels of anxiety, depression and aggression relative to the control condition at 10-month follow up (Brathwaite & Fincham, 2009).

Two randomized trials have also found support for a web-based CBASP program for the prevention of depression and anxiety disorders among college students. As previously mentioned, the trial by Brathwaite and Fincham (2007) found that CBASP produced significantly lower levels of anxiety, depression, and aggression relative to an education control condition. Another study by Cukrowicz and Joiner (2007) randomized 238 undergraduate students with minimal to no depression or anxiety symptoms to web-based CBASP or an education control condition.
Results indicated that participants in the web-based CBASP condition had significantly lower levels of anxiety and depression relative to the education control at two month follow up.

A randomized trial by Schmidt and colleagues (2007) tested the impact of a selective prevention program focused on individuals with elevated anxiety sensitivity for the prevention of anxiety disorders as well as the broader range of axis I disorders. Participants were randomly assigned to either complete a brief computer-based program targeting anxiety sensitivity or an education control condition. Although the sample included members of the community more broadly, over half of the participants were university students. Results indicated that the intervention significantly reduced anxiety sensitivity relative to the control condition at post though the effects did not appear to be maintained at one or two year follow up. Furthermore, there was a higher rate of axis I disorders in the control condition relative to the anxiety sensitivity intervention condition at two year follow up, suggesting the intervention may have had a long-term preventive effect on developing a broad range of psychological disorders. However, there were no observed between group differences on measures of depression or anxiety symptoms at post or follow up assessments. Thus, the study demonstrated some positive findings for the impact of a brief computerized intervention, but results were mixed.

In addition to research with college students, a large scale universal prevention study evaluated MoodGYM, a self-guided cognitive behavioral intervention, across 30 schools with a total of 1,477 adolescents relative to a waitlist control (Calear et al., 2009). Findings indicated significant preventive effects on anxiety at post and 6 month follow up as well as on depression (though only for males) at post and follow up.

Overall, these studies suggest that web-based transdiagnostic programs for the prevention of depression and anxiety disorders among college students are a feasible and promising approach. The majority of these studies took a universal prevention approach with positive findings for intervention effects. However, it is important to note that these studies are
preliminary and the evidence is relatively mixed for their efficacy. Thus, there is a need for further research developing and testing web-based prevention programs for depression and anxiety among college students.

**ACT as a Novel Approach for Transdiagnostic Web-Based Prevention**

The current dissertation seeks to evaluate the feasibility of a transdiagnostic web-based prevention program based on components drawn from Acceptance and Commitment Therapy (ACT; Hayes, Strosahl & Wilson, 1999; 2011). “ACT” is also an acronym for “Acceptance and Commitment Training” when the model is applied in organizational or educational contexts or with non-clinical populations, as in the present case. ACT is a particularly promising approach for the prevention of depression and anxiety because a) psychological inflexibility is a common risk factor across disorders, b) psychological inflexibility can be targeted with ACT to produce clinical improvements, c) ACT is effective with non-clinical and sub-clinical populations, d) ACT can be implemented in a self-guided format, and e) each of the psychological flexibility components of ACT can impact outcomes. The following sections expand on each of these points.

**Psychological Inflexibility is a Common Risk Factor across Disorders**

A recommended approach for developing transdiagnostic prevention programs is to focus on shared risk factors for depression and anxiety disorders that can be effectively targeted by interventions (Dozois et al. 2009; Schmidt et al., 2007). One promising risk factor is psychological inflexibility, “the rigid dominance of psychological reactions, over chosen values and contingencies, in guiding action” (Bond et al., 2011). Psychological inflexibility consists of a combination of harmful psychological processes including the dominance of verbal processes over other sources of behavioral control (e.g., cognitive fusion) and engaging in rigid patterns of
behavior that seek to avoid, escape, or otherwise control the occurrence or intensity of aversive
private events (e.g., experiential avoidance). This can lead to a loss of contact with other
important sources of behavioral control available in the present moment as well as reductions in
values-based actions. These behavioral patterns can subsequently produce or exacerbate a range
of psychological problems including depression and anxiety disorders.

There is a large body of research demonstrating that psychological inflexibility is a risk
factor for psychological disorders including depression and anxiety (Hayes, Luoma, Bond,
Masuda & Lillis, 2006; Ruiz, 2010). The Acceptance and Action Questionnaire (AAQ; Hayes et
al., 2004) and the AAQ-II (Bond et al., 2011) are the most commonly used measures of
psychological inflexibility. These measures are sometimes described as a measure of experiential
avoidance, but they also capture other aspects of psychological inflexibility more broadly such as
cognitive fusion and values-based action (Bond et al., 2011; Hayes et al., 2006).

In a meta-analysis by Hayes and colleagues (2006) the aggregated effect size from 74
correlations across 32 studies between the AAQ and various psychological outcomes was $r = .42$
(95% Confidence Interval [CI] = .41 - .43). Across eight studies examining the correlation
between the AAQ and Beck Depression Inventory, the aggregated effect size was $r = .50$ (95% CI
= .46 - .54) and across five studies examining the correlation between the AAQ and validated
measures of anxiety, the aggregated effect size was $r = .54$ (95% CI = .50 - .58). These results
suggest that psychological inflexibility is strongly related to symptoms of depression and anxiety
disorders.

Another recently completed study provides further support for the relevance of
psychological inflexibility to a broad range of disorders in college students (Levin et al., under
review). The study examined the relationship of the AAQ-II to depression and anxiety disorders
(as determined by clinical interviews) in a sample of 972 first year college students between 17
and 20 years of age who enrolled to participate in an adjustment to college class. Logistic
regression analyses indicated that psychological inflexibility was a significant predictor of both current and lifetime diagnosis for each specific anxiety and depressive disorder relative to a no disorder control group of students. In addition, multinomial logistic regressions found psychological inflexibility predicted having a comorbid depression and anxiety disorder relative to only having a depression or anxiety disorder alone. Thus, psychological inflexibility appears to relate to a range of depression and anxiety disorders as well as comorbid depression and anxiety in college students.

Additional longitudinal studies with the AAQ have found that psychological inflexibility predicts depression and anxiety symptoms over time, even after controlling for relevant baseline variables (e.g., Farach, Mennin, Smith & Mandelbaum, 2008; Marx & Sloan, 2005; Plumb, Orsillo & Luterek, 2004). Studies have also found the AAQ to partially or fully mediate the relationship of a variety of robust predictors to depression and anxiety symptoms, including coping strategies (Kashdan, Barrios, Forsyth & Steger, 2006), anxiety sensitivity (Tull & Gratz, 2008), maladaptive perfectionism (Santanello & Gardner, 2007), sexual victimization (Polusny & Follete, 1995; Merwin, Rosenthal & Coffey, 2009), childhood abuse (Reddy, Pickett & Orcutt, 2006), and internalized homophobia (Gold, Dickstein, Marx & Lexington, 2009). Overall, these results suggest the psychological inflexibility is a significant risk factor for depression and anxiety disorders.

**Psychological Inflexibility can be Targeted with ACT to Produce Clinical Improvements**

Psychological inflexibility is a promising target for prevention efforts because in addition to being a key risk factor for anxiety and depression, this process can be effectively targeted with interventions such as ACT to produce improvements across a range of psychological problems including depression and anxiety disorders (Hayes et al., 2006; Ruiz, 2010). Prevention
researchers stress the importance of focusing on such manipulable risk factors rather than factors such as gender that cannot be readily manipulated (Dozois, 2004).

ACT is a contextual cognitive behavioral therapy (Hayes, Villatte, Levin & Hildebrandt, 2011) designed to reduce psychological inflexibility and promote psychological flexibility, the capacity to actively embrace one’s experiences in the present moment and engage/disengage in patterns of activity in the service of chosen values. A combination of mindfulness, acceptance, values and commitment processes are used to achieve this goal (see Table 1). These psychological flexibility processes are often targeted in ACT through metaphors and experiential exercises as well as instigating, modeling and reinforcing processes within the therapeutic relationship. As psychological inflexibility contributes to a range of psychological disorders, targeting these processes and increasing psychological flexibility is theorized to significantly reduce psychological problems and lead to meaningful changes in individuals’ lives.

Table 1. *Description of psychological flexibility processes*

<table>
<thead>
<tr>
<th>Process</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present Moment</td>
<td>Maintaining flexible contact with one’s experiences in the present moment, rather than rigid attention to a narrow set of stimuli or thoughts about the past/future.</td>
</tr>
<tr>
<td>Acceptance</td>
<td>Actively embracing difficult thoughts and feelings, rather than engaging in ineffective control strategies (e.g., suppression, avoidance).</td>
</tr>
<tr>
<td>Cognitive Defusion</td>
<td>Reducing the behavioral control of thoughts over one’s actions by seeing thoughts as just thoughts, rather than being literally true</td>
</tr>
<tr>
<td>Self-as-Context</td>
<td>Contacting a transcendent sense of self as distinct from one’s thoughts, feelings, or other internal experiences.</td>
</tr>
<tr>
<td>Values</td>
<td>Clarifying and connecting with chosen and desired global qualities of one’s ongoing action.</td>
</tr>
<tr>
<td>Committed Action</td>
<td>Engaging in patterns of activity linked to chosen values, and breaking values-inconsistent patterns.</td>
</tr>
</tbody>
</table>
A number of studies have found that ACT can produce improvements in depression and anxiety disorders (Hayes et al., 2006; Ruiz, 2010). Positive results have been found with ACT in randomized trials for depression (Bohlmeijer, Fledderus, Rokx & Pieterse, 2011; Carlbring et al., in press; Fledderus, Bolmeijer, Pieterse & Schreurs, 2011; Forman, Herbert, Moitra, Yeomans & Geller, 2007; Lappalainen et al., 2007; Hayes, Boyd & Sewell, 2011; Zettle & Hayes, 1986; Zettle & Rains, 1989), general/mixed anxiety symptoms (Arch et al., 2012; Forman et al., 2007), obsessive compulsive disorder (Twohig et al., 2010), social anxiety (Block & Wulfert, 2000), and test anxiety (Brown et al., 2011; Zettle 2003).

A subset of these studies compared ACT to other active treatment conditions. Studies comparing ACT to Cognitive Therapy (CT) have found equivalent outcomes on depression (Forman et al., 2007), general/mixed anxiety symptoms (Arch et al., 2012; Forman et al., 2007), and social anxiety (Block & Wulfert, 2000). In addition, some studies have found superior outcomes for ACT compared to CT on depression (Lappalainen et al., 2007; Zettle & Hayes, 1986; Zettle, Rains & Hayes, 2011) and test anxiety (Brown et al., 2011). Randomized trials have found ACT to produce equivalent effects for test anxiety relative to systematic desensitization (Zettle, 2003) as well as superior effects for ACT compared to treatment as usual for depression (Hayes, Boyd et al., 2011) and for ACT compared to progressive relaxation training for obsessive compulsive disorder (Twohig et al., 2010). A recent meta-analysis by Ruiz (2012) aggregated effect sizes from 16 RCTs comparing ACT and traditional CBT for various clinical problems, finding a small effect size favoring ACT over CBT (Hedge’s g = .40). Overall, these results suggest ACT is an effective intervention for depression and anxiety disorders, potentially as a result of targeting psychological inflexibility.

In addition, a recent study comparing ACT to CBT in treating a heterogeneous sample of patients with anxiety disorders found a moderation effect such that ACT was more effective than CBT in treating anxiety patients with comorbid mood disorders (Wolitzky-Taylor et al., 2012).
This further highlights the potentially unique impact of ACT as a transdiagnostic approach for depression and anxiety.

A number of treatment outcome studies have found evidence that the clinical gains produced in ACT are related to reductions in psychological inflexibility (Hayes et al., 2006). Studies have found that ACT significantly reduces psychological inflexibility and that these reductions relate to improvements in anxiety and depression outcomes (Dalrymple & Herbert, 2007; Forman et al., 2007; Lappalainen et al., 2007) and mediate the treatment effects of ACT relative to other study conditions (Twohig et al., 2010; Muto, Hayes & Jeffcoat, 2011; Bohlmeijer et al., 2011; Fledderus et al., 2013). In addition, studies have found that cognitive fusion with depressive thoughts, which is an important feature of psychological inflexibility, mediates outcomes for depression with ACT relative to CT (Zettle & Hayes, 1986/Hayes et al., 2006; Zettle, Rains & Hayes, 2011).

Overall, these studies suggest that ACT is an effective intervention for depression and anxiety disorders and that these effects are produced by targeting psychological inflexibility. This raises the question of whether ACT could similarly be used with non-clinical populations to prevent depression and anxiety disorders by targeting psychological inflexibility, a common risk factor for these disorders.

**ACT is Effective with Non-Clinical and Sub-Clinical Populations**

There has been little research on the efficacy of ACT for the prevention of psychological disorders. However, a series of outcome studies with non-clinical and sub-clinical populations does provide some support for the potential feasibility of such an intervention.

One body of supporting evidence comes from a series of studies examining the efficacy of ACT to promote wellness and stress management among worksite populations. Randomized trials have found that worksite ACT interventions significantly improve mental health relative to
waitlist conditions (Bond & Bunce, 2000; Brinkborg et al., 2011; Jeffcoat & Hayes, 2012; Flaxman & Bond, 2010a; Flaxman & Bond, 2010b) and produce generally equivalent effects on mental health outcomes relative to other worksite interventions such as innovation promotion (Bond & Bunce, 2000) and stress inoculation training (Flaxman & Bond, 2010a). In additions, these studies have found that improvements in mental health produced through ACT are mediated by reductions in psychological inflexibility (Flaxman & Bond, 2010a; Bond & Bunce, 2000). One worksite study evaluating an ACT self-help intervention also found preventive effects such that, among participants who were not distressed at baseline, there was a higher rate of participants reporting significant depression and anxiety symptoms in the waitlist relative to ACT at follow up (Jeffcoat & Hayes, 2012). These results indicate that ACT can be implemented with non-clinical worksite samples to improve mental health and potentially prevent mental health problems.

A few outcome studies have examined the efficacy of ACT as an indicated prevention approach for individuals with mild to moderate depression. A randomized trial by Bohlmeijer and colleagues (2011) examined the impact of ACT groups relative to a waitlist condition for individuals in the community experiencing mild to moderate depression. The study found that ACT significantly decreased depression and anxiety symptoms relative to a waitlist condition at post and 5-month follow up. Furthermore, reductions in psychological inflexibility mediated the effect of ACT on depression. Another randomized trial by Fledderus and colleagues (2011) using an ACT self-help book for individuals with mild to moderate depression similarly found that the ACT condition produced significantly greater improvements in depression, anxiety, positive mental health and psychological inflexibility relative to a waitlist condition at post and 3-month follow up. These intervention effects were also found to be mediated by changes in psychological inflexibility (Fledderus et al., 2013).

Of particular relevance to the current study, a RCT examined the efficacy of an ACT bibliotherapy intervention for native Japanese students attending the University of Nevada, Reno
(Muto et al., 2011). Seventy native Japanese students were randomized to either a waitlist condition or to read a Japanese translation of *Get Out of your Mind and Into Your Life* (Hayes & Smith, 2008), an ACT self-help book. Results indicated that participants in the ACT condition had significantly improved general mental health relative to the waitlist condition at post and 2-month follow up. In addition, a preventive effect of the intervention was found such that a third of participants in the waitlist condition who were below the clinical cutoff for distress were in the distressed range at 2-month follow up, while none of the participants in the ACT condition who were not distressed became distressed. Follow up changes in general mental health in ACT relative to the waitlist condition were mediated by reductions in psychological inflexibility at post. Overall, these studies provide evidence for the efficacy of ACT in improving mental health with non-clinical and sub-clinical populations, including preliminary evidence for the preventative effects of ACT.

**ACT can be Implemented in a Self-Guided Format**

There is substantial research indicating that many therapies can be implemented through automated, web-based interventions to treat and prevent anxiety and depression (Cuijpers, Donker et al., 2010; Christensen et al., 2010; Zalta, 2011). Recent research evaluating web-based ACT programs as well as bibliotherapy and brief computerized component interventions provide further support for implementing ACT in a web-based format.

A recent series of RCTs provide preliminary support for the feasibility of web-based ACT interventions (Buhrman et al., 2013; Carlbring et al., in press; Hesser et al., 2012). One RCT compared a web-based ACT program to web-based CBT and a control condition (internet discussion forum) for tinnitus, finding equivalent positive effects for the ACT and CBT interventions relative to the control condition (Hesser et al., 2012). Another RCT compared a web-based ACT intervention to a control condition (internet discussion forum) for chronic pain,
indicating significant improvements on pain-related outcomes as well as depression and anxiety symptoms in ACT compared to the control condition (Buhrman et al., 2013). A third RCT compared a web-based intervention combining behavioral activation and ACT for depression to a waitlist with a sample of individuals diagnosed with major depressive disorder, finding that the website produced significant improvements in depression outcomes relative to waitlist (Carlbring et al., in press).

It is important to note that each of these web-based studies included regular therapist contact through a secure messaging system (approximately 15 minutes a week), with an emphasis on guiding and encouraging continued use of the program (i.e., guided self-help). Research indicates that guided self-help produces greater clinical effects and improves retention relative to websites without such contact (Andersson & Cuijpers, 2009). However, such an approach could introduce challenges when implementing a large scale, universal prevention program, given the resources required. There have been no studies to date testing the impact of a web-based ACT intervention without regular therapist contact.

In addition to recent web-based studies, a series of bibliotherapy studies have evaluated the efficacy of implementing ACT in a self-guided approach. As described in the previous section, bibliotherapy studies suggest that self-guided ACT interventions can reduce and prevent mental health problems in non-clinical populations including international college students (Muto et al., 2011), individuals with mild to moderate depressive symptoms (Fledderus et al., 2011) and K-12 school teachers (Jeffcoat & Hayes, 2012). Other bibliotherapy studies have found similar positive results when examining the efficacy of ACT in clinical populations including for anxiety disorders (Russo et al., 2010) and chronic pain (Johnston, Foster, Shennan, Starkey & Johnson, 2010).

In addition to outcome research, a number of studies have been conducted testing the impact of brief interventions using components of ACT in a self-guided format. For example,
studies have found audio/video recordings of brief acceptance, mindfulness, and values-based interventions can improve persistence in a distressing lab-based task (Kehoe, Barnes-Holmes, Barnes-Holmes, Cochrane & Stewart, 2007; McMullen et al., 2008), improve recovery in negative affect following mood induction (Broderick, 2005; Campbell-Sills, Barlow, Brown & Hofmann, 2006), reduce distress related to intrusive thoughts (Marcks & Woods, 2005), increase approach behavior towards spiders among individuals with spider phobia (Wagener & Zettle, 2011), increase willingness to engage in CO₂ exposure among individuals with panic disorder (Levitt, Brown, Orsillo & Barlow, 2004), reduce cognitive fusion with distressing thoughts among individuals high in contamination fear (Watson, Burley & Purdon, 2010), improve functioning on physical tasks among individuals with chronic pain (Vowles, McNeil, Bates, Gallimore & McCall, 2007), and reduce cigarette smoking (Bowen & Marlatt, 2009; Rogojanski, Vettese & Antony, 2011). Overall, these studies suggest that brief self-guided ACT interventions can produce significant effects on outcomes relevant to clinical disorders including depression and anxiety. Also of note, many of these studies used a sample of undergraduate students, suggesting these results generalize to college student populations.

Each of the Psychological Flexibility Components in ACT Can Impact Outcomes

As highlighted in the previous section, there is a body of research indicating the positive impact of brief ACT interventions targeting specific psychological flexibility (Levin et al., 2012). This is key for a web-based approach since brief interventions targeting specific treatment components provides an efficient means of translating a treatment to this new technology as well as reducing burden for user participation.

A recent meta-analysis of lab-based studies testing brief interventions targeting psychological flexibility components found significant small to large effect sizes for acceptance, values, defusion, present moment awareness, and various combinations of components (Levin et
Across the 8 studies evaluating the values component alone relative to an inactive control (i.e., inert attention control) condition there was a medium effect size on all outcomes (Hedge’s $g = .61$) and small effect size on theoretically targeted outcomes (Hedge’s $g = .41$). Across the 3 studies that evaluated the acceptance component alone relative to an inactive control there was a small effect on all outcomes (Hedge’s $g = .32$) and a large effect size on theoretically targeted outcomes (Hedge’s $g = .81$). There is more limited research on the additive benefit of combining subsets of psychological flexibility components. However, one study found that a brief intervention combining acceptance and values components had a greater impact on persistence in a painful task than acceptance alone (Branstetter, Cushing & Douleh, 2009).

It is important to note that these lab-based component studies are only suggestive of the potential clinical efficacy of each psychological flexibility component as measures tend to focus on proximal processes of change and convenience samples are often used. However, a subset of acceptance component studies have found these brief interventions to impact clinically-relevant outcomes including reduced cigarette smoking (Bown & Marlatt, 2009), willingness to participate in exposure (e.g., Eifert & Heffner, 2003; Levitt et al., 2004), and improved functioning in physical activities among individuals with chronic pain (Vowles et al., 2007). Similarly, studies have found that brief values interventions, in which participants are asked to write about their most important values, can have a range of positive effects including improving persistence in distressing lab-based tasks (Schmeichel & Vohs, 2009), academic performance among minority youth (Cohen, Garcia, Purdi-Vaughns, Apfel & Brzustoski, 2009), acceptance of health messages (Crocker, Niiya & Mischkowski, 2008; Harris & Napper, 2005), and positive emotions (Crocker et al., 2008).

There has been a lack of ACT component research using clinical samples and outcomes. One study compared an 8 session values and committed action focused intervention to an 8 session acceptance and defusion focused intervention with a sample of 15 treatment seeking
clients diagnosed with major depression and/or an anxiety disorder (Villatte & Hayes, in preparation). The study found significant improvements in both conditions for symptom severity, quality of life and mindfulness, although the acceptance condition improved more on symptom severity and the values condition improved more on quality of life. There were also differences in processes such that the acceptance condition improved more on cognitive defusion and being nonjudgmental, while the values condition improved more on engaging in values-congruent action. However, the two clients with PTSD in the values condition notably did not show any improvements in processes or outcomes, suggesting that this component in isolation may be less effective for PTSD. This study provides preliminary evidence for the efficacy of targeting a subset of psychological flexibility, albeit with potentially smaller effects depending on the outcomes and components targeted.

Overall, these results indicate that each of the psychological flexibility components has an impact on clinically-relevant outcomes. This provides further support for the implementation of a web-based intervention targeting these components. In addition, the ACT component research literature suggests that even a prototype focusing on only a subset of components, such as values and acceptance, could potentially produce positive clinical effects.

Is a Transdiagnostic Web-Based ACT Prevention Program Feasible?

The reviewed research highlights the potential feasibility and unique benefits of a web-based ACT prevention program for depression and anxiety disorders among college students. Yet, although supportive research has been conducted, there have been only a few published studies to date examining the impact of ACT in the context of prevention or web-based interventions. Thus, the current study could add important knowledge to several areas including the feasibility of transdiagnostic web-based prevention programs for college students, web-based ACT interventions in general, and ACT as a prevention approach for depression and anxiety disorders.
Given the novelty of a transdiagnostic web-based ACT prevention program as well as the development costs and time for creating such an intervention, initial prototype research is needed to determine the feasibility of the approach. Conducting feasibility research with initial prototypes can provide valuable information including the acceptability of the approach with students, usability of the website, and initial efficacy of the program in impacting processes of change and outcomes. This is key in not only determining whether such a program is likely to succeed, but also in informing further development of the program to maximize important factors such as user engagement, acceptability, usability, and efficacy.

If feasibility research identifies issues in terms of program acceptability or initial efficacy, the results can inform further program development as well as the determination of whether to continue to pursue a web-based universal prevention program based on ACT. Findings such as low program usage, poor satisfaction ratings, lack of effects on processes of change or outcomes, or negative reactions in subgroups could all be important warning signs that major revisions to the approach are needed. Conversely, if the prototype program is found to be promising with initial feasibility research, it could provide a foundation and guide for the development of a full web-based ACT prevention program. Ultimately, such a program could provide a relatively low cost means of implementing depression and anxiety prevention, while avoiding many of the barriers in college such as limited resources, breadth of disorders to be prevented, and student motivation. The sections that follow will describe a prototype web-based ACT prevention program designed for college students and preliminary feasibility data from an initial pilot RCT.
Preliminary Evidence for the Feasibility of a Prototype Transdiagnostic Web-Based ACT Prevention Program

ACT on College Life (ACT-CL) represents an effort to develop a prototype transdiagnostic web-based ACT program designed to help prevent a range of mental health problems in college students including depression and anxiety disorders. The program currently consists of two web-based multimedia lessons focused on two ACT components, which were developed as a “proof of concept” prototype through a phase I Small Business Innovation Research (SBIR) grant funded through the National Institute of Mental Health (R43 MH085336-01A2). In the prototype, the first lesson targets clarifying one’s values and setting values-based goals and the second lesson focuses on reducing experiential avoidance and promoting acceptance as an alternative. The program uses a combination of multimedia including animations, audio, text, and interactive elements, to support user engagement and to more effectively target psychological flexibility processes. Additional supplementary program materials are also provided through follow up emails to encourage continued application of program content in users’ lives and completion of goals that were set in the lessons.

The final to-be-developed ACT-CL program will likely include approximately 12 lessons with 2 lessons focused on each of the psychological flexibility components. Thus, the current prototype only includes a subset of psychological flexibility components and the lessons for each of these components are not yet fully deployed (i.e., 1 out of 2 of the values and acceptance lessons). The prototype includes very limited content targeting defusion, present moment, and self-as-context. The choice to focus on values and acceptance to the exclusion of other components is due to the limited resources available in a phase I SBIR grant to develop highly interactive, multimedia elements. Depending on the results of initial feasibility research, a more comprehensive program would later be developed with additional lessons targeting and elaborating on each of the psychological flexibility core processes. The ACT-CL prototype has
been evaluated so far in one pilot RCT (Levin et al., under review), which will be described below.

**Pilot Study Participants and Procedures**

The pilot study sample consisted of 76 first-year college students recruited from the Reno, NV area. The study used a universal prevention design with the only inclusion criteria being first-year college student status, fluent in English and between 18 and 20 years of age, with no inclusion criteria based on level of distress or other risk factors. The study focused on first-year college students to reduce heterogeneity in the sample and because the first year of college may be a promising access point for implementing prevention programming prior to mental health problems developing. The sample was 53.9% female with a mean age of 18.37 (SD = .54, Mode = 18). The sample consisted of 71.1% White, 9.2% Asian, 9.2% American Indian/Alaska Native, 7.9% Black, and 2.6% Native Hawaiian or Other Pacific Islander; 15.8% of the sample described themselves as Hispanic/Latino.

Participants were recruited through a combination of flyers, newspaper and online advertisements. Upon providing informed consent and completing a baseline assessment during an initial in-person meeting, participating students were randomized to either use the ACT-CL program for 3 weeks (n = 37) or to a waitlist condition for 3 weeks (n = 39). At the end of the initial in-person meeting, those who were randomized to ACT-CL were shown the program, briefly oriented on how to access and use it and encouraged to actively use the program for the next 3 weeks. After this 3 week period, participants completed a second self-report assessment. Participants in the waitlist condition were then assigned to use the ACT-CL program for 3 weeks. After the 6th week in the study, participants completed a final self-report assessment, either a 3 week follow up for the ACT-CL condition or a post assessment for the waitlist condition. Participants were compensated with a $60 check for participating. Self-report assessments included measures of psychological inflexibility (AAQ-II; Bond et al., in press), depression,
anxiety and stress (DASS; Lovibond & Lovibond, 1995a), and program usability (SUS; Tullis & Albert, 2008).

There was some attrition across assessment phases. Two participants (one from each condition) dropped out of the study after completing the baseline survey, reportedly because they were too busy with school. An additional participant in the ACT-CL condition dropped out before completing the third web-based survey also citing time constraints. An intent-to-treat (ITT) analytic approach was taken such that study dropouts were included in all analyses. Mixed Model Repeated Measure (MMRM) and Hierarchical Linear Modeling (HLM) were used in order to conduct analyses with the full ITT sample as these statistical methods use all available data and can model change even with missing data. Outlier analyses identified an outlier in the ACT-CL condition who reported experiencing a major non-research related adverse event (accidental death of a close family member) during the program-testing phase. This participant was excluded from all reported analyses.

Program Usability/Acceptability

There were no significant differences on program usage and usability variables between ACT-CL and waitlist participants who used the program (p > .10). Thus, program usage data was summarized across both the ACT-CL condition and waitlist condition (after using the ACT-CL program). The vast majority of students (92%) completed both lessons. Participants generally spent an adequate amount of time in the program (M = 81.98 minutes, SD = 22.68, Median = 77.57). The majority logged onto the program twice (58.1%), with most others logging in 3 (21.6%) or 4 to 5 (16.3%) times. Regarding the tailored emails, 85.3% reported reading the emails and 69.0% of those who read the emails reported engaging in the suggested exercises. Although participants took 3.89 days on average to complete each lesson after it was made available (SD = 2.57), 85% completed both lessons within the designated 3-week intervention period.
The mean usability rating of ACT-CL on the SUS combining both ACT-CL and waitlist participants was 84.55 (SD = 10.91), which indicates an “excellent” program based on past research on anchor scores for the SUS (Bangor et al., 2008). Participants appeared to be split when asked “What was the most important thing you learned from this program?” with 54% describing content from the values lesson and 46% from the acceptance lesson. These results indicate satisfactory usability and acceptability of the ACT-CL prototype with college students.

Program Outcomes

MMRM analyses examined differences between ACT-CL and waitlist on outcome and process measures from pre to post. In addition, HLM analyses were conducted to examine within group changes in the ACT-CL condition on outcome and process variables from pre to post to follow up. HLM analyses also examined within group changes in the waitlist condition before and after using the ACT-CL program (assessment point 2 and 3). In cases where the HLM analysis failed to converge, MMRM analyses were used to examine within group changes over time in ACT-CL. Unstructured covariance models were used in each MMRM and HLM analysis. Prior to running analyses, variables were checked for normality by examining histograms, skewness and kurtosis. Square root transformations were calculated for the DASS depression and anxiety variables at each time point in order to approximate a normal distribution.

Significant time by condition interactions were observed with MMRM on ACT knowledge, F(1, 71.85) = 38.85, p < .001, Cohen’s d = 1.47, education values success, F(1, 71.94) = 5.31, p = .024, Cohen’s d = .54, and intrinsic/positive motivation for education, F(1, 72.01) = 4.62, p = .035, Cohen’s d = .51, as well as a statistical trend on depression, F(1, 72.23) = 2.87, p = .095, Cohen’s d = .40. As can be seen in Table 2, participants in ACT-CL improved more on each of these measures relative to waitlist from pre to post. No other significant between-group effects over time were observed.
Table 2. Mean (SD) for outcome and process variables by condition and time point.

<table>
<thead>
<tr>
<th></th>
<th>Waitlist (n = 39)</th>
<th>ACT-CL (n = 37)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline (Time 1)</td>
<td>Post (Time 3)</td>
</tr>
<tr>
<td>ACT Knowledge</td>
<td>6.60(2.53)</td>
<td>10.18(3.15)</td>
</tr>
<tr>
<td>Depression</td>
<td>5.64(6.76)</td>
<td>6.15(7.23)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>6.00(6.26)</td>
<td>5.19(7.06)</td>
</tr>
<tr>
<td>Stress</td>
<td>10.26(7.37)</td>
<td>8.70(6.52)</td>
</tr>
<tr>
<td>Psych. Inflex.</td>
<td>17.50(7.11)</td>
<td>16.91(6.08)</td>
</tr>
<tr>
<td>Education + Mot.</td>
<td>4.41(.57)</td>
<td>4.36(.72)</td>
</tr>
<tr>
<td>Education Success</td>
<td>4.36(.87)</td>
<td>4.27(.80)</td>
</tr>
<tr>
<td>Relation. + Mot.</td>
<td>4.44(.50)</td>
<td>4.54(.51)</td>
</tr>
<tr>
<td>Relation. Success</td>
<td>4.31(.77)</td>
<td>4.65(.63)</td>
</tr>
</tbody>
</table>

*Education + Mot. = Intrinsic/positive motivation for education values; Relation. + Mot. = Intrinsic/positive motivation for relationship values.*

The lack of significant findings for depression, anxiety and stress may be attributable to insufficient power given the low sample size, which is a common limitation with universal prevention designs given issues such as floor effects and the lower incidence of distress (Cuijpers, 2003; Munoz et al., 2010). In addition, recent studies have found that in non-clinical samples, ACT may have a greater impact on psychological distress among individuals with elevated symptoms (Flederus et al., 2011; Muto et al., 2011). Subgroup analyses were thus conducted among students with at least minimal depression, anxiety and/or stress symptoms based on recommended DASS cutoff scores (Lovibond & Lovibond, 1995a; depression ≥ 10, anxiety ≥ 8, and/or stress ≥ 15). Among students reporting minimal or greater distress, results demonstrated significant time by condition interactions indicating greater reductions in anxiety, $F(1, 30) = 4.98$, $p = .033$, Cohen’s $d = .81$, and depression, $F(1, 30) = 6.23$, $p = .018$, Cohen’s $d = .91$, in the ACT-CL condition relative to waitlist. No significant between group differences were observed on depression or anxiety among non-distressed students ($p > .10$). There were also no significant between group differences for stress in either subgroup ($p > .10$).
Follow up data collected 3 weeks after completing the program was also available for the ACT-CL condition, which allowed preliminary inspection of whether improvements continue over time. HLM analyses were conducted to examine pre to follow up changes in the ACT-CL condition. Significant improvements ($p < .10$) were observed from pre to follow up on each outcome and process measure (see Table 3). Effect sizes for within group changes ranged from Cohen’s $d$ of .50 to .97. HLM failed to converge for ACT knowledge, but MMRM analysis found a significant improvement over time on ACT knowledge, $F(2, 33.28) = 29.56, p < .001$, Cohen’s $d = 1.88$. In each case, results indicated continuing improvement in outcome and process measures over time in the ACT-CL condition.

**Table 3. HLM results for pre to follow up changes within the ACT-CL condition**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Slope Estimate</th>
<th>SE</th>
<th>$t$</th>
<th>Cohen’s $d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>-.47</td>
<td>.13</td>
<td>-3.68***</td>
<td>.97</td>
</tr>
<tr>
<td>Anxiety</td>
<td>-.41</td>
<td>.13</td>
<td>-3.16**</td>
<td>.95</td>
</tr>
<tr>
<td>Stress</td>
<td>-.48</td>
<td>.14</td>
<td>-3.51***</td>
<td>.81</td>
</tr>
<tr>
<td>Psychological Inflexibility</td>
<td>-.85</td>
<td>.46</td>
<td>-1.85†</td>
<td>.52</td>
</tr>
<tr>
<td>Education Positive Motivation</td>
<td>.10</td>
<td>.06</td>
<td>1.79†</td>
<td>.50</td>
</tr>
<tr>
<td>Education Success</td>
<td>.16</td>
<td>.07</td>
<td>2.23*</td>
<td>.92</td>
</tr>
<tr>
<td>Relationship Positive Motivation</td>
<td>.08</td>
<td>.04</td>
<td>2.00†</td>
<td>.74</td>
</tr>
<tr>
<td>Relationship Success</td>
<td>.13</td>
<td>.06</td>
<td>2.10*</td>
<td>.78</td>
</tr>
</tbody>
</table>

†$p < .10$, *$p < .05$; **$p < .01$; ***$p < .001$.

HLM analyses were also conducted to examine changes on process and outcome measures within the waitlist condition before and after using the ACT-CL website (assessment point 2 and 3). There was a significant improvement in ACT knowledge from pre to post in the waitlist condition (slope estimate = -3.52, $SE = .43$, $t(36.14) = -8.20, p < .001$, Cohen’s $d = 1.12$).
There were no other significant changes after using the ACT-CL program in the waitlist condition ($p > .10$).

Overall, these results provide very preliminary evidence suggesting ACT-CL could be an acceptable and effective prevention approach for college students. There were high program usability/acceptability ratings from students and students appeared to actively engage and participate in the program based on program usage data. The program appeared to impart key ACT concepts to students based on improvements in program knowledge from pre to post and it had a positive impact on education values. Results also suggested that the prototype program could impact depression and anxiety symptoms, at least among students with minimal or greater symptoms at baseline. Furthermore, within condition effects from pre to 3 week follow up in the ACT-CL condition suggest that improvements may continue over time, including with outcomes that did not differentially improve between conditions at post. However, the results also raise questions regarding the impact of the existing components of ACT-CL on key process measures such as the AAQ-II and relationship values as well as whether results will replicate given the lack of changes from time 2 and time 3 in the waitlist arm. These findings point to potential future directions in establishing the feasibility of ACT-CL and identifying ways to further improve the program.

*Future Directions in Evaluating Feasibility with the ACT-CL Prototype*

The lack of between group effects on the AAQ-II raises concerns given ACT has been consistently found to reduce psychological inflexibility in past outcome studies (Hayes et al., 2006). The lack of between group differences on the AAQ-II at post may be due to the current prototype status of ACT-CL, which represents a relatively limited ACT intervention focused primarily on values and acceptance. Future feasibility research should examine the impact of ACT-CL when adding intervention content targeting the other psychological flexibility processes...
as well as evaluate intervention effects on a broader range of relevant acceptance and mindfulness processes.

The lack of improvements in the waitlist arm after receiving access to the program also raises questions regarding whether initial feasibility results will replicate. The pilot RCT was underpowered with a fairly low sample size, which may have added to the inconsistent findings and lack of observed effects on key process measures. In addition, results and sample characteristics raise questions regarding whether the program applies to a broader range of students such as those who are not currently distressed as well as non-first year students. Given the benefits of a universal prevention approach for implementation in colleges, it would be important to determine feasibility with a broader and larger population of students to replicate and extend the pilot RCT findings.

The impact of the ACT-CL prototype on education values highlights the potential positive behavioral effects of the program in addition to prevention of depression and anxiety. The focus of ACT-CL on values may serve to improve a range of behavioral outcomes, which is consistent with past ACT research indicating such interventions can lead to positive outcomes including innovation at work (Bond & Bunce, 2000), persistence in difficult tasks (Levin et al., 2012), improved academic performance (Cohen et al., 2009; Chase, 2010) and improved social functioning (Dalrymple & Herbert, 2007). This is key to a universal prevention approach, since such positive improvements could increase student buy in and provide additional incentives for institutions to implement such interventions. Future feasibility research would benefit from further examining the impact of ACT-CL on positive mental health measures.

Within group results in the ACT-CL condition from pre to 3 week follow up suggest that the impact of the program persists, and may even further improve, over time. However, the examination of program effects over time was very limited given the pilot RCT was not designed to examine between group effects at follow up and the follow up assessment in the ACT-CL
condition was only 3 weeks after the post. Conducting a feasibility trial with longer follow up for both conditions would allow for more in depth examination of the effects of ACT-CL over time as well as an initial examination of preventive effects.

Finally, although a waitlist comparison condition provides an initial benchmark for determining feasibility, it represents a relatively low bar (i.e., is this program more effective than doing nothing?). Individuals may improve relative to a waitlist for a variety of reasons including nonspecific intervention and method effects (i.e., social desirability, expectancies, placebo effects). A waitlist comparison does not yet answer the important question of whether the specific intervention approach has a promising positive impact above and beyond these nonspecific and method effects that are likely to occur with any form of intervention. Conducting such a test at the feasibility stage can serve to screen for the many interventions that are unlikely to be more effective than existing approaches, but produce some impact above and beyond nothing, in part due just to method factors (i.e., social desirability). Past reviews of the prevention literature have criticized the lack of active comparison conditions to control for nonspecific intervention and method effects (Dobson et al., 2010; Spence & Shortt, 2007; Stice, Rohde, Seeley & Gau, 2008) and the vast majority of recent pilot studies evaluating web-based prevention programs have focused on using active control conditions (Brathwaite & Fincham, 2007; 2009; Cukrowicz & Joiner, 2007; Chiauzzu et al., 2008; Schmidt et al., 2007). Thus, an important next step in evaluating the feasibility of the ACT-CL prototype is to determine whether such an intervention can produce positive effects on psychological flexibility processes and mental health outcomes above and beyond nonspecific effects that would be produced by participating in any credible intervention.
Overview of Study

The current study sought to further examine the feasibility of the ACT-CL prototype program as a web-based universal prevention approach for depression and anxiety disorders among college students through a RCT comparing the existing components of ACT-CL to an active control website. This study replicates and extends initial research on the ACT-CL prototype in several areas. The study tested the program with a larger and more varied sample of college students to help determine the applicability of the existing components of ACT-CL to a broader range of students. The study assessed the impact of ACT-CL on additional acceptance and mindfulness measures as well as added supplementary content targeting mindfulness to further assess whether the intervention can impact these processes. A text messaging feature was added to examine initial feasibility of including mobile interactivity to the website. A measure of positive mental health was added to further assess the impact of ACT-CL on positive behavioral outcomes. Follow up assessments were extended to 1- and 3-months post intervention to further examine effects over time between conditions. Lastly, the program was compared to an active control website to determine the impact of ACT-CL above and beyond nonspecific intervention and method factors related to accessing a credible web-based intervention discussing mental health issues. This replication and extension of the initial pilot RCT will help further determine the feasibility of a universal web-based prevention approach based on ACT to inform subsequent development and revisions to the program as well as the decision of whether to invest the resources needed to create a complete ACT-CL web-based program.

The specific aims of the study were to:

1. Examine the feasibility of ACT-CL by exploring whether program usage and satisfaction ratings indicate good acceptability for the two components so far developed as compared to an active control website.
2. Evaluate the initial efficacy of ACT-CL relative to an active control website in preventing the onset of clinical levels of depression and anxiety as well as preventing an increase in depression and anxiety symptoms at post and follow up time points. Secondary outcomes will further examine whether ACT-CL improves positive mental health and stress relative to the active control website at post and follow up.

3. Examine the processes of change for ACT-CL by analyzing the relationship of psychological inflexibility, mindfulness and values to intervention effects on outcomes as well as the relationship of ACT-CL program usage and program content knowledge to changes in outcomes.

4. Further explore the feasibility of implementing ACT-CL with a broad range of students by examining whether intervention effects, program usage or satisfaction ratings differ between subgroups of students based on factors including gender, minority status, age, year in school, depression/anxiety symptom severity, and psychological inflexibility.

5. Explore potential predictors of program engagement and program satisfaction with ACT-CL and the control website including psychological distress, positive mental health, psychological flexibility processes, and demographic characteristics.
CHAPTER TWO: METHODS

Participants

The sample consisted of 234 undergraduate college students from the University of Nevada, Reno. The sample was 76.9% female with a median age of 20 ($M = 21.61$, $SD = 5.48$, Range = 18 – 58). In terms of racial distribution, 76.2% were White or Caucasian, 9.3% Asian, 3.5% Black or African American, 1.8% American Indian/Alaska Native, 1.3% Native Hawaiian or Other Pacific Islander, and 7.9% other racial background. In addition, 16.2% identified as being of Hispanic or Latino ethnicity. In terms of year in school, 28.5% were first year students, 15.8% second year, 20.4% third year, 23.1% fourth year, and 12.3% fifth year or higher. In terms of recent treatment, 15% of participants reported seeing a therapist in the past 4 months and 11.5% reported receiving psychological medications in the past 4 months. In terms of participation starting date, 51.7% of participants started the study in the spring semester of 2012 and 48.3% in the fall semester of 2012, with participation start dates ranging from 3/6/2012 to 12/12/2012.

Study Procedures

Students were recruited at the University of Nevada, Reno through the SONA online research platform, flyers posted on campus and announcements made in psychology classes. Recruitment materials described the study as a student wellness program and outlined the main features of the study including eligibility criteria, study procedures, time commitment and compensation. Students were informed they were eligible if they were an undergraduate college student, fluent in English, and 18 years of age or older. Students were informed that they could receive Personal Experience Credit (PEC) for participating, which serves as extra credit for some psychology courses, in addition to a $10 gift card for completing the two follow up surveys.
Interested students were instructed to contact the study investigator to receive a link to the online consent form or to go directly to the online consent form using the link provided.

The online consent form as well as study surveys were hosted on a secure website (Qualtrics.com). The consent form outlined the study details including inclusion/exclusion criteria, procedures, potential risks and benefits, confidentiality, compensation, and their right to withdraw at any time without penalty. The contact information for the study investigator was provided to answer questions students had prior to deciding whether to participate. Students indicated their consent by clicking on the option “yes, I agree to participate.”

Students who consented to participate were automatically directed to the online baseline survey. Self-report questionnaires were administered to assess depression, anxiety, stress, positive mental health, psychological inflexibility, mindfulness, values, and ACT knowledge. Survey completers were automatically randomized by Qualtrics to study conditions (ACT-CL $n = 114$; control $n = 120$). Participants were then provided a link to the relevant website and instructions on how to begin using the program. Thus, all of the study procedures were completed remotely and participants did not meet with study staff in-person at any point in the study.

Participants were sent a post survey link 3 weeks after completing the baseline survey. Follow up survey links were sent 1-month and 3-months after the post survey link was sent. For each survey, participants were sent reminder emails and phone calls to complete the survey every 3 to 6 days for 21 days or until the survey was completed.

**ACT on College Life (ACT-CL)**

The ACT-CL prototype consisted of a 3-week program with 2 core multimedia lessons as well as supplementary emails, web-based resources and text messages to further strengthen and generalize program content. The multimedia lessons include a combination of audio narration, animation, text and graphic elements as well as interactive exercises (see appendix C for screen
shots from ACT-CL). Participants started by registering to create a unique username and password on the ACT-CL website. This unique login was used to customize content based on user characteristics (e.g., gender, name) and carry forward responses to specific worksheets and exercises across the two lessons. The program was designed using a “tunneled” format such that users had to complete the lesson in a pre-determined, sequential order.

The first lesson of ACT-CL focused on values clarification and goal setting and the second lesson on acceptance and committed action (see Table 4 below for an outline of lesson content). Participants were required to wait one week after completing the first lesson before starting the second. Reminder emails and phone calls were made every 3 to 6 days when a program lesson was available for completion until users completed the lesson or the 21-day intervention window passed.

Table 4. Outline of content for the ACT-CL multimedia lessons

<table>
<thead>
<tr>
<th>Lesson 1: Exploring your values</th>
<th>Component</th>
<th>Example Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defining what values are</td>
<td>Values as a direction animation; Quiz</td>
<td></td>
</tr>
<tr>
<td>Clarifying one’s values</td>
<td>Values card sorting exercise</td>
<td></td>
</tr>
<tr>
<td>Reflecting on one’s values</td>
<td>Journaling exercise; “Writing your headline” exercise</td>
<td></td>
</tr>
<tr>
<td>Defining effective and values-based goals</td>
<td>Reading about SMART and BRAVE goals; Quiz</td>
<td></td>
</tr>
<tr>
<td>Goal setting</td>
<td>Goal setting worksheet</td>
<td></td>
</tr>
<tr>
<td>Wrap up</td>
<td>Going further content (e.g., FAQ, other media); Lesson summary</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lesson 2: Dealing with barriers</th>
<th>Component</th>
<th>Example Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review of last session</td>
<td>Session review animation; Homework check-in</td>
<td></td>
</tr>
<tr>
<td>Exploring internal barriers to values-based actions</td>
<td>Values bulls eye exercise; Internal barriers checklist</td>
<td></td>
</tr>
<tr>
<td>The problem with control strategies</td>
<td>Passengers on the bus animation; Pain vs. suffering exercise</td>
<td></td>
</tr>
<tr>
<td>Defining and practicing willingness</td>
<td>And vs. but exercise; Leaning in animation; Quiz; Breath holding to practice willingness</td>
<td></td>
</tr>
</tbody>
</table>
In addition to completing the two multimedia lessons, participants received a number of supplementary materials through three sources. First, participants were automatically sent a series of follow up emails through the ACT-CL program. This included emails to complete one’s goals and suggestions for additional ways to work with values and willingness (e.g., reflecting on people you admire and what that says about your values; using the NAME technique to practice willingness). See Appendix B for a list of follow up emails that were sent to users.

After completing each lesson, participants were also sent an email with a link to access supplementary materials related to practicing mindfulness. Mindfulness resource pages were hosted on Qualtrics.com and were primarily text based with some supplementary illustrations and downloadable audio guided exercises (see Appendix C for example screen shots). The first mindfulness resource focused on introducing participants to mindfulness and guiding them to practice a breathing meditation. There were six pages, which covered defining what mindfulness is, how it can be helpful, the specific qualities of mindfulness, an audio guided breathing exercise, and instructions to continue practicing the breathing mindfulness exercise. The second mindfulness resource focused on learning how to notice difficult internal experiences for what they are without fighting with or getting entangled in them. There were four pages, which covered introducing the concept of “observing passengers for what they are”, written instructions for practicing a labeling mindfulness exercise, and additional downloadable exercises to continue practicing mindfulness (i.e., leaves on a stream, labeling mindfulness exercise, tin can monster exercise). These supplementary materials were added following the initial pilot RCT results to
provide additional intervention content targeting present moment and defusion processes as well as test user engagement with additional supplementary resources.

A text messaging feature was also added in the current study. When participants were first provided the information for the ACT-CL website, they were asked whether they would like to receive text messages as part of the program - “The program also includes a feature in which students receive periodic text messages related to program materials. These additional text messages may be helpful for students, but we also understand that some students have no or limited text messaging for their phone. If you would be willing to receive these text messages, please confirm so by entering the cell phone we can send texts to in the space provided below. Note: this will only be used for text messages related to the program within the designated 3 week program period.” Those participants who provided their cell phone number were sent brief text messages 3 days and 6 days after completing each lesson. These text messages encouraged participants’ to continue to examine ways to apply the program materials to their life (see Appendix B for a list of text messages that were sent). For example, participants were encouraged to reflect on how their activities of the day connect with their personal values or to practice willingness with a difficult internal barrier.

**Active Control Website – Healthy Living**

The active control website, Healthy Living, was a 3-week program involving two web-based lessons focused on providing basic educational information about the symptoms and causes of depression and anxiety as well as brief information on coping strategies. The Healthy Living website was designed to control for nonspecific and method effects related to accessing a credible web-based intervention discussing mental health issues, while avoiding covering content related to acceptance, mindfulness and values-based processes. Each lesson was hosted on a secure website (Qualtrics.com). The lessons were primarily text-based, but also included supplementary
illustrations and knowledge test questions. The lesson content was taken from two websites ulifeline.org and halfofus.com, which were created by the Jed Foundation and in collaboration with mtvU to help provide information to college students about mental health and suicide prevention. However, it is important to note that information taken from these two websites was screened so that only basic psychoeducation regarding depression and anxiety were included, while more active content such as celebrity videos describing experiences with mental health problems were excluded from the control website. The control website was designed to be consistent with other pilot RCTs testing computerized depression and anxiety prevention programs for college students, which have typically included basic psychoeducation as an attention control condition (Brathwaite & Fincham, 2007; 2009; Cukrowicz & Joiner, 2007). Participants were provided links to access each lesson, which included a unique URL so that program usage could be connected to specific participants.

The first lesson was twenty pages and focused on depression. The lesson began with an overview and introduction to the program. Users were then provided educational information regarding symptoms, prevalence and causes of depression. Basic and brief information was provided on dealing with depression (i.e., planning the day, extracurricular activities, seeking support from others, relaxation methods, taking time for yourself, seeking treatment) as well as coping with depression in a relationship (i.e., offering support, sharing feelings, self care). Of note, coping strategies that were presented on the website were very brief and designed so as to not overlap in any way with psychological flexibility processes (i.e., acceptance, mindfulness and values-based strategies). Participants waited one week after completing the first lesson before they were emailed a link to the second lesson.

The second lesson was twenty eight pages and focused on anxiety and stress. The lesson began with an overview and introduction to the lesson. Users were then provided information on identifying symptoms and causes of stress. The program then provided educational information
on the symptoms, prevalence and causes for each of the following anxiety problems - panic attacks, panic disorder, social phobia, generalized anxiety disorder, test anxiety, and other major anxiety disorders. Users were then provided basic and brief information regarding tips for managing stress and anxiety (i.e., physical activity, goal setting, time management, positive thinking, extracurricular activity, making friends, relaxation strategies, taking time for self, and communication) as well as tips for more specific problem areas including struggling with concentration, confidence, and test anxiety. Users were provided a brief summary of the lesson, which was the last step of using the website.

Participants in the active control condition also received regular contact as needed to prompt them to complete available lessons. Reminder emails and phone calls were made every 3 to 6 days when a program lesson was available for completion until users completed the lesson or the 21-day intervention window passed.

**Measures**

Participants completed web-based self-report assessments at baseline, post (3-weeks after baseline), 1-month follow up and 3-month follow up. Table 5 provides an outline of the measures administered at each time point. The full measures are listed in Appendix A.

Table 5. *Assessment instruments administered per time point*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Baseline</th>
<th>Post</th>
<th>1-Month Follow Up</th>
<th>3-Month Follow Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>DASS</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>MHC-SF</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>SUS</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFQ-Y</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>PVQ</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>FFMQ</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>ACT Knowledge</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Primary Outcome Measure

Depression, Anxiety and Stress Scale (DASS; Lovibond & Lovibond, 1995a). The DASS was used as the primary outcome measure for depression and anxiety symptoms. The DASS is composed of three distinct subscales assessing depression, anxiety and stress symptoms. The measure asks participants how much each statement applied to them over the past week on a 4-point scale ranging from 0 “did not apply to me at all” to 3 “applied to me very much, or most of the time.” The 21-item version of the DASS was used in the current study as it has been found to have a better factor structure than the full 42-item version of the scale (Antony, Bieling, Cox, Enns & Swinson, 1998) and the shorter scale helps to reduce the assessment burden for participants.

The DASS depression and anxiety subscales have been found to have adequate convergent and divergent validity with other self-report measures of depression and anxiety and to match expected patterns in symptoms among clinical samples with depression and anxiety disorders in past studies (Antony et al., 1998; Lovibond & Lovibond, 1995a). In addition, the DASS depression and anxiety subscales have been found to better distinguish depression and anxiety symptoms than the Beck Depression Inventory (Beck, Steer & Brown, 1996) and Beck Anxiety Inventory (Beck, Epstein, Brown & Steer, 1988) (Lovibond & Lovibond, 1995b). The DASS has also been found to be sensitive to detecting treatment effects from self-guided ACT interventions with student samples (e.g., Muto et al., 2011). Past research has found the 21-item DASS to have adequate reliability with a Cronbach’s alpha of .94, .87, and .91 for the depression, anxiety, and stress subscales respectively (Antony et al., 1998). In the current study the Cronbach’s alpha for the depression, anxiety and stress subscales were .89, .84 and .87 respectively.

The DASS is particularly apt for the current study as it provides anchors to indicate normal levels of depression (0-9), mild to moderate depression (10-20), and severe depression
(21-42) as well as normal levels of anxiety (0-7), mild to moderate anxiety (8-14), and severe anxiety (15-42). These cutoffs were used to identify participants who are experiencing mild to moderate symptoms as well as a benchmark for severe depression and anxiety when examining preventive effects.

**Secondary Outcome Measures**

*Mental Health Continuum – Short Form (MHC-SF; Keyes, 2005).* The MHC-SF is a 14-item measure of positive mental health. Items assess theoretically meaningful dimensions of wellbeing including positive affect, satisfaction with life, social integration, social contribution, autonomy, personal growth, purpose in life, and self-acceptance. The MHC-SF has been found to have adequate reliability and validity in past research, with a Cronbach’s alpha of .74 (Keyes, 2005). In the current sample, the Cronbach’s alpha for the MHC-SF was .93.

The MHC-SF is a useful additional variable to examine in the context of an ACT prevention program. Research has found that positive mental health can serve as a protective factor for psychological disorders (Keyes, Dhingra & Simoes, 2010) and that positive mental health is an important public health outcome in its own right (Keyes, 2007). Furthermore, many of the items overlap with processes directly targeted in ACT such as acceptance and values-based action.

*System Usability Scale (SUS; Tullis & Albert, 2008).* The SUS is a 10-item scale designed to assess program usability and acceptability. Each item is rated on a 5-point scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). Research summarized across 206 studies indicates that the SUS items load onto a single latent factor, have a high level of internal consistency (Cronbach’s alpha = .91) and can distinguish between more and less usable programs (Bangor, Kortum & Miller, 2008). The Cronbach’s alpha for the SUS in the current study at post was .87.
Additional questions were provided to further assess program satisfaction based on similar items that have been created for other self-help and prevention projects. Participants rated items including “Overall, I was satisfied with the quality of the wellness program.”, “I would like to use the wellness program again in the future.”, “I think the wellness program would be helpful for college students.” and “I would recommend the wellness program to other college students.” Participants in the ACT-CL condition were also asked to rate the program emails (“The follow up emails about values and willingness I received from the program were helpful.”) and supplementary mindfulness resources (“The mindfulness resources I received through the email link were helpful”) as well as their experiences with the text message for those who received them (“The text messages I received from the ACT on College Life program were helpful”). Each of these items were rated on a 6-point scale from 1 (“strongly disagree”) to 6 (“strongly agree”). Users were also asked to indicate why they did not complete both lessons if they did not complete the program with options including “knew it already”, “not interested”, “no time”, “not engaging”, “could not access the program” and “other.” Open ended questions assessed what users liked best about the program, what they liked least, and how they would have liked the program to be different.

Process Measures

Avoidance and Fusion Questionnaire for Youth (AFQ-Y; Greco, Lambert & Baer, 2008).

The AFQ-Y is a 17-item measure of psychological inflexibility developed initially for use with children and adolescents. Responses are given on a 5-point scale ranging from 0 “Not at all true” to 4 “Very true.” The AFQ-Y has been found to have adequate reliability and validity in both child and adolescent (Greco et al., 2008) as well as college student samples (Schmalz & Murrell, 2010). In college student samples, the measure has been shown to have high internal consistency, with a Cronbach’s alpha of .92 (Schmalz & Murrell, 2010). The AFQ-Y had a Cronbach’s alpha of .90 in the current study.
The AFQ-Y appears to function similarly to the AAQ-II. For example, among college students the measure is highly correlated with the AAQ-II \( r = .68 \) and demonstrates nearly identical correlations with psychological symptoms and mindfulness processes (Schmalz & Murrell, 2010). The AFQ-Y differs from the AAQ-II however in that it includes specific examples of events and behaviors that are especially relevant to younger populations, including college students (e.g., “I can’t be a good friend when I’m upset”, “I do worse in school when I have thoughts that make me feel sad”). Thus, the AFQ-Y provides a more domain specific measure of psychological inflexibility relative to the AAQ-II (Schmalz & Murrell, 2010). These more domain specific measures of psychological inflexibility are often found to be more sensitive to detecting intervention effects for relevant populations than the general AAQ and AAQ-II (e.g., Gifford et al., 2004; Gregg, Callaghan, Hayes & Glenn-Lawson, 2007). Therefore, the AFQ-Y may be more sensitive to detecting the impact of a web-based ACT program on psychological inflexibility among college students. This is especially relevant for the current study given the lack of between group differences on the AAQ-II that were observed in the initial pilot RCT.

**Personal Values Questionnaire-Relationship and Education Subscales (PVQ; Ciarrochi, Blackledge & Heaven, 2006).** The PVQ consists of a series of 10-item subscales, which assess various aspects of values within particular domains of living. The relationship and education domains were included in the current study. Participants were asked to provide a brief narrative describing their values in interpersonal relationships and education. A series of 5 questions assessed appetitive and aversive reasons for their values in each of these domains on a 5-point scale ranging from 1 “Not at all for this reason” to 5 “Entirely for this reason.” A ratio can be calculated examining aversive reasons divided by appetitive reasons for a total score of values reasons. Participants were also asked to rate their degree of success in living consistently with their values over the past 3 weeks. Past studies have supported the construct validity of the PVQ
values reasons and success items in samples including college students (Ciarrochi et al, 2006; Ciarrochi, Fisher & Lane, 2011; Ferssizidis et al., 2010)

*Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006)*. The 8-item acting with awareness and 7-item nonreactivity subscales of the FFMQ were used to assess key features of mindfulness. The acting with awareness subscale assesses the tendency to *not* attend to present moment experiences while engaging in activities (i.e., “I find myself doing things without paying attention”). The nonreactivity subscale assesses the capacity to notice thoughts and feelings without acting on or otherwise getting entangled with them (i.e., “I perceive my feelings and emotions without having to react to them”). Each FFMQ item is rated on a 5-point scale ranging from 1 (“never or very rarely true”) to 5 (“very often or always true”). The FFMQ has been found to be a reliable and valid measure of mindfulness in past research with nonclinical college student samples (Baer et al., 2006) and clinical samples (Bohlmeijer et al., 2011). The acting with awareness subscale has been found to be a particularly consistent predictor of mental health and other behavioral problems (Bohlmeijer et al., 2011; Levin, Dalrymple & Zimmerman, under review). Nonreactivity was also included given the relevance of this construct to the psychological flexibility processes of acceptance and defusion. Previous research with college students has found Cronbach’s alpha values of .87 and .75 for the acting with awareness and nonreactivity subscales respectively (Baer et al., 2006). In the current sample, the Cronbach’s alpha was .91 for the acting with awareness subscale and .86 for the nonreactivity subscale.

*ACT Knowledge Questionnaire*. A 16-item ACT knowledge questionnaire was used to assess changes in participants’ understanding of ACT core concepts before and after completing the ACT-CL and control programs. The questionnaire involves a series of multiple choice and true/false questions related to ACT concepts presented in the two multimedia lessons (e.g., “True/False: Values are specific goals and outcomes one hopes to achieve”). The ACT knowledge questionnaire was developed for use with the ACT-CL prototype based on existing
knowledge questionnaires used in ACT bibliotherapy studies (Jeffcoat & Hayes, 2012). In the initial pilot RCT, the questionnaire appeared to be sensitive to detecting increases in ACT knowledge before and after completing the ACT-CL program (paired samples t-test: \( t = 5.52, p < .001, \text{Cohen’s } d = 1.64 \)). The internal consistency of the knowledge test was low in the pilot RCT with a Cronbach’s alpha of .48. In the current study the Cronbach’s alpha was .67.

**Program Usage.** The ACT-CL and control website programs both automatically collected data on participants’ use of the program including number of pages of viewed, time spent on pages, number of logins and specific responses to exercises. This data was used to examine program usage across the two lessons in both conditions. In addition to providing data regarding the usability of the program, usage variables such as time spent on pages and word count in written exercises were used to examine program engagement.

**Data Analysis Plan**

**Preliminary Analyses**

Initial analyses were conducted to ensure the validity of the database. Descriptive statistics were checked for out of range values and Cronbach’s alphas were examined for each measure to help identify any potential syntax errors. At the end of each assessment battery, participants were asked to indicate the degree to which they randomly responded to the surveys. An initial screening was conducted prior to analyses in which students who reported randomly responding to most or all of the questions at any time point were removed from all analyses (ACT-CL \( n = 2 \), Control \( n = 2 \)).

Dependent variables were checked for normality by examining histograms and estimates of skewness and kurtosis. Relevant data transformations (e.g., exponential, logarithmic, square root) were calculated to correct for any non-normal distributions identified. Descriptive statistics were examined for each outcome and process variable by time point and condition in order to
provide an initial overview of the observed results. Independent sample $t$-tests and chi square analyses were conducted to test for between group differences in demographics, outcome and process variables at baseline.

Zero order correlations were conducted to examine baseline relationships between outcome and process measures. These analyses were used to examine the construct validity for each measure as well as to test theoretical predictions regarding the relationship between process and outcome measures.

**Program Usage and Satisfaction**

A series of analyses were conducted to examine program usage and satisfaction ratings in ACT-CL and the control condition. Descriptive statistics were examined for program usage variables including time on each lesson, number of logins, and program completion rates. Independent $t$-tests and chi square analyses were conducted to compare differences on program usage between conditions. Descriptive statistics for program satisfaction ratings at post were also examined for each condition and independent $t$-tests compared differences on SUS and individual satisfaction items between conditions.

In order to better understand any differences found between the current study and initial pilot RCT results, a series of analyses were conducted to compare the ACT-CL participants in these two studies. Program usage and satisfaction ratings were compared on the ACT-CL website between the two studies using independent $t$-tests and chi square analyses. ANCOVA analyses compared differences on depression, anxiety, stress, ACT knowledge and values at post in the ACT-CL condition between studies, controlling for baseline scores. In order to examine potential differences between these samples, independent $t$-tests and chi square analyses were also conducted on demographic and baseline process and outcome variables between the initial pilot RCT and the current study.
**Intervention Effects**

MMRM analyses were conducted to examine between and within group changes over time on outcome and process measures. Unstructured covariance models were used for each outcome/process variable analysis. Analyses were conducted for each outcome and process measure examining time effects and condition by time interactions from pre to post and pre to post to 1-month to 3-month follow up. Post hoc analyses were conducted to examine differences between condition at each time point as well as within condition changes from pre to post, pre to 1-month and pre to 3-month follow up. Cohen’s $d$ effect sizes were calculated for MMRM time and time by condition effects as well as post hoc comparisons of within and between group contrasts using recommended procedures (Rosenthal & Rosnow, 1991; Verbeke & Molenberghs, 2000; Wackerly, Mendenhall & Scheaffer, 2008). Effect sizes were interpreted based on recommended labels for Cohen’s $d$ (Cohen, 1988).

An intent-to-treat (ITT) analytic approach was taken such that all participants were included in analyses, besides the small portion removed for data validity issues (see above). MMRM provides a powerful method for conducting analyses with the full ITT sample because this approach can model change even with participants who are missing data on one or more post and follow up time points. However, if results indicated differential program completion rates between conditions, analyses would first be conducted only among program completers prior to ITT analyses to better control for dosage effect differences between conditions.

The rate of participants meeting DASS cutoff scores for severe depression and anxiety at post, 1-month and 3-month follow up were used to examine group differences in incidence rates for clinical levels of depression and anxiety. Chi square analyses compared rates of severe depression, severe anxiety and severe depression and/or anxiety between the ACT-CL and control condition at each time point. Analyses were conducted with the full sample as well as split between participants who were or were not severely depressed/anxious at baseline. This allowed
for the separate examination of treatment effects (i.e., those who were severely distressed at baseline but improved over time) and prevention effects (i.e., those who were not severely distressed at baseline but became so over time). An ITT approach was taken such that all participants who completed the baseline assessment were included in the analyses. In cases where a participant dropped out and there was missing data for later time points, the participant’s most recent available data was carried forward and used for the missing data point(s).

Given research indicating that mental health education improves treatment seeking (Jorm, 2012), additional chi square analyses examined whether rates of self-reported treatment seeking differed by condition at 3-month follow up for seeing a therapist or receiving psychological medications in the past 4 months. These analyses were conducted with the full sample as well as split between those who did and did not report participating in treatment at baseline.

*Intervention Effects with Specific Subgroups*

MMRM analyses were repeated with specific subgroups to further explore whether results were stronger or otherwise differed when isolating particular subsets of students. Subgroups included participants with various degrees of depression/anxiety symptoms, higher and lower psychological inflexibility, first year students and non-first year students, 18-22 year olds and older students, male and female students, and minority and non-minority students. Analyses conducted separately based on year in school, age, gender, and minority status allowed for the examination of whether ACT-CL has a similar impact across a broad range of types of students or if subsets of students may react differently to the program. Analyses with first-year student and older students were also relevant for determining generalizability given that the initial pilot RCT only included first year students and that the program may be better tailored to this subgroup. The age range of 18 to 22 was selected given this represents 79% of the current sample, with a notable drop in rates of participants starting at age 23, which is consistent with what would be considered a traditional college age sample.
Analyses were conducted separately among participants with no depression or anxiety symptoms (DASS depression < 10 and anxiety < 8), minimal to moderate depression and/or anxiety (depression between 10-20 and/or anxiety between 8-14) and severe depression and/or anxiety (depression > 20 and/or anxiety > 14) based on recommended DASS cutoff scores (Lovibond & Lovibond, 1995a). These analyses were conducted given that greater intervention effects were found among distressed students in the initial pilot study (Levin et al., under review) as well as moderation effects by level of distress found in some previous ACT trials with non-clinical samples (Fledderus et al., 2011; Flaxman & Bond, 2010b). The distinction between minimal/moderate symptoms and severe symptoms allowed for the separate examination of indicated prevention effects and treatment effects for ACT-CL. Analyses were also conducted among participants above and below the median psychological inflexibility score in the sample (median = 35) given some past research indicating moderation effects with this variable (e.g., Masuda et al., 2007; Zettle, 2003).

Processes of Change Analyses

A series of analyses were conducted to examine the relationship of changes in psychological flexibility processes with changes in outcomes. Partial correlations were conducted with the full sample (combining both conditions) to examine the relationship of pre to post changes in psychological flexibility processes with 1-month and 3-month outcomes, controlling for their respective baseline score. This allowed for the examination of whether changes in process measures were predictive of improvements in outcomes irrespective of condition. Moderation analyses were then conducted using linear regression analyses in which a condition by process change score term was added as a predictor of each outcome at 1-month and 3-month follow up, controlling for baseline score. This provided a means of testing whether improvements in outcomes were more related to changes in process measures in the ACT-CL condition.
Additional partial correlation analyses were also conducted with the ACT knowledge questionnaire to determine whether improvement in knowledge from pre to post in the ACT-CL condition were related to changes in process measures at 1-month follow up. This allowed for the examination of whether students who engaged and learned the concepts in the program subsequently improved on relevant psychological flexibility processes.

**Relationship of Program Usage to Changes in Process Measures**

Analyses were conducted to examine the relationship of engagement in ACT-CL with improvements from pre to post in psychological flexibility process measures. A series of variables were identified as proxies for program engagement in the ACT-CL condition including time on each lesson, word count on key exercises, number of logins, lesson completion, whether users access additional mindfulness resources, and whether students received text messages. Partial correlations were used to examine the relationship between continuous program engagement variables and post scores on each process measures, controlling for the respective baseline score on the process measure. Analysis of Covariance (ANCOVA) examined whether post process measures differed based on dichotomous program engagement variables, controlling for each respective process measure score at baseline.

**Predicting Program Usability and Satisfaction**

Analyses were conducted to examine whether baseline outcome, process or demographic variables predicted level of program engagement. In the ACT-CL condition, correlations tested whether baseline process and outcome variables were related to time on each ACT lesson and word count in key exercises. Independent sample \( t \)-test compared baseline variable scores between participants who did and did not request to receive text messages, did or did not access the additional mindfulness resources, and did or did not complete the program lessons. Independent \( t \)-tests and chi square analyses were also conducted to examine whether ACT-CL program engagement variables differed between specific subgroups including first year students.
and non-first year students, 18-22 year olds and older students, male and female students, minority and non-minority students, participants with various degrees of depression/anxiety symptoms, and higher and lower psychological inflexibility.

In the control condition, correlations were examined between baseline outcome and process measures and time spent on each lesson. These analyses allowed for further examination of whether outcome and process measures predict degree of engagement in a mental health education website in which there is no minimum required time on each page and users can skip through as quickly as they choose.

A series of independent t-tests compared program usability and satisfaction ratings between subgroups. Subsequent 2x2 ANOVA tested for interaction effects between condition and subgroup to determine if students belonging to particular groups reacted differently depending on what website they viewed. Open ended questions regarding students reactions to the program were coded for themes and rates of responses on these themes were compared between conditions using chi square analyses.
CHAPTER THREE: RESULTS

Participant Flow

The rate of participants in each condition who were screened out of analyses and who completed each step of the study is listed in Table 6. There was significantly lower program completion in ACT-CL relative to the control condition, with 85\% completing lesson 1 in ACT-CL versus 100\% completing lesson 1 in the control condition ($\chi^2 = 18.46, p < .001, \text{Cohen's } d = .59$) and 55\% completing lesson 2 in ACT-CL versus 86\% completing lesson 2 in the control condition ($\chi^2 = 25.14, p < .001, \text{Cohen's } d = .70$). There was significantly lower survey completion rates in ACT-CL relative to control condition at post ($\chi^2 = 9.12, p = .003, \text{Cohen's } d = .41$), but not at 1-month follow up ($\chi^2 = 2.26, p = .13, \text{Cohen's } d = .20$) or 3-month follow up ($\chi^2 = 2.25, p = .13, \text{Cohen's } d = .20$).

Table 6. Participant flow by condition

<table>
<thead>
<tr>
<th>Time point</th>
<th>ACT-CL</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participated in previous study</td>
<td>2/114</td>
<td>0/120</td>
</tr>
<tr>
<td>Randomly responded on one or more assessment points</td>
<td>2/112</td>
<td>2/120</td>
</tr>
<tr>
<td>Completed Lesson 1</td>
<td>94 / 110 (85%)</td>
<td>118 / 118 (100%)</td>
</tr>
<tr>
<td>Completed Lesson 2</td>
<td>61 / 110 (55%)</td>
<td>101 / 118 (86%)</td>
</tr>
<tr>
<td>Completed Post</td>
<td>77 / 110 (70%)</td>
<td>102 / 118 (86%)</td>
</tr>
<tr>
<td>Completed 1-Month Follow Up</td>
<td>70 / 110 (64%)</td>
<td>86 / 118 (73%)</td>
</tr>
<tr>
<td>Completed 3-Month Follow Up</td>
<td>69 / 110 (63%)</td>
<td>85 / 118 (72%)</td>
</tr>
</tbody>
</table>

Missing Data

Six participants were removed from the database and all analyses, 2 in the ACT-CL condition had previously participated in the pilot RCT evaluating the same website and 4 (2 from each condition) indicated on one or more assessment points that they randomly responded to most or all of the survey questions. For the baseline assessment, between 0 and 9 participants were
missing data depending on the variable. For the post assessment between 0 and 7 participants were missing data per variable in addition to the 49 participants who did not complete the assessment. For the 1-month follow up between 0 and 7 participants were missing data per variable in addition to the 72 participants who did not complete the assessment. For the 3-month follow up between 1 and 9 participants were missing data per variable in addition to the 74 participants who did not complete the assessment.

Preliminary Analyses

The distribution for each variable was examined through histograms as well as skewness and kurtosis statistics. Square root transformations were calculated with DASS depression, DASS anxiety, and relationship values reasons, a log 10 transformation was calculated with the AFQ, and an exponential transformation was calculated with education values reasons to approximate a normal distribution for each variable. Transformations were conducted with relevant variables at each time point to allow for longitudinal analyses.

Independent t-tests and chi square analyses were conducted to test for between group differences at baseline. There were no significant differences on any outcome, process or key demographic variables between conditions at baseline ($p > .10$).

Zero Order Correlations at Baseline between Process and Outcome Measures

Zero order correlations were conducted to examine the relationship between process and outcome measures at baseline (See Tables 7, 8 and 9). Within the outcome variables, greater positive mental health significantly correlated with lower psychological distress symptoms with correlation coefficients ranging from -.41 and -.54. In addition, greater values success significantly correlated with lower psychological distress symptoms with coefficients ranging
from -.20 and -.32 as well as greater positive mental health with coefficients of .38 and .35.

Overall, these observed relationships supported the construct validity of the scales.

Table 7. Zero order correlations for outcome variables at baseline

<table>
<thead>
<tr>
<th></th>
<th>Depression</th>
<th>Anxiety</th>
<th>Stress</th>
<th>MHC</th>
<th>Rel. Success</th>
<th>Ed. Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>-</td>
<td>.68***</td>
<td>.75***</td>
<td>-.54***</td>
<td>-.32***</td>
<td>-.26***</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.68***</td>
<td>-</td>
<td>.70***</td>
<td>-.41***</td>
<td>-.20**</td>
<td>-.21**</td>
</tr>
<tr>
<td>Stress</td>
<td>.75***</td>
<td>.70***</td>
<td>-</td>
<td>-.46***</td>
<td>-.23***</td>
<td>-.23***</td>
</tr>
<tr>
<td>MHC</td>
<td>-.54***</td>
<td>-.41***</td>
<td>-.46***</td>
<td>-</td>
<td>.38***</td>
<td>.35***</td>
</tr>
<tr>
<td>Rel. Success</td>
<td>-.32***</td>
<td>-.20**</td>
<td>-.23***</td>
<td>.38***</td>
<td>-</td>
<td>.35***</td>
</tr>
<tr>
<td>Ed. Success</td>
<td>-.26***</td>
<td>-.21**</td>
<td>-.23***</td>
<td>.35***</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

*p < .10, *p < .05; **p < .01; ***p < .001. MHC = Positive Mental Health; Rel. Success = Relationship Values Success; Ed. Success = Education Values Success.

Within the process variables, greater psychological inflexibility was significantly related to lower nonreactivity, lower acting with awareness, and worse values reasons with relatively low correlation coefficients ranging between .14 and .22 besides a moderate relationship with acting with awareness (r = -.46). The mindfulness variables had low to no relationship with other process measures besides the AFQ, with only nonreactivity being related to reasons for values. Also noteworthy, the nonreactivity and acting with awareness subscales were not correlated. Greater ACT knowledge was found to relate to higher nonreactivity and better values reasons with coefficients ranging between .13 and .29 as well as a trend with lower psychological inflexibility. Overall the relationship between psychological flexibility process measures was lower than what would be expected given each of these measures is designed to assess a key aspect of psychological inflexibility/flexibility, besides ACT knowledge which was more an assessment of content knowledge related to the ACT-CL program.
Table 8. Zero order correlations for process variables at baseline

<table>
<thead>
<tr>
<th></th>
<th>AFQ</th>
<th>FFMQ-NR</th>
<th>FFMQ-AW</th>
<th>Rel. Ratio</th>
<th>Ed. Ratio</th>
<th>ACT Quiz</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFQ</td>
<td>-</td>
<td>-.14*</td>
<td>-.46***</td>
<td>.15*</td>
<td>.22**</td>
<td>-.13†</td>
</tr>
<tr>
<td>FFMQ-NR</td>
<td>.14*</td>
<td>-</td>
<td>-.05</td>
<td>-.14*</td>
<td>-.20**</td>
<td>.13*</td>
</tr>
<tr>
<td>FFMQ-AW</td>
<td>-.46***</td>
<td>-.05</td>
<td>-</td>
<td>-.11</td>
<td>-.08</td>
<td>-.03</td>
</tr>
<tr>
<td>Rel. Ratio</td>
<td>.15*</td>
<td>-.14*</td>
<td>-.11</td>
<td>-</td>
<td>.58***</td>
<td>-.29***</td>
</tr>
<tr>
<td>Ed. Ratio</td>
<td>.22**</td>
<td>-.20**</td>
<td>-.08</td>
<td>.58***</td>
<td>-</td>
<td>-.22**</td>
</tr>
<tr>
<td>ACT Quiz</td>
<td>-.13†</td>
<td>.13*</td>
<td>-.03</td>
<td>-.29***</td>
<td>-.22***</td>
<td>-</td>
</tr>
</tbody>
</table>

†p < .10, *p < .05; **p < .01; ***p < .001. AFQ = Psychological Inflexibility; FFMQ-NR = Nonreactivity; FFMQ-AW = Acting with Awareness; Rel. Ratio = Relationship Values Reasons; Ed. Ratio = Education Values Reasons; ACT Quiz = ACT Knowledge.

Zero order correlations also examined the relationship of psychological flexibility processes to outcomes at baseline. Consistent with the theoretical model, greater psychological inflexibility was related to greater psychological symptoms, worse positive mental health and lower values success with coefficients ranging between .23 and .64. Greater acting with awareness related to better functioning on each of the outcomes except for relationship values success with coefficients ranging between .19 and .48. Although nonreactivity would be expected to have a similar relationship with outcomes, it was only related to greater positive mental health and relationship values success. Worse reasons for values were related to greater psychological distress with significant correlation coefficients ranging from .13 to .30. However, only education reasons were related to positive mental health and values reasons were only predictive of values success in their respective values domain (i.e., education values reasons did not predict relationship values success). ACT knowledge did not relate to any outcome variables (p > .10). Overall, the results were generally consistent with the theoretical model, with psychological inflexibility, mindfulness and values being related to psychological symptoms, positive mental health and values success.
Table 9. Zero order correlations between outcome and process variables at baseline

<table>
<thead>
<tr>
<th>Variable</th>
<th>Depression</th>
<th>Anxiety</th>
<th>Stress</th>
<th>MHC</th>
<th>Rel. Success</th>
<th>Ed. Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFQ</td>
<td>.64***</td>
<td>.59***</td>
<td>.63***</td>
<td>-.44***</td>
<td>-.28***</td>
<td>-.23***</td>
</tr>
<tr>
<td>FFMQ-NR</td>
<td>-.09</td>
<td>-.09</td>
<td>-.12†</td>
<td>.34***</td>
<td>.23**</td>
<td>.10</td>
</tr>
<tr>
<td>FFMQ –Aw</td>
<td>-.45***</td>
<td>-.39***</td>
<td>-.48***</td>
<td>.29***</td>
<td>.09</td>
<td>.19**</td>
</tr>
<tr>
<td>Rel. Ratio</td>
<td>.22**</td>
<td>.24***</td>
<td>.13*</td>
<td>-.10</td>
<td>-.29***</td>
<td>-.05</td>
</tr>
<tr>
<td>Ed. Ratio</td>
<td>.25***</td>
<td>.30***</td>
<td>.14*</td>
<td>-.16*</td>
<td>-.06</td>
<td>-.13*</td>
</tr>
<tr>
<td>ACT Quiz</td>
<td>.06</td>
<td>-.06</td>
<td>.04</td>
<td>-.04</td>
<td>.09</td>
<td>-.03</td>
</tr>
</tbody>
</table>

†p < .10, *p < .05; **p < .01; ***p < .001.

Program Usage and Satisfaction

Program Usage Differences between ACT-CL and Control Condition

As previously mentioned, there was a significantly higher program completion rate in the control condition for lesson 1 ($\chi^2 = 18.46, p < .001$, Cohen’s $d = .59$) and for lesson 2 ($\chi^2 = 25.14, p < .001$, Cohen’s $d = .70$). Participants spent significantly more time on the ACT-CL website than the control website for both the first lesson ($t(215) = 19.68, p < .001$, Cohen’s $d = 2.77$, ACT-CL $M = 29.05, SD = 8.98$; Control $M = 8.13, SD = 6.16$) and second lesson ($t(163) = 19.00, p < .001$, Cohen’s $d = 3.06$, ACT-CL $M = 42.07, SD = 11.30$; Control $M = 10.33, SD = 9.87$). In the control condition 14% logged in to the program once and 86% logged in to the program twice. In the ACT-CL condition 8% never logged in, 26% logged in once, 38% logged in twice, 23% logged in three times, and 5% logged in four or more times. In the ACT-CL condition, 36.4% requested to receive a text messages and 16.4% accessed the additional mindfulness resources at least once.

Overall, although students spent significantly more time on ACT-CL lessons, there was more variability in the number of logins and a substantial proportion of ACT-CL participants did not complete both lessons. In addition, only a small percentage of ACT-CL participants accessed
the supplementary mindfulness resources designed to target additional psychological flexibility processes.

**Program Satisfaction Ratings by Condition**

The mean SUS rating for the ACT-CL website was 73.41 ($SD = 19.72$) and for the control website was 72.63 ($SD = 17.54$). This is consistent with a “good” rating based on a study mapping SUS ratings to a 7-point adjective scale ranging from “worst imaginable” to “best imaginable” with “good” falling 2 points below the “best imaginable” (Bangor, Kortum & Miller, 2008). There was not a significant difference between conditions on SUS ratings ($p > .10$).

Additional individual program satisfaction items were examined between conditions. Each item was rated on a 6-point scale ranging from 1 “strongly disagree” to 6 “strongly agree.” The mean rating for the question “Overall, I was satisfied with the quality of the wellness program.” was 4.55 ($SD = 1.26$) for ACT-CL and 4.97 ($SD = 1.00$) for the control website, with significantly higher ratings in the control condition ($t(174) = 2.45, p = .02, Cohen’s d = .38$). The mean rating for the question “I would like to use the wellness program again in the future.” was 3.58 ($SD = 1.50$) for ACT-CL and 4.10 ($SD = 1.30$) for the control website, with significantly higher ratings in the control condition ($t(170) = 2.44, p = .02, Cohen’s d = .38$). The mean rating for the question “I think the wellness program would be helpful for college students.” was 4.35 ($SD = 1.30$) for ACT-CL and 4.79 ($SD = 1.06$) for the control website, with significantly higher ratings in the control condition ($t(173) = 2.49, p = .01, Cohen’s d = .38$). The mean rating for the question “I would recommend the wellness program to other college students.” was 4.04 ($SD = 1.32$) for ACT-CL and 4.53 ($SD = 1.17$) for the control website, with significantly higher ratings in the control condition ($t(174) = 2.61, p = .01, Cohen’s d = .40$).

Additional program satisfaction items were provided to ACT-CL participants regarding other program features using the same 6-point scale. The mean rating for the question “The follow up emails about values and willingness I received from the program were helpful.” was
4.08 (SD = 1.56), with 70% rating the follow up emails as 4 “slightly agree” or higher. The mean rating for the question “The mindfulness resources I received through the email link were helpful.” was 4.67 (SD = 1.97), with 75% rating the resources as 4 “slightly agree” or higher. When only including the 18 students who accessed the mindfulness resources, the mean rating for this item was 4.94 (SD = 1.12), with 88% rating the resources as 4 “slightly agree” or higher. The mean rating for the question “The text messages I received from the ACT on College Life program were helpful.” among the students who requested to receive them was 4.27 (SD = 1.61), with 70% rating the resources as 4 “slightly agree” or higher.

Overall, these results indicate equivalent usability ratings between ACT-CL and the control website, but significantly lower program satisfaction ratings with the ACT-CL website. The usability ratings were fairly low however for both conditions, which is more notable for ACT-CL given the sophistication and resources put into developing the website. In addition, the satisfaction ratings for ACT-CL were fairly low, including for the emails, mindfulness resources and text message features, with average ratings close to a 4 on a 6-point scale in which scores between 1 and 3 indicates dissatisfaction.

ACT-CL Program Usage and Satisfaction Differences between Current Study and Initial Pilot

Given the low program usage and satisfaction findings with ACT-CL, additional analyses were conducted to compare program satisfaction and usage variables between students using the ACT-CL website in the current study and those in the initial pilot trial. The mean SUS rating for ACT-CL in the current study (M = 73.41, SD = 19.72) was lower than in the pilot trial (M = 84.97; SD = 9.89), t(108) = 3.27, p < .001, Cohen’s d = .61. In terms of program usage, participants in the current study spent significantly less time on the website (current study M = 56.25 minutes, SD = 25.87; pilot trial M = 84.02, SD = 22.47, t(133) = 5.70, p < .001, Cohen’s d = 1.11). This was due in part to the lower frequency of program completers; 92% completed the two lessons in the pilot trial vs. 55% in the current study (χ² = 15.51, p < .001, Cohen’s d = .69).
When total time on the website was examined only among participants who completed both lessons, there was still a significant difference between groups such that participants in the current study spent less time on the website (current study $M = 73.51$ minutes, $SD = 14.08$; pilot trial $M = 86.65$, $SD = 16.68$, $t(92) = 4.04$, $p < .001$, Cohen’s $d = .88$). Participants in the pilot trial also logged onto the website more than the current study, $t(144) = 2.65$, $p = .01$, Cohen’s $d = .51$.

In the pilot trial, 3% logged in once, 63% logged in twice, 17% logged in three times, and 17% logged in four or more times. In the current study in the ACT-CL condition 8% never logged in, 26% logged in once, 38% logged in twice, 23% logged in three times, and 5% logged in four or more times.

The substantial differences in program engagement and usability ratings suggests that the intervention effects for ACT-CL in the current study are likely to be lower than in the initial pilot trial. A quasi-experimental approach was taken in which a series of ANCOVA analyses compared differences at post on ACT knowledge, depression, anxiety, stress, and education values success between ACT-CL participants in the current study and the initial pilot trial, controlling for baseline score. ANCOVA analysis indicated a significant difference between the pilot trial and current study at post for anxiety ($F(1, 109) = 6.14$, $p = .015$, partial $\eta^2 = .05$; pilot trial post adjusted $M = 3.65$, $SE = 1.02$; current study post adjusted $M = 6.69$, $SE = .68$), stress ($F(1, 109) = 5.09$, $p = .026$, partial $\eta^2 = .05$; pilot trial post adjusted $M = 8.19$, $SE = 1.32$; current study post adjusted $M = 11.81$, $SE = .88$) and education values success ($F(1, 108) = 5.64$, $p = .019$, partial $\eta^2 = .05$; pilot trial post adjusted $M = 4.29$, $SE = .13$; current study post adjusted $M = 3.91$, $SE = .09$) as well as a trend for ACT knowledge ($F(1, 109) = 2.86$, $p = .09$, partial $\eta^2 = .03$; pilot trial post adjusted $M = 10.86$, $SE = .47$; current study post adjusted $M = 9.91$, $SE = .31$). In each case, results indicated greater improvements in outcome and process measures among ACT-CL participants in the initial pilot trial relative to the current study. However, there was no significant difference between studies on improvements in depression at post ($p > .10$).
Overall, the results indicated that participants in the current study engaged less in the ACT-CL program, rated the program more poorly, and improved less on process and outcome measures compared to the pilot RCT. Analyses were conducted to examine sample differences between the pilot trial and current study. There were significantly more males in the pilot trial ($\chi^2 = 5.17, p = .02$, Cohen’s $d = .38$) and participants were younger on average in the pilot trial ($t(144) = -3.37, p = .001$, Cohen’s $d = .65$), but there were no differences between studies on number of minority students ($p > .10$). Participants in the pilot trial reported less stress ($t(144) = -2.88, p = .01$, Cohen’s $d = .56$; pilot trial $M = 7.78$, $SD = 6.30$; current study $M = 12.84$, $SD = 10.16$) and better relationship values reasons ($t(141) = -2.90, p = .004$, Cohen’s $d = .56$; pilot trial $M = .30$, $SD = .14$; current study $M = .46$, $SD = .31$). There was also a trend for higher ACT knowledge ($t(144) = 1.88, p = .06$, Cohen’s $d = .36$; pilot trial $M = 7.35$, $SD = 2.48$; current study $M = 6.28$, $SD = 3.11$) and better education values reasons in the pilot trial($t(138) = -1.79, p = .08$, Cohen’s $d = .35$; pilot trial $M = .35$, $SD = .17$; current study $M = .45$, $SD = .28$). Thus, the poorer performance of ACT-CL in the current study may be attributable at least in part to differences in the samples including having fewer males, older students, more stressed students, poorer ACT knowledge and poorer values reasons on average in the current trial compared to the pilot RCT.

**Summary**

Overall, these results indicate substantially lower program usage and satisfaction ratings with the ACT-CL website relative to the control website and relative to ACT-CL participants in the initial pilot RCT. The impact of these differences is further reflected in the significantly lower improvements in outcome and process measures among ACT-CL participants in the current study relative to the pilot trial. Given these issues, between group intervention analyses will first be conducted only among program completers to better control for dosage differences prior to conducting analyses with the complete ITT sample.
Program Completers Analyses

MMRM analyses examining between group differences on process and outcome measures over time were first conducted only among participants who completed both lessons (ACT \( n = 61 \); Control \( n = 101 \)). Descriptive statistics among program completers by condition and time point are provided in tables 10 and 11.

Table 10. Descriptive statistics of raw means with available data for outcome measures by condition and time point among program completers.

<table>
<thead>
<tr>
<th></th>
<th>ACT-CL</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>1-Month</td>
<td>3-Month</td>
</tr>
<tr>
<td>Depression</td>
<td>8.07 (9.14)</td>
<td>9.96 (11.98)</td>
<td>7.96 (9.31)</td>
<td>7.85 (9.96)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>7.31 (9.91)</td>
<td>7.43 (9.57)</td>
<td>7.84 (9.38)</td>
<td>5.92 (7.87)</td>
</tr>
<tr>
<td>Stress</td>
<td>13.21 (9.75)</td>
<td>13.76 (10.71)</td>
<td>12.76 (10.70)</td>
<td>9.96 (9.64)</td>
</tr>
<tr>
<td>MHC</td>
<td>62.60 (12.39)</td>
<td>64.11 (13.30)</td>
<td>64.73 (13.91)</td>
<td>61.48 (16.68)</td>
</tr>
<tr>
<td>Rel. Success</td>
<td>4.08 (1.12)</td>
<td>4.16 (.96)</td>
<td>4.15 (1.11)</td>
<td>4.08 (1.02)</td>
</tr>
<tr>
<td>Ed. Success</td>
<td>3.80 (.98)</td>
<td>3.85 (1.06)</td>
<td>3.96 (.97)</td>
<td>3.58 (1.23)</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>1-Month</td>
<td>3-Month</td>
</tr>
<tr>
<td>Depression</td>
<td>7.14 (8.40)</td>
<td>7.10 (9.66)</td>
<td>7.69 (9.65)</td>
<td>6.03 (7.70)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>6.99 (7.52)</td>
<td>6.83 (8.75)</td>
<td>6.55 (8.30)</td>
<td>5.04 (7.20)</td>
</tr>
<tr>
<td>Stress</td>
<td>12.08 (9.47)</td>
<td>10.54 (9.26)</td>
<td>11.58 (8.89)</td>
<td>9.24 (8.40)</td>
</tr>
<tr>
<td>MHC</td>
<td>62.92 (11.99)</td>
<td>66.27 (11.61)</td>
<td>66.80 (11.58)</td>
<td>64.13 (13.45)</td>
</tr>
<tr>
<td>Rel. Success</td>
<td>4.17 (.98)</td>
<td>4.31 (.81)</td>
<td>4.36 (.88)</td>
<td>4.22 (.96)</td>
</tr>
<tr>
<td>Ed. Success</td>
<td>3.67 (.95)</td>
<td>3.93 (.95)</td>
<td>4.00 (1.04)</td>
<td>3.92 (1.06)</td>
</tr>
</tbody>
</table>

Table 11. Descriptive statistics of raw means with available data for process measures by condition and time point among program completers.

<table>
<thead>
<tr>
<th></th>
<th>ACT-CL</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>1-Month</td>
<td>3-Month</td>
</tr>
<tr>
<td>AFQ</td>
<td>37.08 (11.80)</td>
<td>36.05 (12.40)</td>
<td>36.15 (13.97)</td>
<td>32.72 (12.34)</td>
</tr>
<tr>
<td>FFMQ-NR</td>
<td>21.58 (6.07)</td>
<td>23.06 (5.95)</td>
<td>23.46 (6.85)</td>
<td>23.64 (6.94)</td>
</tr>
<tr>
<td>FFMQ –Aw</td>
<td>25.53 (6.46)</td>
<td>26.03 (7.21)</td>
<td>25.88 (7.15)</td>
<td>26.24 (7.14)</td>
</tr>
<tr>
<td>Rel. Ratio</td>
<td>.41 (.29)</td>
<td>.36 (.21)</td>
<td>.44 (.31)</td>
<td>.42 (.30)</td>
</tr>
<tr>
<td>Ed. Ratio</td>
<td>.43 (.27)</td>
<td>.45 (.43)</td>
<td>.54 (.34)</td>
<td>.41 (.30)</td>
</tr>
<tr>
<td>ACT Quiz</td>
<td>6.65 (3.04)</td>
<td>10.08 (3.30)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
There was no significant time by condition interactions from pre to post or pre to 3-month follow up with MMRM analyses for depression or anxiety ($p > .10$). There was a significant time effect from pre to 3-month follow up for anxiety, $F(3, 139.76) = 3.99, p = .009$, Cohen’s $d = .34$. Post hoc analyses indicated a significant improvement from pre to 3-month follow up in the control condition (slope estimate = -.49, $t(143.76) = -2.87, p = .005$, Cohen’s $d = .31$), but not in the ACT-CL condition ($p > .10$). There was no significant time effect from pre to post for anxiety or from pre to post or pre to 3-month follow up for depression ($p > .10$).

**Primary Outcomes: Rates of Severe Depression and Anxiety**

Recommended DASS cutoff scores were used to examine rates of severe depression and anxiety symptoms between conditions over time (see Table 12). Chi square analyses did not indicate any differences between conditions in severe depression and/or anxiety symptoms among students who were and were not severely depressed and/or anxious at baseline ($p > .10$).

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Post</th>
<th>1-Month</th>
<th>3-Month</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACT-CL</strong></td>
<td>12</td>
<td>13</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td>21</td>
<td>18</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td><strong>ACT-CL Pre Distressed</strong></td>
<td>8</td>
<td>6</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td><strong>Control Pre Distressed</strong></td>
<td>10</td>
<td>9</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td><strong>ACT-CL Pre Non-Distressed</strong></td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>Control Pre Non-Distressed</strong></td>
<td>8</td>
<td>11</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>
Secondary Outcomes: Stress, Positive Mental Health and Values Success

There was no significant time by condition interactions from pre to post or pre to 3-month follow up with MMRM analyses for stress, positive mental health, or values success ($p > .10$). However, there were a series of significant time effects for these secondary outcomes.

There was a significant time effect from pre to 3-month follow up for stress, $F(3, 142.20) = 7.52, p < .001$, Cohen’s $d = .46$. Post hoc analyses indicated a trend for improvement from pre to post in the control condition (slope estimate = -1.60, $t(153.93) = -1.85, p = .067$, Cohen’s $d = .19$), but not in the ACT-CL condition ($p > .10$), with significantly lower stress in the control condition relative to the ACT-CL condition at post (estimate = 3.30, $t(157.36) = 2.04, p = .043$, Cohen’s $d = .34$). There were significant improvements from pre to 3-month follow up on stress in both the ACT-CL condition (slope estimate = -3.27, $t(139.33) = -2.68, p = .008$, Cohen’s $d = .36$) and the control condition (slope estimate = -3.22, $t(144.25) = -3.31, p = .001$, Cohen’s $d = .35$).

There was a significant time effect for education values success from pre to post, $F(1, 151.25) = 4.36, p = .039$, Cohen’s $d = .34$. Post hoc analyses indicated a significant improvement from pre to post in the control condition (slope estimate = .25, $t(151.25) = 2.57, p = .011$, Cohen’s
but not in the ACT-CL condition \((p > .10)\). There was no significant time effect from pre to post or pre to 3-month follow up for relationship success \((p > .10)\).

\textit{Process Measures: Psychological Inflexibility, Mindfulness, Values, and ACT Knowledge}

There was a significant time by condition effect for ACT knowledge from pre to post, \(F(1, 152.85) = 58.03, p < .001\), Cohen’s \(d = 1.23\), such that participants in ACT-CL improved in ACT knowledge relative to the control condition. There was no significant time by condition interactions from pre to post or pre to 3-month follow up with MMRM analyses for psychological inflexibility, acting with awareness, nonreactivity, or values reasons \((p > .10)\). However, there were a series of significant time effects for these process measures.

There was a significant time effect for psychological inflexibility from pre to 3-month follow up for psychological inflexibility, \(F(3, 134.96) = 15.16, p < .001\), Cohen’s \(d = .67\). Post hoc analyses indicated significant improvements in the control condition from pre to 1-month follow up (slope estimate = -.02, \(t(140.60) = -2.09, p = .038\), Cohen’s \(d = .21\)), but not in the ACT-CL condition \((p > .10)\). There was also a significant improvement from pre to 3-month follow up in both the control (slope estimate = -.06, \(t(138.73) = -5.38, p < .001\), Cohen’s \(d = .58\)) and ACT-CL conditions (slope estimate = -.06, \(t(134.40) = -4.12, p < .001\), Cohen’s \(d = .55\)).

There was no significant time effect from pre to post for psychological inflexibility \((p > .10)\).

There were significant time effects for nonreactivity from pre to post, \(F(1, 147.80) = 10.18, p = .002\), Cohen’s \(d = .52\), and pre to 3-month follow up, \(F(3, 134.61) = 6.21, p = .001\), Cohen’s \(d = .43\). Post hoc analyses indicated significant improvements in the ACT-CL condition from pre to post (slope estimate = 1.73, \(t(151.66) = 2.77, p = .006\), Cohen’s \(d = .37\)), pre to 1-month follow up (slope estimate = 2.43, \(t(139.28) = 3.36, p = .001\), Cohen’s \(d = .46\)) and pre to 3-month follow up (slope estimate = 2.15, \(t(137.20) = 2.69, p = .008\), Cohen’s \(d = .37\)). Within the control condition there were trends for improvements from pre to post (slope estimate = .91, \(t(147.59) = 1.91, p = .058\), Cohen’s \(d = .20\)), pre to 1-month follow up (slope estimate = 1.04,
\( t(141.71) = 1.84, p = .068, \text{ Cohen's } d = .20 \) and pre to 3-month follow up (slope estimate = 1.18, 
\( t(141.68) = 1.85, p = .066, \text{ Cohen's } d = .20 \). There was no significant time effect from pre to post 
or pre to 3-month follow up for acting with awareness \( (p > .10) \).

There was a trend with relationship values reasons for a time effect from pre to 3-month 
follow up, \( F(3, 134.68) = 2.25, p = .086, \text{ Cohen's } d = .26 \). Post hoc analyses indicated significant 
worsening in the control condition from pre to 1-month follow up (slope estimate = .06, \( t(141.85) 
= 2.27, p = .025, \text{ Cohen's } d = -.25 \), but no changes from pre to 1-month follow up in the ACT-
CL condition \( (p > .10) \). There was no significant time effect from pre to post for relationship 
values reasons \( (p > .10) \).

There was a significant time effect for education values reasons from pre to 3-month 
follow up, \( F(3, 134.65) = 2.86, p = .039, \text{ Cohen's } d = .29 \). Post hoc analyses indicated significant 
worsening in the ACT-CL condition from pre to 1-month follow up (slope estimate = .04, 
\( t(137.97) = 2.12, p = .036, \text{ Cohen's } d = -.29 \), but no changes from pre to 1-month follow up in 
the control condition \( (p > .10) \). There was no significant time effect from pre to post for education 
values reasons \( (p > .10) \).

**Process Measures: Treatment Seeking**

Research suggests that mental health education programs increase treatment seeking rates 
(Jorm, 2012). Thus, analyses were conducted to compare rates of treatment seeking between the 
two conditions. There were no differences between conditions at baseline regarding rates of 
participants in the past 4 months who had seen a therapist (ACT-CL = 22\%, Control = 13\%) or 
received psychological medications (ACT-CL = 17\%, Control = 9\%). At 3-month follow up, 
there were also no between group differences on rates of participants who had seen a therapist 
(ACT-CL 19\%, Control 11\%) or received psychological medications (ACT-CL = 23\%, Control = 
12\%). Among participants who did not receive therapy or medications at baseline, only 8\% in 
ACT-CL and 5\% in control reported receiving therapy and/or medications at 3-month follow up,
with no significant difference between conditions ($p > .10$). In addition, of the participants reporting receiving therapy and/or medications at baseline, 79% in ACT-CL and 80% in control reported continuing to receive such treatment ($p > .10$).

**Summary**

Overall, analyses with program completers did not indicate any between group differences over time on outcome or process measures besides improvements in ACT knowledge from pre to post in the ACT-CL condition relative to the control condition. There were also no differences found on rates of severe depression/anxiety over time or treatment seeking. Time effects indicated improvements over time on some of the outcome and process measures including anxiety, stress, positive mental health, education values success, psychological inflexibility and nonreactivity. However, there were no improvements over time on depression, acting with awareness, or relationship values success, and there was a worsening of values reasons over time. Although time by condition interaction effects were not significant, it is important to note that time effects were stronger in the control than ACT-CL condition in almost every case.

**Intent to Treat (ITT) Analyses**

MMRM analyses were conducted to examine changes in outcome and process measures between conditions over time with the full ITT sample. Descriptive statistics for the full ITT sample are provided for each outcome and process variable between conditions at each time point (see Tables 13 and 14).
Table 13. Descriptive statistics of raw means with available data for outcome measures by condition and time point in the ITT sample.

<table>
<thead>
<tr>
<th>ACT-CL</th>
<th>Pre</th>
<th>Post</th>
<th>1-Month</th>
<th>3-Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>8.38 (9.69)</td>
<td>8.79 (11.59)</td>
<td>7.91 (9.34)</td>
<td>7.67 (9.90)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>7.27 (9.00)</td>
<td>7.05 (9.34)</td>
<td>7.74 (9.42)</td>
<td>5.40 (7.39)</td>
</tr>
<tr>
<td>Stress</td>
<td>12.84 (10.16)</td>
<td>12.69 (10.61)</td>
<td>12.46 (10.62)</td>
<td>9.88 (9.61)</td>
</tr>
<tr>
<td>MHC</td>
<td>62.32 (13.26)</td>
<td>64.81 (12.93)</td>
<td>65.06 (12.99)</td>
<td>61.38 (15.96)</td>
</tr>
<tr>
<td>Rel. Success</td>
<td>3.96 (1.11)</td>
<td>4.22 (.93)</td>
<td>4.15 (1.01)</td>
<td>4.11 (.99)</td>
</tr>
<tr>
<td>Ed. Success</td>
<td>3.83 (.99)</td>
<td>3.86 (1.00)</td>
<td>4.00 (.90)</td>
<td>3.59 (1.15)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Control</th>
<th>Pre</th>
<th>Post</th>
<th>1-Month</th>
<th>3-Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>7.31 (8.60)</td>
<td>7.31 (9.60)</td>
<td>7.65 (9.54)</td>
<td>5.83 (7.56)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>7.07 (7.39)</td>
<td>6.94 (8.68)</td>
<td>6.42 (8.25)</td>
<td>4.82 (7.09)</td>
</tr>
<tr>
<td>Stress</td>
<td>11.78 (9.28)</td>
<td>10.69 (9.26)</td>
<td>11.54 (8.79)</td>
<td>9.02 (8.35)</td>
</tr>
<tr>
<td>MHC</td>
<td>62.67 (12.34)</td>
<td>65.80 (11.90)</td>
<td>66.17 (12.26)</td>
<td>64.06 (13.62)</td>
</tr>
<tr>
<td>Rel. Success</td>
<td>4.16 (.95)</td>
<td>4.28 (.83)</td>
<td>4.36 (.87)</td>
<td>4.23 (.95)</td>
</tr>
<tr>
<td>Ed. Success</td>
<td>3.73 (.97)</td>
<td>3.91 (.95)</td>
<td>3.99 (1.04)</td>
<td>3.94 (1.07)</td>
</tr>
</tbody>
</table>

Table 14. Descriptive statistics of raw means with available data for process measures by condition and time point in the ITT sample.

<table>
<thead>
<tr>
<th>ACT-CL</th>
<th>Pre</th>
<th>Post</th>
<th>1-Month</th>
<th>3-Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFQ</td>
<td>37.60 (12.36)</td>
<td>35.37 (12.27)</td>
<td>37.39 (14.51)</td>
<td>33.18 (12.62)</td>
</tr>
<tr>
<td>FFMQ-NR</td>
<td>21.67 (5.72)</td>
<td>23.13 (5.53)</td>
<td>22.66 (6.89)</td>
<td>23.21 (6.74)</td>
</tr>
<tr>
<td>FFMQ –Aw</td>
<td>25.58 (6.80)</td>
<td>25.96 (7.14)</td>
<td>26.03 (7.42)</td>
<td>25.74 (7.56)</td>
</tr>
<tr>
<td>Rel. Ratio</td>
<td>.46 (.31)</td>
<td>.37 (.24)</td>
<td>.44 (.31)</td>
<td>.41 (.29)</td>
</tr>
<tr>
<td>Ed. Ratio</td>
<td>.45 (.28)</td>
<td>.43 (.39)</td>
<td>.52 (.33)</td>
<td>.47 (.64)</td>
</tr>
<tr>
<td>ACT Quiz</td>
<td>6.28 (3.11)</td>
<td>9.79 (3.37)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Control</th>
<th>Pre</th>
<th>Post</th>
<th>1-Month</th>
<th>3-Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFQ</td>
<td>36.58 (11.85)</td>
<td>36.11 (13.51)</td>
<td>35.11 (12.91)</td>
<td>32.18 (11.79)</td>
</tr>
<tr>
<td>FFMQ-NR</td>
<td>21.45 (5.30)</td>
<td>22.57 (5.88)</td>
<td>22.96 (6.16)</td>
<td>22.97 (6.02)</td>
</tr>
<tr>
<td>FFMQ –Aw</td>
<td>24.90 (6.59)</td>
<td>25.36 (7.35)</td>
<td>25.77 (7.13)</td>
<td>25.68 (7.12)</td>
</tr>
<tr>
<td>Rel. Ratio</td>
<td>.43 (.27)</td>
<td>.41 (.28)</td>
<td>.45 (.27)</td>
<td>.43 (.26)</td>
</tr>
<tr>
<td>Ed. Ratio</td>
<td>.52 (.48)</td>
<td>.52 (.35)</td>
<td>.50 (.29)</td>
<td>.49 (.31)</td>
</tr>
<tr>
<td>ACT Quiz</td>
<td>6.91 (2.80)</td>
<td>7.11 (3.24)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Primary Outcomes: Depression and Anxiety

There was no significant time by condition interactions from pre to post or pre to 3-month follow up with MMRM analyses for depression or anxiety ($p > .10$). However, there was a significant time effect from pre to 3-month follow up for anxiety, $F(3, 165.72) = 6.92, p < .001$, Cohen’s $d = .41$. Post hoc analyses indicated a significant improvement from pre to 3-month follow up in both the ACT-CL (slope estimate = -.40, $t(173.43) = -2.26, p = .03$, Cohen’s $d = .26$) and control condition (slope estimate = -.57, $t(169.25) = -3.52, p = .001$, Cohen’s $d = .37$). There were no significant improvements from pre to post or pre to 1-month follow up on anxiety in either condition ($p > .10$).

There was a statistical trend for a time effect from pre to 3-month follow up for depression, $F(3, 164.82) = 2.13, p = .098$, Cohen’s $d = .23$. Post hoc analyses indicated a significant improvement from pre to 3-month follow up in the control condition (slope estimate = -.40, $t(161.68) = -2.33, p = .02$, Cohen’s $d = .24$), but not in the ACT-CL condition ($p > .10$), which appeared to be due to a decrease in depression in the control condition from 1-month and 3-month follow up (slope estimate = -.37, $t(153.72) = -2.16, p = .03$, Cohen’s $d = .25$) that was not seen in the ACT-CL condition ($p > .10$). There were no other significant time effects from pre to post or pre to 3-month follow up for depression or anxiety ($p > .10$).

Primary Outcomes: Rates of Severe Depression and Anxiety

Chi square analyses were conducted to compare rates of severe depression and/or anxiety between conditions in the ITT sample (see Table 15). Chi square analyses among participants who were severely depressed or anxious at baseline indicated a statistical trend for greater rates of severe depression and/or anxiety symptoms in the ACT-CL condition at post ($\chi^2 = 3.80, p = .051$, Cohen’s $d = .26$) and 3-month follow up ($\chi^2 = 2.79, p = .095$, Cohen’s $d = .22$), but not at 1-month follow up ($p > .10$). Among students who were severely depressed at baseline, there were significant differences at post ($\chi^2 = 4.53, p = .03$, Cohen’s $d = .29$) and 1-month follow up ($\chi^2 =...$
4.03, \( p = .045 \), Cohen’s \( d = .27 \), but not 3-month follow up \( (p > .10) \), such that there were greater rates of severe depression in the ACT-CL condition. Among students who were severely anxious at baseline, there was a statistical trend at post \( (\chi^2 = 2.76, p = .096, \text{Cohen’s } d = .22) \), but not 1-month of 3-month follow up \( (p > .10) \), such that there were greater rates of severe anxiety in the ACT-CL condition. However, there were no significant differences on rates of severe depression and/or anxiety at any time point in the full sample or among students who were not distressed at baseline \( (p > .10) \). Overall, results indicated that participants who were severely depressed or anxious at baseline were less likely to remit over time in the ACT-CL condition, but there were no differences between conditions on onset of severe symptoms among those who were not severely distressed at baseline.

Table 15. Rate of students with severe depression and/or anxiety symptoms per condition and time point in the ITT sample.

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Post</th>
<th>1-Month</th>
<th>3-Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT</td>
<td>19  (17%)</td>
<td>22 (20%)</td>
<td>23 (21%)</td>
<td>20 (18%)</td>
</tr>
<tr>
<td>Control</td>
<td>24  (20%)</td>
<td>20 (17%)</td>
<td>22 (19%)</td>
<td>15 (13%)</td>
</tr>
<tr>
<td>ACT Pre Distressed</td>
<td>15 (79%)</td>
<td>13 (68%)</td>
<td>12 (63%)</td>
<td></td>
</tr>
<tr>
<td>Control Pre Distressed</td>
<td>12 (50%)</td>
<td>11 (46%)</td>
<td>9 (38%)</td>
<td></td>
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<tr>
<td>ACT Pre Non-Distressed</td>
<td>7 (8%)</td>
<td>10 (11%)</td>
<td>8 (9%)</td>
<td></td>
</tr>
<tr>
<td>Control Pre Non-Distressed</td>
<td>8 (9%)</td>
<td>11 (12%)</td>
<td>6 (6%)</td>
<td></td>
</tr>
</tbody>
</table>

Secondary Outcomes: Stress, Positive Mental Health and Values Success

There was a trend for a time by condition interaction for education values success from pre to 3-month follow up, \( F(3, 168.81) = 2.22, p = .088 \), Cohen’s \( d = .23 \). Post hoc analyses indicated significantly higher education values success at 3-month follow up in the control condition compared to ACT-CL \( \text{estimate = -.35, } t(158.05) = -1.99, p = .049 \), Cohen’s \( d = .32 \).
There was no other significant time by condition interactions from pre to post or pre to 3-month follow up with MMRM analyses for stress, positive mental health or values success ($p > .10$).

There was a significant time effect for stress from pre to 3-month follow up, $F(3, 168.47) = 8.00, p < .001$, Cohen’s $d = .44$. Post hoc analyses indicated a significant improvement on stress from pre to 3-month follow up for both the ACT-CL condition (slope estimate = -2.77, $t(174.59) = -2.76, p = .006$, Cohen’s $d = .31$) and the control condition (slope estimate = -3.19, $t(169.29) = -3.48, p = .001$, Cohen’s $d = .36$). There was also a trend for a pre to post improvement on stress in the control condition (slope estimate = -1.38, $t(185.33) = -1.66, p = .098$, Cohen’s $d = .16$), but not the ACT-CL condition ($p > .10$).

There were significant time effects for improvements in positive mental health from pre to post, $F(1, 183.19) = 18.95, p < .001$, Cohen’s $d = .64$, and from pre to 3-month follow up, $F(3, 165.63) = 9.24, p < .001$, Cohen’s $d = .47$. Post hoc analyses indicated significant improvements in positive mental health from pre to post in both the ACT-CL condition (slope estimate = 2.08, $t(193.57) = 2.14, p = .03$, Cohen’s $d = .24$) and the control condition (slope estimate = 3.62, $t(184.06) = 4.20, p < .001$, Cohen’s $d = .41$) as well as significant improvements from pre to 1-month follow up in both the ACT-CL condition (slope estimate = 2.76, $t(180.92) = 2.47, p = .01$, Cohen’s $d = .28$) and the control condition (slope estimate = 4.25, $t(177.43) = 4.20, p < .001$, Cohen’s $d = .43$). There was also a trend for improvements in positive mental health from pre to 3-month follow up in the control condition (slope estimate = 2.38, $t(158.57) = 1.78, p = .08$, Cohen’s $d = .19$), but not in the ACT-CL condition ($p > .10$). Instead, there was a decrease in positive mental health from 1-month to 3-month follow up in the ACT-CL condition (slope estimate = -3.64, $t(156.79) = -2.39, p = .02$, Cohen’s $d = -.29$), but not in the control condition ($p > .10$).

There was a significant time effect from pre to post for improvements in relationship success, $F(1, 196.54) = 6.80, p = .01$, Cohen’s $d = .37$, as well as a trend from pre to 3-month
follow up, \( F(3, 168.66) = 2.65, p = .051 \), Cohen’s \( d = .25 \). Post hoc analyses indicated improvement on relationship success in the ACT-CL condition from pre to post (slope estimate = .24, \( t(394.79) = 2.29, p = .02 \), Cohen’s \( d = .27 \)), but not in the control condition (\( p > .10 \)). There were no time effects from pre to 1-month or pre to 3-month follow up in either condition.

There was a statistical trend for a time effect from pre to post for improvements in education success, \( F(1, 193.30) = 3.28, p = .07 \), Cohen’s \( d = .26 \). Post hoc analyses indicated significant improvements in the control condition from pre to post (slope estimate = .20, \( t(185.49) = 2.08, p = .04 \)), pre to 1-month follow up (slope estimate = .27, \( t(180.62) = 2.27, p = .02 \)) and pre to 3-month follow up (slope estimate = .26, \( t(154.96) = 2.12, p = .04 \)), but no significant changes over time within the ACT-CL condition (\( p > .10 \)).

Process Measures: Psychological Inflexibility, Mindfulness, Values, and ACT Knowledge

There was a significant time by condition interaction from pre to post for ACT knowledge, \( F(1, 196.43) = 59.05, p < .001 \), Cohen’s \( d = 1.10 \), such that participants in the ACT-CL condition improved more in ACT knowledge from pre to post relative to the control condition. There was no other significant time by condition interactions from pre to post or pre to 3-month follow up with MMRM analyses for process measures (\( p > .10 \)).

There was a significant time effect for psychological inflexibility from pre to 3-month follow up, \( F(3, 157.92) = 14.52, p < .001 \), Cohen’s \( d = .61 \), as well as a trend for a time effect from pre to post, \( F(1, 180.73) = 3.35, p = .07 \), Cohen’s \( d = .27 \). Post hoc analyses indicated significant improvements in psychological inflexibility from pre to 3-month follow up in both the ACT-CL (slope estimate = -.04, \( t(163.83) = -3.62, p < .001 \), Cohen’s \( d = .39 \)) and control condition (slope estimate = -.06, \( t(162.92) = -5.47, p < .001 \), Cohen’s \( d = .59 \)) as well as improvements in the control condition from pre to 1-month follow up (slope estimate = -.02, \( t(164.09) = -2.08, p = .04 \), Cohen’s \( d = .18 \)), but not in the ACT-CL condition (\( p > .10 \)). While
not significantly different, it is worth noting that improvement was actually larger in the control condition for this key process variable.

There were significant time effects for improvements in nonreactivity from pre to post, \( F(1, 177.90) = 13.20, p < .001, \) Cohen’s \( d = .54, \) and pre to 3-month follow up, \( F(3, 159.25) = 5.71, p = .001, \) Cohen’s \( d = .38. \) Post hoc analyses indicated significant improvements on nonreactivity in both the ACT-CL condition from pre to post (slope estimate = 1.50, \( t(186.42) = 2.94, p = .004, \) Cohen’s \( d = .33), \) pre to 1-month follow up (slope estimate = 1.51, \( t(165.72) = 2.32, p = .02, \) Cohen’s \( d = .27), \) and pre to 3-month follow up (slope estimate = 1.61, \( t(163.45) = 2.35, p = .02, \) Cohen’s \( d = .28), \) as well as improvements in the control condition from pre to post (slope estimate = 1.05, \( t(176.48) = 2.36, p = .02, \) Cohen’s \( d = .23), \) and trends from pre to 1-month follow up (slope estimate = 1.15, \( t(165.61) = 1.95, p = .052, \) Cohen’s \( d = .21), \) and pre to 3-month follow up (slope estimate = 1.16, \( t(163.10) = 1.90, p = .059, \) Cohen’s \( d = .20). \)

There was a trend for a time effect with relationship values reasons from pre to 3-month follow up, \( F(3, 158.04) = 2.40, p = .07, \) Cohen’s \( d = .25. \) Post hoc analyses indicated a significant improvement in relationship values reasons in the ACT-CL condition from pre to post (slope estimate = -.05, \( t(485.01) = -1.98, p = .049, \) Cohen’s \( d = .21), \) but not in the control condition (\( p > .10). \) There was a trend for worsening relationship values reasons in the control condition from pre to 1-month follow up (slope estimate = .04, \( t(467.36) = 1.76, p = .08, \) Cohen’s \( d = -.17), \) but not in the ACT-CL condition (\( p > .10). \) There were no significant time effects from pre to post, pre to 1-month follow up or pre to 3-month follow up for education values reasons or acting with awareness (\( p > .10). \)

*Process Measures: Treatment Seeking*

There were no differences between conditions at baseline regarding rates of participants in the past 4 months who had seen a therapist (ACT = 18%, Control = 13%) or received psychological medications (ACT = 15%, Control = 8%). At 3-month follow up, there were also
no between group differences on rates of participants who had seen a therapist (ACT 16%, Control 11%) or received psychological medications (ACT = 17%, Control = 12%). Among participants who did not receive therapy or medications at baseline, only 6% in ACT-CL and 4% in the control condition reported receiving therapy and/or medications at 3-month follow up ($p > .10$). In addition, of the participants reporting receiving therapy and/or medications at baseline, 80% in ACT-CL and 80% in control reported continuing to receive such treatment ($p > .10$).

**Summary**

Overall, most of the results with the ITT sample did not indicate any between group differences over time on outcome or process measures. However, there were significantly greater remission rates of severe depression and anxiety and a trend for greater improvements in education values success in the control condition over time compared to ACT-CL. Results also indicated greater improvements in ACT knowledge in ACT-CL relative to the control condition. Time effects indicated improvements over time on all of the outcome and process measures except education values reasons and acting with awareness, with effects typically stronger at 3-month follow up. Although time by condition interaction effects were not significant for most of these variables, it is important to note that time effects were stronger in the control than ACT-CL condition in almost every case.

**Subgroup Analyses Examining Intervention Effects between Conditions**

A series of MMRM analyses were conducted with the full ITT sample to test for time by condition interactions within subgroups of participants. Separate analyses were conducted among participants with various degrees of depression/anxiety symptoms, higher and lower psychological inflexibility, first year students and non-first year students, 18-22 year olds and older students, male and female students, and minority and non-minority students.
Students at Different Levels of Depression/Anxiety Symptoms at Baseline

Separate MMRM analyses were conducted among the non-distressed subsample of participants who did not report depression or anxiety symptoms at baseline (ACT \( n = 59 \); Control \( n = 63 \)), indicated prevention subsample who reported minimal to moderate depression and/or anxiety symptoms, but not severe symptoms (ACT \( n = 32 \); Control \( n = 31 \)), and treatment subsample who reported severe depression and/or anxiety symptoms (ACT \( n = 19 \); Control \( n = 24 \)).

Among participants with severe depression and/or anxiety symptoms, there was a significant time by condition effect on education values reasons from pre to post, \( F(3, 36.05) = 13.79, p = .001, \) Cohen’s \( d = 1.24 \), and pre to 3-month follow up, \( F(3, 29.97) = 5.68, p = .003, \) Cohen’s \( d = .87 \). Post hoc analyses indicated a significant between group difference at post (estimate = .13, \( t(34.04) = 3.19, p = .003, \) Cohen’s \( d = 1.13 \)) such that those in the ACT-CL condition improved more on education values reasons relative to the control condition.

Among participants with severe depression/anxiety, there was also a trend for a time by condition effect from pre to 3-month follow up on acting with awareness, \( F(3, 30.15) = 2.61, p = .07, \) Cohen’s \( d = .59 \). Post hoc analyses did not indicate any significant between group differences at any time point. However, those in the control condition significantly improved from pre to post (estimate =2.07, \( t(32.39) = 2.10, p = .04, \) Cohen’s \( d = .45 \), pre to 1-month follow up (estimate = 3.53, \( t(30.22) = 3.32, p = .002, \) Cohen’s \( d = .78 \) and pre to 3-month follow up (estimate = 2.93, \( t(31.04) = 2.26, p = .03, \) Cohen’s \( d = .52 \)), but no improvements were found over time in the ACT-CL condition.

Among non-distressed participants, there was a significant time by condition effect from pre to 3-month follow up on education values success, \( F(3, 86.39) = 3.41, p = .021, \) Cohen’s \( d = .40 \). Post hoc analyses indicated a trend for a between group difference at 1-month (estimate = - .29, \( t(87.59) = -1.85, p = .067, \) Cohen’s \( d = .39 \) and 3-month follow up (estimate = -.45, \( t(75.68) \))
such that those in the control condition improved more on education values success relative to the ACT-CL condition.

Among the indicated prevention subsample, there were no significant time by condition effects on any of the outcome or process measures from pre to post or pre to 3-month follow up. There was no other significant time by condition effects from pre to post or pre to 3-month follow up in any of the three subgroups on any other outcome or process measures ($p > .10$).

**Higher and Lower Psychological Inflexibility**

The sample’s median baseline score of 35 on the AFQ was used to separate participants who were higher (ACT $n = 59$; Control $n = 54$) and lower in psychological inflexibility (ACT $n = 51$; Control $n = 64$). MMRM analyses did not find any significant time by condition effects from pre to post or pre to 3-month follow up in either subgroup ($p > .10$).

**First Year Students and Non-First Year Students**

MMRM analyses were conducted separately among first year college students (ACT $n = 29$; Control $n = 33$) and non-first year students (ACT $n = 81$; Control $n = 85$). Among first year students, there was a significant time by condition interaction from pre to post on positive mental health, $F(1, 44.04) = 5.70, p = .021$, Cohen’s $d = .72$, such that those in the control condition improved more on positive mental health at post relative to the ACT-CL condition.

Among first year students, there was also a significant time by condition interaction from pre to post, $F(1, 46.42) = 7.90, p = .007$, Cohen’s $d = .83$, and pre to 3-month follow up on education values reasons, $F(3, 35.33) = 3.02, p = .043$, Cohen’s $d = .58$. Post hoc analyses indicated a significant difference at post on education values reasons, (estimate = .09, $t(44.86) = 2.31, p = .03$, Cohen’s $d = .71$), such that first year students in the ACT-CL condition reported greater improvements on education values reasons relative to the control condition.

Among first year students, there was a trend for a time by condition interaction from pre to post on relationship values reasons, $F(1, 49.36) = 3.47, p = .068$, Cohen’s $d = .53$, such that
those in the ACT-CL condition worsened on relationship values reasons relative to the control condition at post. MMRM analyses did not find any significant time by condition effects from pre to post or pre to 3-month follow up among non-first year students ($p > .10$).

**18-22 Year Old vs. Older Students**

MMRM analyses were conducted separately among younger students between 18 and 22 years of age (ACT $n = 86$; Control $n = 93$) and older students between 23 and 58 years of age (ACT $n = 24$; Control $n = 25$). Among older students, there was a significant time by condition interaction from pre to 3-month follow up on anxiety, $F(3, 37.18) = 2.95, p = .045$, Cohen’s $d = .56$. Post hoc analyses indicated a trend for a difference at post on anxiety, (estimate = .87, $t(36.97) = 1.88, p = .068$, Cohen’s $d = .56$), such that older students in the ACT-CL condition reported greater improvements on anxiety relative to the control condition.

Among older students, there was a trend for a time by condition interaction from pre to 3-month follow up on education values reasons, $F(3, 35.35) = 2.33, p = .091$, Cohen’s $d = .51$. Post hoc analyses did not find any between group differences at post or follow up, however there was a significant change in the ACT-CL condition from pre to 1-month follow up, (slope estimate = -.11, $t(39.49) = -3.15, p = .003$, Cohen’s $d = .74$) such that older students in the ACT-CL condition worsened on education values reasons from pre to 1-month follow up, but not in the control condition ($p > .10$).

Among younger students, there was a trend for a time by condition interaction from pre to post on education values reasons, $F(1, 139.06) = 2.77, p = .098$, Cohen’s $d = .28$, such that education values reasons improved more in the ACT-CL condition than control condition. There was no other significant time by condition effects from pre to post or pre to 3-month follow up in either subgroup ($p > .10$).
**Male and Female Students**

MMRM analyses were conducted separately among male (ACT \( n = 27 \); Control \( n = 25 \)) and female participants (ACT \( n = 83 \); Control \( n = 93 \)). MMRM analyses did not find any significant time by condition effects from pre to post or pre to 3-month follow up in either subgroup \((p > .10)\).

**Minority and Non-Minority Students**

MMRM analyses were conducted separately among minority (ACT \( n = 32 \); Control \( n = 42 \)) and non-minority students (ACT \( n = 77 \); Control \( n = 75 \)). Among minority students, there was a significant time by condition interaction from pre to post, \( F(1, 56.24) = 12.72, p = .001, \) Cohen’s \( d = .95 \), and pre to 3-month follow up on positive mental health, \( F(3, 51.22) = 4.71, p = .006, \) Cohen’s \( d = .61 \). Post hoc analyses indicated a significant difference between conditions at post \((estimate = -7.46, t(66.83) = -2.33, p = .023, \) Cohen’s \( d = .59)\) and a trend for a difference at 3-month follow up \((estimate = -7.61, t(53.50) = -1.72, p = .091, \) Cohen’s \( d = .50)\), such that minority participants in the control condition reported greater improvements in positive mental health relative to the ACT-CL condition.

Among minority students, there was also a significant time by condition interaction from pre to 3-month follow up on acting with awareness, \( F(3, 49.99) = 3.83, p = .015, \) Cohen’s \( d = .55 \). Post hoc analyses indicated a significant difference between conditions at 1-month follow up \((estimate = -4.93, t(58.54) = -2.55, p = .013, \) Cohen’s \( d = .69)\) and a trend for a difference at 3-month follow up \((estimate = -4.19, t(54.42) = -1.97, p = .054, \) Cohen’s \( d = .56)\), such that minority participants in the control condition reported greater improvements in acting with awareness relative to the ACT-CL condition.

Among non-minority students, there was a significant time by condition interaction from pre to 3-month follow up on education values reasons, \( F(3, 108.69) = 2.82, p = .042, \) Cohen’s \( d = .32 \). Post hoc analyses indicated a significant difference between conditions at post \((estimate = \)
.06, \( t(123.73) = 2.74, p = .007\), Cohen’s \( d = .47\) and at 3-month follow up (estimate = .05, 
\( t(106.93) = 2.07, p = .041\), Cohen’s \( d = .36\)), such that non-minority participants in the control 
condition worsened on education values reasons relative to the ACT-CL condition.

Among non-minority students, there was also a trend for a time by condition interaction 
from pre to 3-month follow up on education values success, \( F(3, 113.13) = 1.76, p = .064\), 
Cohen’s \( d = .25\). Post hoc analyses indicated a significant difference between conditions at 3-
month follow up (estimate = -.39, \( t(104.14) = -1.81, p = .073\), Cohen’s \( d = .35\)), such that non-
minority participants in the control condition improved more on education values success relative 
to the ACT-CL condition. MMRM analyses did not find any other significant time by condition 
effects from pre to post or pre to 3-month follow up in either subgroup (\( p > .10\)).

**Summary**

Overall, although a few significant time by condition effects were found in some of the 
subgroups, there were no consistent findings regarding between group differences over time in 
any of the subgroups. These results suggest that the ACT-CL website performed similarly to the 
active control website across a range of different subgroups.

**Examining the Relationship of Changes in Process Measures to Changes in Outcomes**

The results suggest that the existing components of the ACT-CL program failed to 
differentially impact psychological flexibility processes relative to the control website. This 
suggests a failure of the ACT-CL prototype technology in having a unique effect on 
psychological flexibility processes. However, it does not necessarily challenge the psychological 
flexibility model, which assumes that students who improve in acceptance, mindfulness and 
values processes would subsequently improve on mental health outcomes. Partial correlation 
analyses were conducted to further examine the relationship between changes in psychological
flexibility processes and subsequent improvements in outcomes at 1- and 3-month follow up across both conditions combined (see Tables 16 and 17).

Results indicated that improvements in psychological inflexibility from pre to post were related to improvements at 1-month follow up on most of the outcome variables. The results were more mixed for the other psychological flexibility processes in relation to outcomes at 1-month follow up with processes most consistently relating to depression and stress. In each case, significant correlations were such that improvements in psychological flexibility processes from pre to post were related to improvements in outcomes at 1-month follow up, controlling for baseline scores. Improvements in ACT knowledge were not related to improvements in any outcomes.

Table 16. Partial correlation results examining pre to post changes in process measures predicting outcomes at 1-month follow up controlling for baseline scores.

<table>
<thead>
<tr>
<th></th>
<th>Depression</th>
<th>Anxiety</th>
<th>Stress</th>
<th>MHC</th>
<th>Rel. success</th>
<th>Ed. success</th>
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<td>.25**</td>
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<td>-.30***</td>
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</table>

†p < .10, *p < .05; **p < .01; ***p < .001.

There were very few significant relationships between pre to post changes in process measures and improvements on outcomes at 3-month follow up controlling for baseline scores. There was a significant correlation between nonreactivity and anxiety, but in an unexpected direction such that improvements in nonreactivity related to worse anxiety at 3-month follow up.
Table 17. Partial correlation results examining pre to post changes in process measures predicting outcomes at 3-month follow up controlling for baseline scores.

<table>
<thead>
<tr>
<th></th>
<th>Depression</th>
<th>Anxiety</th>
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<th>MHC</th>
<th>Rel. success</th>
<th>Ed. success</th>
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<td>.06</td>
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<td>.09</td>
<td>.10</td>
</tr>
<tr>
<td>Ed. Ratio</td>
<td>.11</td>
<td>.14</td>
<td>.11</td>
<td>.02</td>
<td>-.09</td>
<td>-.05</td>
</tr>
<tr>
<td>ACT Quiz</td>
<td>.04</td>
<td>.04</td>
<td>-.04</td>
<td>-.01</td>
<td>.03</td>
<td>-.15†</td>
</tr>
</tbody>
</table>

†p < .10, *p < .05; **p < .01; ***p < .001.

Moderation Analyses with Intervention Condition

A series of linear regression analyses examined whether the relationship between changes in processes from pre to post to outcomes at follow up were moderated by condition. For each moderation analysis, a hierarchical linear regression was conducted in which baseline outcome score, process change score and intervention condition were included and then a second step was tested in which the interaction between process change score and intervention condition was added. There was a significant interaction between pre to post changes on the AFQ and intervention condition when predicting positive mental health at 1-month follow up (b = .16, t(145) = 1.98, R² change = .01, F(1, 145) = 3.92, p = .05). Partial correlations indicated that pre to post improvements in psychological inflexibility was significantly related to improvements in positive mental health in the control condition (r = -.32, p = .003), but not the ACT-CL condition (r = .02, p > .10). There were no other significant moderation effects by intervention condition with psychological inflexibility in predicting 1-month or 3-month outcomes (p > .10).

There was a significant moderation effect by condition for changes in relationship values reasons predicting anxiety at 1-month follow up (b = -.24, t(136) = -2.30, R² change = .02, F(1, 136) = 5.27, p = .023). Partial correlations indicated that pre to post improvements in relationship values reasons was related to improvements in anxiety at 1-month follow up in the control
condition ($r = .27, p = .02$), but not in the ACT-CL condition ($r = -.13, p > .10$). There was also a trend for a moderation effect with relationship values reasons and anxiety at 3-month follow up ($b = -.18, t(137) = -1.73, R^2 \text{ change} = .02, F(1, 137) = 2.99, p = .086$) such that there was a trend for improvements in relationship values reasons relating to worsening anxiety in the ACT-CL condition ($r = -.22, p = .09$), but not in the control condition ($r = .14, p > .10$). There was a trend for condition moderating the relationship between changes in relationship values reasons and positive mental health at 3-month follow up ($b = -.18, t(135) = -1.80, R^2 \text{ change} = .02, F(1, 135) = 3.24, p = .074$) such that improvements in relationship values reasons were related to improvements in positive mental health in the ACT-CL condition ($r = -.26, p = .04$), but not in the control condition ($r = .06, p > .10$). Lastly, there was a trend for condition moderating the relationship between changes in relationship values reasons and education values success at 3-month follow up ($b = .22, t(131) = 1.92, R^2 \text{ change} = .02, F(1, 131) = 3.68, p = .057$) such that there was a trend for improvements in relationship values reasons being related to worsening in education values success in the ACT-CL condition ($r = .25, p = .057$), but not in the control condition ($r = -.09, p > .10$).

There was a significant moderation effect for education values reasons predicting depression at 1-month follow up ($b = -.21, t(137) = -2.25, R^2 \text{ change} = .03, F(1, 137) = 5.08, p = .026$) such that improvements in education values reasons was related to improvements in depression at follow up in the control condition ($r = .36, p = .001$), but not in the ACT-CL condition ($r = .00, p > .10$). There was a trend for an intervention condition moderation effect with anxiety at 1-month follow up ($b = -.15, t(136) = -1.67, R^2 \text{ change} = .01, F(1, 136) = 2.77, p = .098$) such that improvements in education values reasons were related to improvements in anxiety at follow up in the control condition ($r = .29, p = .009$), but not in the ACT-CL condition ($r = .02, p > .10$).
Intervention condition significantly moderated the relationship between ACT knowledge and anxiety at 3-month follow up ($b = .30$, $t(145) = 2.47$, $R^2$ change = .03, $F(1, 145) = 6.08$, $p = .015$) such that there was a trend for improvements in ACT knowledge being related to improvements in anxiety in the control condition ($r = -.19$, $p = .08$), but for improvements in knowledge relating to worsening anxiety in the ACT-CL condition ($r = .22$, $p = .077$). There was a trend for a moderation effect with relationship success at 1-month follow up ($b = .24$, $t(148) = 1.73$, $R^2$ change = .02, $F(1, 148) = 3.01$, $p = .085$) such that improvements in ACT knowledge was related to improvements in relationship values success in the ACT-CL condition ($r = .22$, $p = .076$), but not in the control condition ($r = -.07$, $p > .10$). There were no significant moderation effects by intervention condition with nonreactivity or acting with awareness in predicting 1-month or 3-month outcomes ($p > .10$).

**Relationship between Changes in ACT Knowledge and Psychological Flexibility in ACT-CL**

A series of partial correlations in the ACT-CL condition examined whether pre to post changes in ACT knowledge were related to improvements in psychological flexibility processes at 1-month follow up, controlling for baseline scores. Results indicated that improvements in ACT knowledge was significantly related to improvements in psychological inflexibility at 1-month follow up ($r = -.43$, $p < .001$) in the ACT-CL condition. There was also a statistical trend for improvements in ACT knowledge relating to improvements in acting with awareness at 1-month follow up ($r = .23$, $p = .061$). ACT knowledge was not related to values reasons or nonreactivity at 1-month follow up ($p > .10$).

**Summary**

Overall, the results indicated that improvements in psychological inflexibility were related to improvements in outcomes at 1-month follow up, but not 3-month follow up. Results with the other processes were more mixed, but tended to show that changes in mindfulness and values processes were predictive of at least some outcome improvements at 1-month follow up.
Changes in process measures were not predictive however of outcomes at 3-month follow up. In addition, changes in ACT knowledge were not related to improvements in outcomes, but were related to improvements in some psychological flexibility processes at 1-month follow up in the ACT-CL condition.

Moderation analyses did not find a consistent pattern indicating that the relationship of changes in processes to changes in outcome was attributable more to the ACT-CL or control website. Some moderation effects were found, but they were very inconsistent, though it is worth noting that these effects tended to favor a stronger relationship between changes in processes and changes in outcomes in the control condition.

**Examining the Relationship between Program Usage and Changes in Process Measures**

The current study results suggest a technology failure of the ACT-CL prototype in having a greater impact on psychological flexibility processes than an active control website. Given the low program engagement with ACT-CL, it is unclear if this is due to a lack of user engagement and if students had been more engaged whether there would have been a greater impact on psychological flexibility processes. Conversely, it may be that the program content itself simply fails to impact psychological flexibility, even if students are highly engaged. To further explore this issue, a series of analyses examined the relationship of program usage to changes in process measures at post.

*Time on Web-Based Lessons*

Partial correlations were conducted to examine the relationship of time on each program lesson to process measures at post, controlling for baseline scores (see Table 18). The more time participants spent on the first ACT-CL lesson was significantly related to better education success and nonreactivity at post as well as trends for improved psychological inflexibility and acting with awareness. Time spent on the second lesson of ACT-CL was not related to any variables at
post \((p > .10)\). Time spent on the control condition lessons was not related to any variables at post except worse education success and better ACT knowledge. These results suggest that the longer participants spent on the first ACT lesson, the more they tended to improve on psychological flexibility processes, but this was not the case with the second lesson or control website.

Table 18. Partial correlation results between time on website and process measures at post controlling for pre scores.

<table>
<thead>
<tr>
<th></th>
<th>ACT L1 Time</th>
<th>ACT L2 Time</th>
<th>Cont L1 Time</th>
<th>Cont L2 Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rel. Success</td>
<td>.21†</td>
<td>-.05</td>
<td>-.01</td>
<td>-.07</td>
</tr>
<tr>
<td>Ed. Success</td>
<td>.26*</td>
<td>.02</td>
<td>-.19†</td>
<td>-.21*</td>
</tr>
<tr>
<td>AFQ</td>
<td>-.22†</td>
<td>-.07</td>
<td>-.04</td>
<td>-.06</td>
</tr>
<tr>
<td>FFMQ-NR</td>
<td>.25*</td>
<td>.18</td>
<td>.10</td>
<td>.10</td>
</tr>
<tr>
<td>FFMQ –Aw</td>
<td>.22†</td>
<td>.00</td>
<td>-.03</td>
<td>.07</td>
</tr>
<tr>
<td>Rel. Ratio</td>
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<td>.18</td>
<td>-.07</td>
<td>-.10</td>
</tr>
<tr>
<td>Ed. Ratio</td>
<td>-.12</td>
<td>.17</td>
<td>-.04</td>
<td>.06</td>
</tr>
<tr>
<td>ACT Quiz</td>
<td>.08</td>
<td>-.17</td>
<td>.18†</td>
<td>.22*</td>
</tr>
</tbody>
</table>

\(†p < .10\), \(*p < .05\); \(**p < .01\); \(***p < .001\). ACT L1 Time = Total Time on ACT-CL Lesson 1; ACT L2 Time = Total Time on ACT-CL Lesson 2; Cont L1 Time = Total Time on Control Website Lesson 1; Cont L2 Time = Total Time on Control Website Lesson 2.

**Word Count on ACT-CL Exercises**

Partial correlations were conducted to examine the relationship of word count in ACT-CL program exercises to process measures at post, controlling for baseline scores (see Table 19). Greater word count in the lesson 1 values writing exercise was significantly related to improved acting with awareness and relationship values reasons as well as a trend for improved ACT knowledge. There were statistical trends for a relationship between greater lesson 1 goal setting word count and improved relationship values reasons and ACT knowledge at post. Greater lesson 2 goal setting word count was significantly related to improved psychological inflexibility, acting with awareness, and ACT knowledge as well as trends for improved education success, relationship values reasons, and education values reasons at post.
Table 19. Relationship between ACT-CL exercise word count and post process measures controlling for baseline scores.

<table>
<thead>
<tr>
<th></th>
<th>Values writing word count</th>
<th>Lesson 1 goal word count</th>
<th>Lesson 2 goal word count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rel. Success</td>
<td>-.05</td>
<td>.05</td>
<td>.12</td>
</tr>
<tr>
<td>Ed. Success</td>
<td>-.17</td>
<td>-.02</td>
<td>.24†</td>
</tr>
<tr>
<td>AFQ</td>
<td>-.13</td>
<td>-.15</td>
<td>-.30*</td>
</tr>
<tr>
<td>FFMQ-NR</td>
<td>.13</td>
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<td>.02</td>
</tr>
<tr>
<td>FFMQ –Aw</td>
<td>.31**</td>
<td>.10</td>
<td>.41**</td>
</tr>
<tr>
<td>Rel. Ratio</td>
<td>-.36**</td>
<td>-.20†</td>
<td>-.24†</td>
</tr>
<tr>
<td>Ed. Ratio</td>
<td>-.17</td>
<td>-.09</td>
<td>-.26†</td>
</tr>
<tr>
<td>ACT Quiz</td>
<td>.22†</td>
<td>.20†</td>
<td>.31*</td>
</tr>
</tbody>
</table>

†p < .10, *p < .05; **p < .01; ***p < .001.

Text Messages from ACT-CL Program

ANCOVAs were conducted to compare participants who did and did not receive text messages from the ACT-CL program on process measures at post, controlling for baseline scores. There were significant between group effects on psychological inflexibility, $F(1, 76) = 5.19, p = .03$, partial $\eta^2 = .07$, acting with awareness, $F(1, 72) = 4.43, p = .04$, partial $\eta^2 = .06$, relationship values reasons, $F(1, 73) = 4.93, p = .03$, partial $\eta^2 = .07$, and ACT knowledge, $F(1, 76) = 4.81, p = .03$, partial $\eta^2 = .06$, as well as a trend for relationship values success, $F(1, 75) = 3.64, p = .06$, partial $\eta^2 = .05$. In each case, those who received text messages improved more on post measures relative to those who did not receive texts. There was no significant difference on nonreactivity, education values reasons or education values success ($p > .10$).

Other Program Engagement Variables

Three additional program engagement variables were not found to predict changes in process measures at post. Number of logins was not correlated with process measures at post, controlling for baseline scores ($p > .10$). There were no significant differences on post process measures between participants who did or did not access the additional mindfulness resources ($p$
There were also no differences on post measures between participants who completed or did not complete the two lessons in the ACT-CL program ($p > .10$).

**Summary**

The results indicate that students who engaged more in some aspects of the ACT-CL prototype tended to improve more on psychological flexibility processes. This included spending more time on the first lesson and writing more in key exercises. In addition, students who requested to receive follow up text messages tended to improve more on process measures. However, completing both lessons did not relate to greater improvements, suggesting it may be more a matter of how engaged students were in completing the lessons than whether they went through all of the program content. These effects appear to be more specific to ACT-CL as evidenced by the relative lack of relationship between time on the control website and improvements in psychological flexibility processes.

**Predicting Engagement in the ACT-CL Prototype**

The current study results suggest that the technology failure with the ACT-CL prototype may be due to low program engagement and that students who were more engaged in the program tended to improve more on psychological flexibility. Additional analyses were conducted to further explore why students were less engaged with ACT-CL relative to the control website and the initial pilot RCT.

**Post Questionnaire**

The post questionnaire included an assessment for why participants did not complete the program with checkbox options including “knew it already”, “not interested”, “no time”, “not engaging”, “could not access program” and “other.” Unfortunately, only 24% of students who did not complete both program lessons answered this questionnaire ($n = 12$ out of 49). The most
frequently endorsed item was “no time” with 10 participants selecting this reason and the second most frequent was “not engaging” with 5 participants.

Examining Baseline Process and Outcome Variables as Predictors of Engagement in ACT-CL

Correlations were examined between baseline process and outcome variables and time on ACT-CL lessons and word count in key ACT-CL exercises (see Table 20). None of the baseline measures consistently related to all of the program engagement variables, but there was a pattern for greater ACT knowledge, relationship values reasons, education values reasons, and nonreactivity being related to higher program engagement.

Table 20. Correlations between baseline variables and ACT program engagement variables.

<table>
<thead>
<tr>
<th></th>
<th>ACT-CL L1 Time</th>
<th>ACT-CL L2 Time</th>
<th>Values writing word count</th>
<th>Lesson 1 goal word count</th>
<th>Lesson 2 goal word count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>.03</td>
<td>.17</td>
<td>-.03</td>
<td>.04</td>
<td>.09</td>
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<tr>
<td>Anxiety</td>
<td>-.04</td>
<td>.05</td>
<td>-.12</td>
<td>-.12</td>
<td>-.30*</td>
</tr>
<tr>
<td>Stress</td>
<td>-.08</td>
<td>-.01</td>
<td>-.06</td>
<td>.07</td>
<td>-.03</td>
</tr>
<tr>
<td>MHC</td>
<td>.02</td>
<td>.01</td>
<td>.18†</td>
<td>.12</td>
<td>.02</td>
</tr>
<tr>
<td>Rel. Success</td>
<td>-.01</td>
<td>.01</td>
<td>-.02</td>
<td>.07</td>
<td>-.01</td>
</tr>
<tr>
<td>Ed. Success</td>
<td>-.09</td>
<td>-.02</td>
<td>.19†</td>
<td>.00</td>
<td>.12</td>
</tr>
<tr>
<td>AFQ</td>
<td>.02</td>
<td>.13</td>
<td>.05</td>
<td>.05</td>
<td>-.01</td>
</tr>
<tr>
<td>FFMQ-NR</td>
<td>.12</td>
<td>.09</td>
<td>.19†</td>
<td>.30**</td>
<td>.33**</td>
</tr>
<tr>
<td>FFMQ-Aw</td>
<td>.01</td>
<td>-.10</td>
<td>.02</td>
<td>-.12</td>
<td>-.03</td>
</tr>
<tr>
<td>Rel. Ratio</td>
<td>-.09</td>
<td>.00</td>
<td>-.19†</td>
<td>-.28**</td>
<td>-.14</td>
</tr>
<tr>
<td>Ed. Ratio</td>
<td>-.04</td>
<td>.23†</td>
<td>-.32**</td>
<td>-.02</td>
<td>-.17</td>
</tr>
<tr>
<td>ACT Quiz</td>
<td>.18†</td>
<td>.30*</td>
<td>.14</td>
<td>.39***</td>
<td>.37**</td>
</tr>
</tbody>
</table>

†p < .10. *p < .05; **p < .01; ***p < .001.

Independent sample t-tests were conducted to compare scores on outcome and process measures at baseline between participants who did and did not request to receive text messages, who did and did not access the additional mindfulness resources, and those who did and did not
complete the program lessons. There was a significant difference between groups on ACT knowledge, \( t(108) = -3.42, p = .001 \), Cohen’s \( d = .69 \), as well as a trend on nonreactivity, \( t(108) = -1.91, p = .06 \), Cohen’s \( d = .38 \), such that participants who requested to receive text messages had higher ACT knowledge and nonreactivity at baseline. When comparing students who did and did not access the additional mindfulness resources the only significant difference at baseline was on ACT knowledge, \( t(108) = -3.38, p = .001 \), Cohen’s \( d = .88 \), such that those who accessed the additional resources had greater ACT knowledge at baseline. The only difference between participants who did not complete any lessons and those who did was on relationship values reasons, \( t(105) = 2.03, p = .05 \), Cohen’s \( d = .40 \), such that those who did not complete any lessons had worse relationship values reasons. There were no significant differences between participants who only completed one lesson and those who completed both lessons \( (p > .10) \).

**Examining Subgroup Variables as Predictors of Program Engagement**

A series of analyses were conducted to examine differences on program engagement variables between specific subgroups including first year students and non-first year students, 18-22 year olds and older students, male and female students, minority and non-minority students, participants with various degrees of depression/anxiety symptoms, and participants with higher and lower psychological inflexibility. For each subgroup category, independent \( t \)-tests compared subgroups on time spent on lesson 1 and lesson 2 as well as word count on the values writing, lesson 1 goal setting, and lesson 2 goal setting exercises. Chi square analyses compared subgroups on rates of completing at least one lesson, completing both lessons, requesting to receive text messages and whether users accessed mindfulness resources at least once.

**First Year and Non-First Year Students.** There was a significant between group difference for time on lesson 1, \( t(91) = -2.54, p = .013 \), Cohen’s \( d = .59 \), such that first year students \((M = 25.65, SD = 8.52)\) spent significantly less time on lesson 1 than non-first year students \((M = 30.62, SD = 8.45)\). There was also a trend for a between group difference for word
count in the values writing exercise, \( t(87) = -1.76, p = .082 \), Cohen’s \( d = .42 \), such that first year students \( (M = 63.42, SD = 36.01) \) wrote significantly less than non-first year students \( (M = 82.28, SD = 48.59) \). There were no differences between first year and non-first year students on any other program engagement variables \( (p > .10) \).

Younger (18-22) and Older Students. There was a trend for a between group difference for time on lesson 1, \( t(97) = -1.75, p = .083 \), Cohen’s \( d = .44 \), such that younger students \( (M = 28.23, SD = 8.33) \) spent significantly less time on lesson 1 than older students \( (M = 32.07, SD = 10.78) \). There were no differences between younger and older students on any other program engagement variables \( (p > .10) \).

Males vs. Females. There was a trend for a between group difference for time on lesson 1, \( t(97) = 1.83, p = .07 \), Cohen’s \( d = .43 \), such that males \( (M = 31.87, SD = 6.70) \) spent more minutes on lesson one than females \( (M = 28.10, SD = 9.50) \). There were no differences between males and females on any other program engagement variables \( (p > .10) \).

Minority vs. Non-Minority Students. There was a trend for a between group difference for word count in the values writing exercise, \( t(91) = -1.10, p = .059 \), Cohen’s \( d = .47 \), such that minority students wrote less in the values writing exercise \( (M = 62.96, SD = 31.27) \) than non-minority students \( (M = 83.52, SD = 48.73) \). There were no differences between minority and non-minority students on any other program engagement variables \( (p > .10) \).

Higher vs. Lower Psychological Inflexibility. There was a trend for a between group difference on text messaging, \( \chi^2 = 3.14, p = .077 \), Cohen’s \( d = .34 \), such that fewer students who were high in psychological inflexibility requested to receive text messages \( (29\%) \) than those who were low in psychological inflexibility \( (45\%) \). There were no differences between high and low psychological inflexibility students on any other program engagement variables \( (p > .10) \).

Level of Depression/Anxiety Symptoms at Baseline. There were no differences on any program engagement variables between students who did not endorse depression or anxiety
symptoms relative to those who did ($p > .10$). There were also no differences on any program engagement variables between students reporting severe depression and/or anxiety symptoms relative to those who did not ($p > .10$).

**Predicting Time on Control Website**

Zero order correlations were examined between baseline outcome and process measures and time spent on the control condition website (see Table 21). Significant correlations were found between greater time on program lessons and higher depression, lower positive mental health, lower relationship values success, better values reasons, and better ACT knowledge. Significant correlation coefficients ranged between .21 and .36.

**Table 21. Relationship of baseline outcome and process measures to time on the control website.**

<table>
<thead>
<tr>
<th></th>
<th>Control Lesson 1 Total Time</th>
<th>Control Lesson 2 Total Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>.15</td>
<td>.21*</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.05</td>
<td>.04</td>
</tr>
<tr>
<td>Stress</td>
<td>.14</td>
<td>.11</td>
</tr>
<tr>
<td>MHC</td>
<td>-.28**</td>
<td>-.28**</td>
</tr>
<tr>
<td>Rel. Success</td>
<td>-.29**</td>
<td>-.33**</td>
</tr>
<tr>
<td>Ed. Success</td>
<td>-.15</td>
<td>-.13</td>
</tr>
<tr>
<td>AFQ</td>
<td>.09</td>
<td>.11</td>
</tr>
<tr>
<td>FFMQ-NR</td>
<td>.03</td>
<td>.04</td>
</tr>
<tr>
<td>FFMQ –Aw</td>
<td>-.14</td>
<td>-.08</td>
</tr>
<tr>
<td>Rel. Ratio</td>
<td>-.21*</td>
<td>-.10</td>
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<tr>
<td>Ed. Ratio</td>
<td>-.27**</td>
<td>-.27**</td>
</tr>
<tr>
<td>ACT Quiz</td>
<td>.36***</td>
<td>.32**</td>
</tr>
</tbody>
</table>

†$p < .10$, *$p < .05$; **$p < .01$; ***$p < .001$.

**Summary**

Greater ACT knowledge was consistently related to more program engagement, while there were more inconsistent findings with other baseline measures. Only ACT knowledge related
to time on ACT-CL lessons. Higher scores on nonreactivity, relationship values reasons, education values reasons, and ACT knowledge at baseline related to writing more in the ACT exercises, though none of these variables related to all three word count variables. ACT knowledge also related to whether students requested text messages or accessed mindfulness resources, with no other baseline measures relating to these engagement variables. None of the outcome or process measures related to completing one or both lessons. Outcome variables at baseline tended to not be related to any of the ACT-CL program engagement variables. A similar pattern of results was found among baseline predictors of time spent on the control website, although positive mental health, depression, and relationship values success were also predictors for the control condition.

There were no consistent patterns indicating that particular subgroups engaged less in the ACT-CL program. There were a few findings suggesting that first year, younger and female students tended to spend less time on the first lesson and that first year and minority students wrote less in the values writing exercise. However, there were no differences between subgroups for most program engagement variables.

**Predicting Program Satisfaction**

The low program satisfaction ratings for ACT-CL may provide further insight into the program engagement issues that were found in the current study. A series of analyses were conducted to further examine predictors of program satisfaction across and between conditions. **Examining Subgroup Variables as Predictors of Program Satisfaction**

A series of paired $t$-tests were conducted to examine differences in program satisfaction between subgroups. There were no significant differences on satisfaction ratings between males and females, minority and non-minority, 18-22 year old and older students, students who did not endorse depression/anxiety and those who did, or students reporting severe depression/anxiety
and those who did not. There was a significant difference between first year and non-first year 
students on SUS ratings, $t(163) = -2.74, p = .007$, Cohen’s $d = .48$, such that first year students 
rated both websites significantly lower on the SUS ($M = 66.40, SD = 16.69$) than non-first year 
students ($M = 75.18, SD = 18.74$). There were statistical trends for differences between high and 
low psychological inflexibility participants on two items; High inflexibility students rated both 
websites higher on “I was satisfied with the quality of the wellness program” ($M = 4.94, SD = 
.97$) than lower inflexibility students ($M = 4.65, SD = 1.26$), $t(174) = 1.72, p = .087$, Cohen’s $d = 
.26$. High inflexibility students also rated both websites higher on “I would like to use the 
wellness program again in the future” ($M = 4.08, SD = 1.36$) than lower inflexibility students ($M 
= 3.69, SD = 1.43$), $t(170) = 1.87, p = .063$, Cohen’s $d = .28$.

Moderators of Program Satisfaction Differences between Conditions

A series of 2 X 2 ANOVA were conducted to test for interaction effects between 
conditions and subgroup variables in predicting program satisfaction ratings. There were no 
significant interactions for satisfaction ratings between condition and minority status, first year 
students vs. non-first year students, 18-22 year old vs. older students, students who did not 
endorse depression/anxiety vs. those who did, students reporting severe depression/anxiety vs. 
those who did not, or higher vs. lower psychological inflexibility ($p > .10$). There was a 
significant interaction between condition and gender in predicting ratings for the question 
“Overall, I was satisfied with the quality of the wellness program.” such that males rated the 
ACT-CL website as better and females rated the control website as better ($F(1, 172) = 6.45, p = 
.01$). There were no other significant interactions with gender ($p > .10$).

Open Ended Program Satisfaction Questions

Participants also completed three open ended questions at post assessing what they liked 
most about the program, liked least, and how they would have wanted to the program to be 
different, which could provide further explanations for the poor satisfaction and engagement in
ACT-CL. Responses to these questions were coded by ML for content themes, with the results for each question provided below (see Tables 22, 23 and 24).

Table 22. Coded participant responses to the question “What did you like best about the wellness program?”

<table>
<thead>
<tr>
<th>Coded participant responses</th>
<th>ACT-CL (n = 70)</th>
<th>Control (n = 83)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple/easy to use</td>
<td>14%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>20%&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Lesson flow and organization</td>
<td>11%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2%&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Clear/understandable information</td>
<td>13%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>17%&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Engaging/interesting</td>
<td>9%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5%&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Length (i.e., not too long)</td>
<td>4%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8%&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Interactive elements</td>
<td>10%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4%&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Multimedia elements</td>
<td>11%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4%&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Tailored elements</td>
<td>3%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0%&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Emails</td>
<td>3%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0%&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Helpful/liked the information</td>
<td>57%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>63%&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>ACT values lesson content</td>
<td>17%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0%&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>ACT willingness lesson content</td>
<td>4%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0%&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Learned about depression and anxiety</td>
<td>0%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5%&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Normalization/acceptance of emotions (i.e., others have these emotions, it’s okay to feel that way)</td>
<td>0%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5%&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Learned coping strategies when dealing with difficulties</td>
<td>1%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>13%&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Rated baseline/post survey instead</td>
<td>4%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7%&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Nothing</td>
<td>6%&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1%&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a,b</sup> superscripts indicate differences in rate of responses between groups (p < .10).

There were significant differences between conditions on the rate of participants who described the following features as what they liked the best about the program: the lesson flow/organization, $\chi^2 = 5.06, p = .025$, Cohen’s $d = .37$, ACT values lesson content, $\chi^2 = 15.44, p < .001$, Cohen’s $d = .67$, and learning coping strategies, $\chi^2 = 7.35, p = .007$, Cohen’s $d = .45$, as
well as statistical trends for multimedia elements, $\chi^2 = 3.48, p = .062$, Cohen’s $d = .31$, ACT willingness lesson content, $\chi^2 = 3.63, p = .057$, Cohen’s $d = .31$, learning about depression and anxiety, $\chi^2 = 3.46, p = .063$, Cohen’s $d = .30$, and normalization/acceptance of emotions, $\chi^2 = 3.46, p = .063$, Cohen’s $d = .30$. Participants in the ACT-CL condition were more likely to mention lesson flow/organization (11% vs. 2%), multimedia elements (11% vs. 4%), ACT values lesson content (17% vs. 0%), and willingness lesson content (4% vs. 0%), while participants in the control condition were more likely to mention learning about depression and anxiety (5% vs. 0%), normalization/acceptance of emotions (5% vs. 0%), and learning coping strategies (13% vs. 1%). Of note, within the ACT-CL condition, participants were significantly more likely to mention liking the values content than the willingness content, $\chi^2 = 6.05, p = .014$, Cohen’s $d = .62$.

The most common theme regarding what participants liked the most referenced the program content being helpful (57% ACT, 63% in control). Other common responses referred to the program being simple/easy to use (14% ACT, 20% control) and providing clear/understandable information (13% ACT, 17% control).

Table 23. Coded participant responses to the question “What did you like least about the wellness program?”

<table>
<thead>
<tr>
<th>Coded participant responses</th>
<th>ACT-CL ($n = 68$)</th>
<th>Control ($n = 75$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too long</td>
<td>31% $^a$</td>
<td>12% $^b$</td>
</tr>
<tr>
<td>Boring/tedious</td>
<td>9% $^a$</td>
<td>7% $^a$</td>
</tr>
<tr>
<td>Repetitive/excessive explanation</td>
<td>7% $^a$</td>
<td>11% $^a$</td>
</tr>
<tr>
<td>Common sense information/already knew it</td>
<td>1% $^a$</td>
<td>11% $^b$</td>
</tr>
<tr>
<td>Too simple/not in depth</td>
<td>0% $^a$</td>
<td>4% $^b$</td>
</tr>
<tr>
<td>The content</td>
<td>9% $^a$</td>
<td>8% $^a$</td>
</tr>
<tr>
<td>Too immature/targeted to younger audience</td>
<td>15% $^a$</td>
<td>1% $^b$</td>
</tr>
<tr>
<td>Did not like cartoon/graphics</td>
<td>3% $^a$</td>
<td>0% $^a$</td>
</tr>
</tbody>
</table>
Did not like the look and feel & 0\%^a & 1\%^a \\
Did not like the audio narration & 15\%^a & 0\%^b \\
Did not like the tunneled format with required responding & 19\%^a & 1\%^b \\
Too much reading & 0\%^a & 4\%^b \\
Did not like the reminder emails & 1\%^a & 1\%^b \\
Did not like the technology of using computers for wellness program & 1\%^a & 3\%^a \\
Encountered website bugs & 12\%^a & 0\%^b \\
Rated baseline/post survey instead & 4\%^a & 16\%^b \\
Nothing & 9\%^a & 20\%^b \\

^a,b superscripts indicate differences in rate of responses between groups (p < .10).

There were significant differences between conditions on the rate of participants who described the following features as what they liked the least about the program: too long, $\chi^2 = 7.67, p = .005$, Cohen’s $d = .46$, common sense information/already knew it, $\chi^2 = 5.11, p = .024$, Cohen’s $d = .38$, too immature/targeted to younger audience, $\chi^2 = 8.98, p = .003$, Cohen’s $d = .51$, disliked the audio narration, $\chi^2 = 11.86, p < .001$, Cohen’s $d = .59$, disliked the tunneled format with required responding, $\chi^2 = 12.77, p < .001$, Cohen’s $d = .61$, encountered website bugs, $\chi^2 = 9.35, p = .002$, Cohen’s $d = .52$, rated the baseline/post survey accidentally, $\chi^2 = 5.10, p = .02$, Cohen’s $d = .38$, as well as statistical trends for too simple/not in depth, $\chi^2 = 2.78, p = .096$, Cohen’s $d = .28$, too much reading, $\chi^2 = 2.78, p = .096$, Cohen’s $d = .28$, and nothing disliked, $\chi^2 = 3.56, p = .059$, Cohen’s $d = .31$. Participants in the ACT-CL condition were more likely to rate the program as too long (31% vs. 12%), too immature (15% vs. 1%), disliking the audio narration (15% vs. 0%), disliking the tunneled format (19% vs. 1%), and encountering website bugs (12% vs. 0%), while control participants were more likely to rate the program as common sense (11% vs. 1%), too simple (4% vs. 0%), too much reading (4% vs. 0%), or finding nothing they disliked (20% vs. 9%) or accidentally rating the surveys instead (16% vs. 4%). The most commonly mentioned feature that users disliked was it being too long.
Table 24. *Coded participant responses to the question “How would you have liked the wellness program to be different?”*

| Coded participant responses                              | ACT-CL  
|----------------------------------------------------------|---------
|                                                          | \( n = 59 \) | Control  
|                                                          |         | \( n = 74 \) |
| Shorter/faster pace/less repetitive                      | 19\(^{a}\) | 9\(^{a}\) |
| More self-paced/add skip feature                        | 5\(^{a}\) | 1\(^{a}\) |
| More engaging                                            | 3\(^{a}\) | 5\(^{a}\) |
| Less audio narration                                     | 1\(^{a}\) | 0\(^{a}\) |
| Less interactivity                                       | 1\(^{a}\) | 0\(^{a}\) |
| More interactivity                                       | 1\(^{a}\) | 5\(^{a}\) |
| More videos/other media                                  | 0\(^{a}\) | 5\(^{b}\) |
| More reading                                             | 3\(^{a}\) | 0\(^{a}\) |
| Less reading                                             | 0\(^{a}\) | 3\(^{a}\) |
| Improve look and feel                                    | 1\(^{a}\) | 3\(^{a}\) |
| Targeted more to college students/more mature            | 15\(^{a}\) | 0\(^{b}\) |
| Applied more to me/more tailored                         | 8\(^{a}\) | 1\(^{b}\) |
| More real life/college examples                          | 7\(^{a}\) | 3\(^{a}\) |
| Change/revise aspects of the program content             | 5\(^{a}\) | 16\(^{b}\) |
| More sophisticated/in depth content                      | 5\(^{a}\) | 7\(^{a}\) |
| Fix program bugs                                         | 10\(^{a}\) | 0\(^{b}\) |
| Baseline/post questionnaire comment                      | 10\(^{a}\) | 19\(^{a}\) |
| No changes needed                                        | 20\(^{a}\) | 27\(^{a}\) |

\(^{a,b}\) superscripts indicate differences in rate of responses between groups \((p < .10)\).

There were significant differences between conditions on the rate of participants who described the following features as what could be improved in the program: targeting the program more to college students/making it more mature, \(\chi^2 = 12.11, p < .001\), Cohen’s \(d = .63\), making it applied more to the user/more tailored, \(\chi^2 = 3.87, p = .049\), Cohen’s \(d = .34\), change/revise aspects of the program content, \(\chi^2 = 4.07, p = .044\), Cohen’s \(d = .35\), and fix program bugs, \(\chi^2 = 7.88, p = .005\), Cohen’s \(d = .50\), as well as a statistical trend for adding more videos/other media, \(\chi^2 = 3.29, p = .070\), Cohen’s \(d = .32\). Participants in the ACT-CL condition were more likely to requesting targeting the program more to college students (15% vs. 0%), making the program more applied.
to individual user (8% vs. 1%), and to fixing program bugs (10% vs. 0%), while those in the control condition more often requested changes to program content (16% vs. 5%) and adding more videos and media (5% vs. 0%). The most frequent revision request was to make the program shorter and less repetitive (ACT 19%, control 9%).

Summary

The analyses did not find any consistent predictors of program satisfaction across or between conditions, suggesting students from a variety of subgroups tended to rate the websites similarly. The coded responses to the open ended questions at post highlighted a number of design features with the ACT-CL and control websites that may have impacted satisfaction, engagement and efficacy and that could be addressed with further program development.
CHAPTER FOUR: DISCUSSION

Summary of Results

The current study sought to examine the feasibility of a prototype ACT-CL program as a universal prevention approach for depression and anxiety among college students by comparing it to an active control website in a RCT. A significant portion of students in the ACT-CL condition did not complete both lessons, with much higher lesson completion rates in the control condition. Participants also tended to rate the control website higher than ACT-CL on program satisfaction items. The program completion rates and usability ratings for ACT-CL were also lower than in the initial pilot trial. For the most part, there were no differences between the ACT-CL and control website on outcome or process measures at post or follow up using both the full ITT sample as well as only those who completed both lessons. Furthermore, differences that were found tended to favor the control website relative to the ACT-CL website, most notably in the ITT sample in which fewer participants in ACT-CL remitted from severe depression and/or anxiety relative to the control website. Time effects indicated that participants in both conditions improved on some of the outcome and process measures over time, especially at follow up, although changes over time tended to be small and to be stronger in the control condition. Subgroup analyses did not identify any consistent pattern of between group intervention effects including among those with severe, mild to moderate or no depression/anxiety symptoms, higher and lower psychological inflexibility, first year students and non-first year students, 18-22 year olds and older students, male and female students, and minority and non-minority students. Overall, these results indicate low program engagement in the ACT-CL website and that the existing components of ACT-CL failed to impact outcome or process measures above and beyond an active control condition, even in the subgroup of students who completed both lessons.

Although results indicated a technology failure, processes of change findings were supportive of the psychological flexibility model and suggestive that degree of engagement in the
ACT-CL prototype was predictive of improvements in psychological flexibility processes. Changes in psychological inflexibility, and to a lesser extent values and mindfulness, across both conditions combined were related to improvements in outcomes at 1-month follow up. Participants in the ACT-CL condition improved on ACT knowledge from pre to post relative to the control condition and improvements in ACT knowledge were found to relate to improvements in psychological flexibility processes at 1-month follow up. Degree of engagement in the ACT-CL program including word counts in key exercises, time spent on lesson 1, and receiving text messages from the program, were related to improvements in outcome and process measures at post (though the results varied and none of these engagement variables predicted improvements in all outcome or process measures). Psychological flexibility process measures at baseline were predictive of degree of engagement in the ACT-CL program as well as the control website, particularly ACT knowledge and education and relationship values (although again results were varied and none of these measures consistently predicted all engagement variables).

**Poor Program Engagement and Satisfaction Ratings with the ACT-CL Prototype**

The current feasibility study found that many students did not engage fully in the prototype ACT-CL program. In the ACT-CL condition, only 85% completed the first lesson and only 55% completed the second lesson. This stands in marked contrast to the control website in which 100% completed the first lesson and 86% completed the second lesson. This is also much lower than in the initial pilot trial in which 97% completed the first lesson and 92% completed the second lesson. ACT-CL users in the current study also spent significantly less time in each lesson than those in the pilot trial. In addition to lower program completion rates, only 36% of ACT-CL participants in the current study requested to receive text messages. Furthermore, only 16% accessed the additional mindfulness resources, many of which only briefly viewed these resources and did not spend sufficient time to participate in any of the exercises.
Students in the ACT-CL condition also did not find the program as acceptable and usable as the control website and as students in the previous pilot trial. Program satisfaction ratings were lower for ACT-CL than the control website, with the average rating for satisfaction items often being only slightly positive, most notably on the question “I would like to use the wellness program again in the future.” In which the average rating for ACT-CL was 3.58 with 3 being “slightly disagree” and 4 being “slightly agree.” The usability ratings for ACT-CL and the control website were equivalent on a measure of program usability, but were significantly lower relative to the initial pilot RCT.

The low program satisfaction and engagement rates in ACT-CL are particularly striking when considering the amount of resources that were put into its development and the sophistication of the website relative to the control website. The ACT-CL prototype was carefully developed and refined through an iterative series of feedback from experts in web-based interventions and ACT, focus groups, and usability testing procedures. The program was developed in collaboration with a multimedia company to include a rich combination of multimedia elements, interactive exercises, and program tailoring features, which were specifically included to increase engagement and user satisfaction, given past research that they can increase adherence and engagement to web-based interventions (e.g., Danaher et al., 2006; Strecher et al., 2008). In contrast, the control website was a text driven program developed by the study investigator (ML), hosted within a platform designed primarily for surveys (qualtrics.com), and included minimal multimedia and interactive features.

The data from coded open ended responses provide some potential clues as to why students tended to not engage in the ACT-CL website and rated the program fairly low on usability and satisfaction despite the sophistication of the website. The most notable comments from students in the ACT-CL condition regarding what they liked least about the program were that 31% of students rated the website as being too long, 15% rated the website as being too
immature and seemingly targeted to a younger audience, 19% did not like the tunneled format of the program with required responding to proceed, 15% did not like the audio narration, and 12% encountered website bugs. Students spent more time on the ACT-CL website on average than the control website, due in part to the tunneled and audio narration design, which required that users wait for narration and exercises to be completed on a page prior to proceeding. User ratings suggest that this combination of features may have reduced engagement and compliance with the ACT-CL website. In contrast, students in the control website had the option to go through pages as quickly as they chose, which although likely reducing exposure to some content for less engaged users, also reduced barriers to completing each lesson. In addition, a notable percent rated the website as seeming to be more fitting for a high school or even elementary school audience, citing features including the audio narration format and style of cartoons, which may have further reduced engagement. A smaller percentage of users in the initial pilot RCT had made similar comments, but the higher rate in the current study could be due in part to the inclusion of a broader and older sample of students. Lastly, program bugs were prevalent based on user comments and were noted by some as reducing engagement and adherence to the website. Thus, some of the added features in ACT-CL that were designed to increase user engagement and adherence such as audio narration, program tunneling, and cartoons may have actually had the opposite effect, while the increased complexity of the site also introduced a higher probability of encountering website errors.

Consistent with this, multimedia, interactive, tailoring, texting and email features did not receive the expected positive feedback from students in the ACT-CL condition. Surprisingly only 10% of students in ACT-CL commented on liking the interactive elements and only 11% commented on liking the multimedia elements. Tailoring elements and follow up emails in ACT-CL were rarely mentioned with only 3% noting each when asked what they liked best about the program. The texting feature was never mentioned in ACT-CL user comments. The email and
texting features also received low satisfaction ratings with an average satisfaction rating of 4.08 for email and 4.27 for text messaging (satisfaction items were on a 6-point scale with scores between 1 and 3 indicating dissatisfaction). Thus, results suggest that these elements may not have had a notable impact on improving user satisfaction or engagement.

ACT-CL was specifically designed so that it would not be a text driven website, given concerns that this approach would lead to low user engagement. However, the results for the control condition indicate that most students completed both lessons and that students actually rated this approach higher on satisfaction ratings. In addition, only 4% of control participants commented on the program having too much reading as a negative, suggesting a text driven site may be acceptable in this population. This is consistent with other web-based intervention research which has found in some contexts that more users prefer text driven than video-based website programs (Vandelanotte et al., 2012) and no difference in user engagement rates between text and video-based websites (Stanczyk et al., 2013).

In addition to lower satisfaction and engagement scores relative to the control website, the results indicated that ACT-CL participants in the current study had lower engagement and satisfaction scores than those in the initial pilot trial. This may be due in part to differences between the two samples. The current study included a broad range of students at different ages and years in school, while the pilot trial narrowly focused on students 18 to 20 years of age who were in their first year of school. Analyses also indicated that there were more males and students were less stressed on average in the pilot trial. The differences between these samples raise questions regarding whether the ACT-CL program is acceptable to a broader range of students. However, subgroup analysis results did not indicate a consistent pattern for the ACT-CL prototype being more or less effective, engaging, or acceptable with older students. Similarly, there was no consistent pattern indicating that other demographic characteristics impact program efficacy, engagement or acceptability. Overall, these results suggest that ACT-CL has a similar
impact across a broad sample of students and that such factors are unlikely to account for the relatively low program engagement and satisfaction ratings in the current study. This is a key issue for feasibility testing given that ACT-CL would be optimally implemented as a flexible and universal program for students in a variety of ages and settings.

Another key difference between the two studies was the degree of personal contact. In the initial pilot RCT, each participant first met with the study investigator in person, during which time the investigator highlighted the importance of engaging in the study and walked participants through the steps involved in accessing the website. This step was added to help ensure participant engagement and retention in ACT-CL and was feasible given the relatively small sample size in the pilot trial. In the current study, due to the larger sample recruited, the study investigator did not meet with or even speak directly to participants prior to enrolling and starting the study. Rather the procedures were automated, with participants only being contacted if they failed to complete a study step on time. This may have significantly reduced initial user engagement and adherence in the current study relative to the pilot, as evidenced by the low completion rate for lesson 1. The lack of initial contact might also have limited the impact of subsequent prompts from the study investigator, whom participants had not met and may have felt less accountable to. Research has consistently indicated the importance of supportive accountability and personal contact in improving program adherence and engagement (Mohr, Cuijpers & Lehman, 2011) and this may be an important factor in the lower engagement rates observed in the current study.

Compounding this issue, another potentially important difference between the current study and pilot trial was the use of incentives. The vast majority of students participating in the current study were enrolled in the SONA system and received research credits for their participation. Although students also received a $10 gift card, this compensation was relatively small and only provided after they completed the 3-month follow up assessment. In contrast,
students in the initial pilot RCT were compensated with a $60 check for completing the 6-week study. Although compensation was not connected to whether participants in the pilot RCT completed the ACT-CL program, the monetary compensation may have contributed to improved adherence and even potentially the higher usability ratings compared to the current study. This is consistent with research indicating that monetary incentives increase compliance in web-based prevention (Fridrici, Lohaus & Glab, 2009). Students participating for research credits may have been less invested in the study and using the program, focusing more on receiving credits as a requirement for their psychology courses. The impact of compensation on program participation and engagement has important implications for the generalizability of results and issues related to “real world” implementation of a web-based universal prevention program for students.

It is important to note that although ACT-CL participants had lower program completion rates than the control condition and participants in the previous trial, these completion rates are actually consistent with other web-based prevention studies (Calear et al., 2009; Christensen et al., 2009). For example, a large scale universal prevention study with 1,477 adolescents found that only 62% of those in the web-based intervention condition completed at least 3 of the 5 modules and only 33% completed all 5 modules (Calear et al., 2009). A review of web-based depression and anxiety intervention studies more broadly found that rates of web-based program completion in RCTs vary from 50 to 100% (Christensen et al., 2009).

**Lack of Between Group Results on Outcome and Process Measures**

Overall, the feasibility results indicated that the existing components of the prototype ACT-CL program did not have a greater impact on depression or anxiety symptoms relative to the control website, and in fact in the ITT analysis the control website outperformed ACT-CL in remission of severe depression and anxiety. Analyses with subgroups of students reporting minimal/moderate and those reporting severe depression and/or anxiety symptoms also did not
indicate any between group differences on depression and anxiety symptoms over time. These findings did not appear to be due to differences in dosage from poor engagement in ACT-CL as evidenced by the lack of between group effects when analyzing only those who completed both lessons. These results contrast with findings from the initial pilot trial, which indicated significant pre to post improvements in depression and anxiety among distressed students relative to the waitlist condition. The current results suggest that although the ACT-CL prototype may have an impact on depression and anxiety relative to a waitlist, it does not outperform an active control condition providing general education information on depression and anxiety, although this is also confounded by differences in program engagement between the two studies and the significantly poorer outcomes in the ACT-CL condition in the present study.

The finding that the control website produced greater remission rates of severe depression and anxiety raises concerns regarding whether the ACT-CL prototype was ineffective or potentially iatrogenic among students with severe symptoms at baseline. Follow up analyses with this subgroup found that those in the ACT-CL condition improved more on education values reasons over time and improved less on acting with awareness relative to the control condition, but there were no other between group effects that might indicate an iatrogenic effect. In addition, there were no differences in program engagement or satisfaction among participants with severe vs. mild/moderate or no depression/anxiety symptoms.

Although results indicated that some outcome and process measures improved over time, the changes were small and difficult to interpret without the inclusion of a waitlist comparison condition. Potentially, these results suggest that both conditions improved equivalently over time on some of the outcomes and processes, but it may also be the case that both conditions were inert or even had an iatrogenic effect relative to no intervention at all. The finding that ACT-CL participants in the pilot RCT reported significantly greater improvements in outcome and process measures than ACT-CL in the current study adds to concerns regarding whether there were any
improvements over time. Thus, time effects have to be interpreted cautiously in the current study, although the term “improvement” is used in reference to time effects for the sake of simplicity.

Given the positive results on education values in the initial pilot RCT and the focus in the program on engaging in values-based living, the study hypothesized that ACT-CL would produce greater improvements in positive mental health and values success compared to a website focused on providing basic information about depression and anxiety. These outcomes are important as improving positive mental health and values success could increase buy in from students who do not see themselves at risk for developing problems as well as because positive mental health can increase resiliency to developing depression and anxiety problems (Keyes, 2007). However, the lack of between group effects suggests that the prototype ACT-CL program was relatively inert on impacting these outcomes. Arguably the significant effects for time suggest that both conditions improved on positive mental health and values success, but given the lack of content focused on these areas in the control condition, it more likely suggests that any improvement could be attributable to general intervention and method effects (i.e., social demand, placebo).

The study similarly found that ACT-CL did not differentially impact key process measures including psychological inflexibility, appetitive/aversive reasons for values or mindfulness. There were significant time effects for improvements on some of these measures in both conditions. However, given the lack of content targeting these processes in the control website, the results suggest that the prototype ACT-CL program did not impact processes above and beyond nonspecific intervention and method effects. The lack of impact on psychological flexibility processes may account in part for the failure of ACT-CL to produce a differential effect on primary and secondary outcomes. Research has consistently found that when ACT does improve acceptance, mindfulness and values processes, results improve for a wide variety of outcomes, including depression, anxiety and stress in self-guided interventions with non-clinical samples (Fledderus et al., 2013; Jeffcoat & Hayes, 2012; Muto et al., 2011). This suggests that the
study findings do not indicate a failure of the psychological flexibility model per se, which proposes that improving acceptance, mindfulness and values processes will lead to clinical gains, but rather a failure of the ACT-CL technology to successfully impact these processes (Follette, 1995).

Consistent with this, baseline analyses indicated that psychological inflexibility, as well as mindfulness and values to a lesser extent, related to outcomes including depression, anxiety, stress, positive mental health and values success. Furthermore, analyses across conditions found that improvements in psychological inflexibility from pre to post, irrespective of condition, were related to improvements in outcome at 1-month follow up. However, moderation analyses indicated that for positive mental health, changes in psychological inflexibility were more related to improvements on the MHQ in the control than the ACT-CL condition. In addition, results did not replicate at 3-month follow up and were more mixed for the other process measures. Although results were somewhat mixed, overall they suggest a pattern such that changes in psychological flexibility processes irrespective of condition were related to improvements in outcomes. This provides some further evidence for the application of the psychological flexibility model in a universal prevention format, although a failure of the existing components of ACT-CL in adequately targeting these processes.

Results did indicate that participants in the ACT-CL condition improved on ACT knowledge relative to the control website. This suggests that the ACT-CL program was at least somewhat effective in imparting ACT concepts to students, although it failed to produce a differential impact on psychological flexibility processes. Furthermore, improvements in ACT knowledge in the ACT-CL condition were found to predict subsequent improvements in psychological flexibility processes at 1-month follow up.

The current study results did not replicate the more positive findings from the initial pilot trial. This may be attributable at least in part to key differences between the pilot trial and current
study including the use of an active control website and sample differences. However, it is important to note that the pilot trial results were somewhat inconsistent regarding effects on depression and anxiety, with results only indicating improvements in the subgroup of distressed students. The pilot trial also did not find a differential impact on psychological inflexibility or relationship values relative to a waitlist, raising concerns regarding whether the existing components of the ACT-CL program impact psychological flexibility processes effectively. In addition, the pilot trial included a small sample, which raised questions regarding whether results would replicate, particularly given the lack of within group improvements in the waitlist condition after they received access to the program. Thus, the results are only partially inconsistent with the initial pilot trial, suggesting that the more positive findings are less likely to replicate, at least with an active control condition and broader sample.

Overall, the current study highlights that although both conditions potentially improved over time on some outcome and process measures, the ACT-CL prototype did not impact these variables above and beyond factors controlled for by the comparison website (i.e., placebo effects, demand characteristics). It is unclear the degree to which a website focused on basic information regarding symptoms and causes of depression and anxiety as well as very brief and basic information on coping strategies would have active effects on outcomes with college students. In either case, a proof of concept test might include the expectation that an ACT-CL prototype specifically targeting acceptance and values would have a greater impact on these relevant processes. The results from the current study suggest this was not the case. This raises feasibility questions regarding whether ACT-CL can effectively target psychological flexibility processes and how the program might be revised in future development.
**Program Engagement**

It is unclear to what degree the lack of between group differences can be attributed to poor user engagement in ACT-CL versus the program content being inert. This is an important issue given the differences in program engagement between conditions as well as relative to the initial pilot trial. To further explore this issue, a series of analyses examined whether the program was impactful among students who were more engaged.

Analyses conducted only with program completers did not find any evidence for greater program effects for ACT-CL relative to control among students who completed both lessons. However, it may be the case that there is heterogeneity in program completers, such that some students who completed both ACT-CL lessons were still not engaged in the website. This was evidenced by the notable frequency of time stamps on pages that exceeded 5 minutes in ACT-CL, suggesting that some students were multitasking or possibly even walking away from the program for extended periods of time throughout completion of each lesson.

More specific program engagement variables were examined to further explore the potential relationship between engaging in the program and improving in targeted psychological flexibility processes. Time spent on the lessons represents one proxy for program engagement, hypothetically with students who spent more time on a page getting more exposure to and interacting more with relevant content. This variable can also be affected by noise from students who are multitasking and spend large periods of time inactive on the website. To help counteract this issue, any page on which students spent 5 minutes or longer were excluded from calculated total scores on time spent on a lesson. The partial correlation results in the current study found that time spent on the first ACT-CL lesson was related to improvements in process measures at post (controlling for pre scores), although time spent on the second lesson was not. It is important to note that time spent on either of the control website lessons was unrelated to improvements in psychological flexibility processes. These results indicate that students who spent more time on
the first ACT-CL lesson, and hypothetically were thus more engaged in the website materials, improved more on relevant processes. This suggests a potential direct connection between engaging in ACT-CL program materials and improving in relevant processes, although raises questions regarding the impact of the second lesson on psychological flexibility processes.

Another proxy for program engagement is to examine how much participants wrote in key ACT-CL exercises. A values writing exercise asked participants to reflect on a personal value they identified in a values card sort and how that value is relevant and meaningful in their life. The observed results indicated that the more users wrote in the exercise was predictive of greater improvements in relationship values reasons and acting with awareness, two processes that would be expected to be related to reflecting on the importance and relationship of one's values to one's actions. The amount that users wrote for their values-based goal in lesson 1 was found to relate to improvements in relationship values, but was generally not related to changes in processes. However, the more participants wrote about their goal to practice acceptance in lesson 2 was predictive of improvements in psychological inflexibility and acting with awareness, again two processes that would be expected to be related to an acceptance goal, with additional statistical trends for improvements in education and relationship values. These results suggest that users who engaged more in the ACT-CL writing exercises improved more in relevant psychological flexibility processes.

Results also found that students in ACT-CL who requested to receive text messages improved more on psychological inflexibility, acting with awareness and relationship values relative to those who did not receive text messages. However, it is unclear the degree to which these results are due to the impact of additional intervention provided through text messaging, greater engagement among students who requested text messages, or other third variables.

Related to program engagement, the study examined whether changes in ACT knowledge were related to improvements in process measures. Improvements in ACT knowledge may
indicate users who engaged and attended to the program. Results indicated that within the ACT-CL condition, improvements in ACT knowledge at post were related to subsequent improvements in psychological inflexibility and acting with awareness at 1-month follow up. This provides further evidence that when students engaged in the website and learned the program concepts, they tended to subsequently improve in psychological flexibility processes.

Overall, the results indicate that students who were more engaged in the ACT-CL program tended to improve more on psychological flexibility processes. This suggests that the lack of intervention effects for ACT-CL may be due to low user engagement rather than the program exercises being inert and that ACT-CL may be effective when users actually engage in the program. It is important to note that the relationship between program engagement variables and improvements in processes may also be due to other third variables. For example, students who are more compliant or who want to please the experimenters may both spend more time engaging in program exercises and report larger improvements in process measures (although note that baseline scores were controlled for in the partial correlations to help account for related issues). Results with the control condition do not support this third variable explanation given the lack of relationship found between time on the control website and improvements in processes, suggesting these results are more specific to engaging in the prototype ACT-CL website. Findings with engagement variables were mixed though with some relationships only reaching a statistical trend ($p < .10$) and no program engagement variables consistently correlating with improvements in all processes. This may be due in part to statistical noise that is likely to be introduced when using proxy variables for program engagement such as word count and time spent on site, which can be influenced by a host of other factors not directly reflecting engagement.
Use of an Active Control Website

The most notable methodological difference between the current study and pilot RCT was the use of an active control website rather than a waitlist comparison. Prevention researchers have highlighted the importance of including active comparison conditions in order to determine whether observed findings are due to important aspects of the intervention or can be accounted for by more general nonspecific intervention and method effects (Stice et al., 2008; Spence & Shortt, 2007). Providing basic health information is the most commonly used control condition for recent web-based prevention trials with college students (Chiauzzi et al., 2008; Brathwaire & Fincham, 2007; 2009; Cukrowicz & Joiner, 2007; Schmidt et al., 2007), with a subset of these studies specifically focusing on providing information on depression and anxiety (Brathwaite & Fincham, 2007; 2009; Cukrowicz & Joiner, 2007). These educational interventions are typically classified as attention placebo controls (Brathwaite & Fincham, 2007; 2009; Christensen et al., 2010). The study hypothesized that the ACT-CL prototype would be more effective than and work through distinct therapeutic processes than a website providing basic information on depression and anxiety disorders. The general lack of between group differences on process and outcome measures between these conditions raises questions regarding whether the impact of ACT-CL is accounted for by nonspecific intervention and method effects (i.e., a placebo control) or alternatively that the results potentially indicate equivalently positive effects from two active intervention approaches. Although it is important to note that neither of these would be a full explanation for the study findings given the weaker impact on outcomes in the ACT-CL condition in the current study relative to the initial pilot trial, which highlights additional factors contributing to the lack of treatment effects (i.e., program engagement, sample differences).

Providing mental health education information such as through websites (i.e., ulifeline, halfofus) and as part of the curriculum in First Year Experience Courses is a commonly used strategy on many college campuses to help prevent mental health problems. However, research
on the efficacy of these types of intervention in colleges is fairly limited (Jorm, 2012). Of note, none of the preventive studies identified that used a mental health education control condition included a waitlist comparison to assess the impact of mental health education relative to no intervention.

There is some evidence to indicate that mental health education produces an impact above and beyond nonspecific and method effects. Researchers have theorized that mental health education interventions may serve to improve identification of psychological problems, increase treatment seeking, support use of healthy coping strategies, and provide guidance on how to support others who struggle with such problems (Jorm, 2012). Consistent with this, mental health literacy campaigns have been found to improve identification of disorders, positive beliefs about treatment and increase treatment seeking in general communities and high schools (for a review see Jorm, 2012). However, only one study has been conducted with university students, which found improvements in identification of depression and attitudes towards treatment (Merritt et al., 2007). Of particular relevance to the current study, web-based mental health education websites providing basic information on identification and treatment of depression have been found to improve symptoms of depression relative to a control condition and equivalent to an effective web-based CBT program at up to 12-month follow up (Christensen, Griffiths & Jorm, 2004; MacKinnon, Griffiths & Christensen, 2008). A meta-analysis of four studies that tested the impact of mental health education interventions relative to control conditions found a significant small effect size on measures of depression (Donker et al., 2009). Overall, this research suggests that even a basic mental health educational website may have a positive impact on depression and anxiety symptoms above and beyond nonspecific and method effects. However, there are no indications in existing research to suggest that mental health education targets similar processes to an ACT intervention, focusing instead more on increasing knowledge related to identification of disorders and treatment seeking.
The study results provide some further clues as to what may account for the positive effects found in the control website. Of note, there were no differences between conditions on rates of treatment seeking at 3-month follow up, a common goal of mental health education and a topic that was covered at length in the control website. The open ended responses from control participants at post indicated that only 11% of students commented on the program being common sense or providing information they already knew and only 4% thought the program was too simple, which contrasted with 63% of control participants who commented on liking the content of the website and that it was helpful. These results suggest that the mental health education website, which was designed to provide relatively inert information related to depression and anxiety, potentially provided more active intervention content for students.

The control condition did include a series of brief suggestions regarding coping strategies for depression and anxiety. These coping strategies were very brief, taken directly from halfofus.com and ulifeline.com and represent those typically provided in brochures and other health education information resources. Coping strategies that overlapped with psychological flexibility processes were removed. These coping strategies were provided to increase the credibility of the website to students and to control for effects related to being provided suggestions for making positive behavioral changes. Of note, a small portion of students in the control condition (13%) specifically highlighted liking the coping strategies that were provided. Although the inclusion of these strategies was predicted to be relatively inert given their brevity, simplicity and lack of details, it may be the case that students actively engaged in coping strategies such as relaxation, time management and seeking social support, which affected processes and outcomes measured.

A small portion of control condition students (5%) also commented that they liked how the control website normalized depression and anxiety and by doing so increased their ability to accept these emotions (i.e., “it’s normal and okay to feel anxious”). Providing information on the
prevalence of these disorders and giving examples of students struggling with these experiences may have inadvertently impacted processes related to psychological flexibility (i.e., acceptance of difficult emotions as normal human experiences). Thus, the lack of between group effects on measures of psychological inflexibility may be accounted for in part by the normalization and acceptance of emotions that was imparted in the control website.

Use of a Prototype Program

Another potential explanation for the observed results is that the study was conducted with only a prototype program. The ACT-CL prototype includes only two web-based multimedia lessons with supplementary emails and text messages, which focus on values, committed action and acceptance processes. The psychological flexibility model includes three other core processes - preset moment awareness, self-as-context and defusion. Self-guided ACT interventions typically include modules that target each of these six psychological flexibility processes, often with several focused modules. For example, two bibliotherapy studies used a book by Hayes and Smith (2005), which is approximately 200 pages and includes one or more chapters focused on each of the six psychological flexibility processes (Muto et al., 2011; Jeffcoat & Hayes, 2012). Similarly, web-based ACT interventions that have been evaluated included seven modules (Burham et al., 2013) and eight modules (Hessor et al., 2012) targeting each of the core psychological flexibility processes. Due to the costs and time required to develop the web-based ACT intervention, the current study used only a prototype with two modules, while the final to-be-developed ACT-CL program would likely include approximately 12 modules, with 1-2 modules targeting each of the core processes.

A more comprehensive focus on each of the six psychological flexibility processes is theorized to be critical in order to reduce psychological inflexibility and produce clinical gains. For example, cognitive defusion, the capacity to take perspective on one’s thoughts as just
thoughts, is a critical process for improving psychological flexibility. An individual who is cognitively fused with evaluations and judgments of their emotions (i.e., reacting to the thought “anxiety is bad and dangerous” as literally true) will struggle with the notion of accepting and not fighting their emotions. Similarly, someone who is cognitively fused with what they “should do” and what “the right thing to do is” will struggle with stepping out of that process to identify personal values that are outside these rigid, rule governed sources of behavioral control. In contrast, cognitive defusion can serve to reduce the rigid dominance of ineffective rules on guiding behavior, providing more flexibility and opportunities to identify and engage in personal values as well as to approach rather than avoid difficult emotions. Each of these psychological flexibility processes interact and combine to enhance one’s capacity to engage in valued patterns of action in the moment while experiencing whatever difficult thoughts and feelings may arise. Thus, excluding one or more psychological flexibility processes may lead to an intervention being less effective or even potentially inert.

There has been very limited dismantling research with ACT to test this theoretical assertion, although one study found that an intervention that excluded the self-as-context component from a multi session intervention for PTSD was less effective than the full ACT intervention (Williams, 2006). Another study comparing a values and committed action protocol to an acceptance and defusion protocol found that both led to improvements in outcomes and processes, though notably through distinct psychological flexibility processes and with a lack of effects in the values condition among clients diagnosed with PTSD (Villatte & Hayes, in preparation). There has been limited research on additive designs, but one laboratory-based component study found that adding a values component to a brief acceptance and mindfulness intervention improved persistence in a cold pressor task relative to acceptance and mindfulness alone (Branstetter et al., 2009). There are also a large number of laboratory-based ACT component studies and it is possible to examine average effects sizes when only one component
is tested versus multiple components. A recent meta-analysis of ACT component studies found the largest effect size for component studies testing interventions that combined mindfulness processes (i.e., acceptance, defusion, present moment awareness, self-as-context) with values (Hedge’s $g = 1.37, 95\% \text{ CI} = .74, 2.00, k = 5$), with notably smaller effect sizes for interventions that combined mindfulness processes without values (Hedge’s $g = .46, 95\% \text{ CI} = .29, .64, k = 8$) or only targeted values (Hedge’s $g = .41, 95\% \text{ CI} = .01, .82, k = 5$).

Given these issues, it may be the case that a brief web-based intervention focused only on values, committed action and acceptance was not sufficient to impact psychological flexibility processes or subsequent clinical outcomes. Theoretically, students may not have been able to adequately engage in the processes of values, acceptance and committed action without additional content elaborating on processes of present moment awareness, defusion and self-as-context. An additional methodological issue was that the process measures may have not been as sensitive to detecting an ACT intervention targeting a subset of psychological flexibility processes as these measures were designed to assess psychological inflexibility/flexibility more broadly. This may be particularly applicable to the mindfulness and psychological inflexibility measures, which tend to include an emphasis on defusion from evaluations of one’s emotions and noticing experiences in the present moment.

In order to increase the comprehensiveness of psychological flexibility processes targeted, the current study expanded the ACT-CL prototype to include additional mindfulness resources. After participants completed each lesson they were provided a link to access a brief “mini lesson” on mindfulness, which emphasized present moment awareness and defusion processes. These lessons were optional (i.e., they did not receive reminders to complete them and could still go to the next lesson if they did not access them), but provided a way to expand the processes targeted while still maintaining a fairly brief intervention. However, program usability results indicated that very few students accessed these resources (16%), and of those who did,
only a small minority spent enough time on them to suggest they engaged in the exercises. Thus, although the current study sought to expand the processes targeted by the ACT-CL prototype, it was largely unsuccessful due to low user engagement.

It is important to note however that there is a body of research suggesting that such brief and more limited ACT interventions can produce clinical benefits. For example, a recent study found that a 2-hour ACT workshop for test anxiety with college students improved test performance relative to a cognitive therapy workshop and produced equivalent improvements in test anxiety (Brown et al., 2011). Another study found that the addition of a four session intervention reduced rehospitalization rates among patients with psychotic symptoms relative to treatment as usual (Bach & Hayes, 2002). Although these interventions were brief, they did typically target each of the core psychological flexibility processes. However, other research has found positive effects for the impact of very brief interventions that only targeted a limited subset of ACT components (Levin et al., 2012). A study by Cohen and colleagues (2009) found that the effects of a very brief values writing exercise, similar to one included in the ACT-CL prototype, produced and maintained improvements in grades among low achieving minority students up to 2-years after the intervention. Another randomized trial comparing three sessions targeting defusion to a waitlist among distressed college students found that the defusion intervention significantly improved distress and depression scores (Hinton & Gaynor, 2012). An experimental study found that a 20 minute urge surfing intervention significantly reduced cigarette smoking for the following week among college students relative to waitlist (Bowen & Marlatt, 2009). Studies such as these suggest that brief ACT interventions, including those targeting a subset of psychological flexibility processes, can be efficacious in impacting clinical outcomes. Such brief interventions are possible when taking a process-driven approach in which key therapeutic processes can be identified and efficiently targeted to produce lasting behavior change.
Intervention brevity is an important issue because although existing self-guided ACT studies have typically tested longer and more comprehensive interventions, several of the existing web-based prevention programs for college students that have empirical support are actually of a similar length to the ACT-CL prototype. These programs include a single session, 40-minute intervention targeting anxiety sensitivity (Schmidt et al., 2007), a 1-hour ePREP intervention targeting relationship skills (Brathwaite & Fincham, 2007; 2009), and a single session, 2-hour CBASP intervention targeting depression and anxiety prevention (Cukrowicz & Joiner, 2007). Brief programs are likely to reduce the burden for participation, which could increase student engagement and participation rates. In support of this, a meta-analysis by Stice and colleagues (2009) of depression prevention trials found that shorter prevention programs actually tended to produce larger effect sizes than longer programs, hypothetically due to the increased burden longer programs impose on students. Implementing briefer interventions is particularly relevant to a universal prevention approach given challenges related to participant engagement and the burden placed on a broad segment of the population. Nonetheless, the current study highlights the potential need to balance brevity with ensuring that the psychological flexibility processes are effectively targeted.

Lessons Learned for Further Development of Web-Based ACT Interventions

The results from this feasibility trial highlight a number of important issues for further development of web-based ACT interventions, particularly in regards to addressing issues of program engagement. First, the ACT-CL program was developed with the assumption that a heavy multimedia emphasis, including with animations and audio narration, as well as the use of complex interactive exercises and tailored content, is critical for engaging students in the website. This is consistent with research indicating that such features improve engagement and program efficacy (e.g., Danaher et al., 2006; Strecher et al., 2008). However, usability and satisfaction
ratings did not indicate a preference for the approach taken in ACT-CL relative to a simple, text
driven website with minimal interactivity, and in fact some users noted that they actively disliked
some of these features. This may be due in part to the heavily tunneled nature of ACT-CL, which
required that students complete the program in a specific sequence and that they could not skip
past sections until they completed relevant multimedia and interactive elements (i.e., completed
the exercise or waited for the audio/animation file to finish). This was necessary in part since the
program could only function correctly if it could be ensured that users completed the exercises
where their responses would be carried forward to other parts of the program (i.e., selecting
values, writing personal goals). Student feedback indicates that they found this feature to be quite
cumbersome. Future development of ACT-CL may emphasize a more text driven approach and
with increased flexibility for students to proceed through lessons at their own pace. This would
need to be balanced with ensuring that users adequately engage in the program rather than
quickly skipping through sections. However, the low program completion rates indicates that
simply requiring students to take the program’s pace may lead to higher attrition which is
ultimately even more problematic.

The results also highlighted potential content revisions for the program. Open ended
comments from students included suggestions to add more real life examples of college students.
Adding such examples could serve to both increase user engagement by enhancing the salience of
program materials to students as well as increase efficacy through supporting generalization of
program content to real world situations. The low rate of positive comments for lesson 2, low
completion rate for lesson 2, and the lack of relationship between time on lesson 2 and changes in
process measures all suggest that this lesson would benefit from further refinement. Students in a
universal prevention setting may have more difficulty engaging in content focused on acceptance
of difficult emotions than in the first lesson that focused on personal values and goals.
The study also highlighted issues related to incentives for participation. A universal prevention approach is likely to require some form of incentive for participation in order to ensure that a broad segment of the population participates. Potential incentives in a college setting might include course credit, extra credit, monetary incentives (i.e., raffles), or simply making it mandatory for all students. The results of the current study suggest that research credits, which can go towards course requirements or extra credits, and small monetary incentives may increase rates of participation, but are not adequate incentives to ensure students engage in the program. The study however did not make incentives contingent on completing and engaging in the program. More stringent requirements are used in some universal prevention approaches such as AlcoholEdu, in which all incoming students are often required to complete the entire program. Early formative data gathered from focus groups and usability testing for ACT-CL suggested that these mandatory approaches are often viewed very negatively by students. Alternatively, monetary incentives via a raffle can substantially increase program adherence (Fridrici et al., 2009), but this approach may be challenging to implement for universities at a large scale level. Future research is needed to determine how to adequately incentivize participation to encourage initial participation and continued program engagement over time, while balancing any approach taken with the feasibility for schools to implement and potential for student reactivity to external pressures for participation.

Research has consistently demonstrated that providing guidance and “supportive accountability” to complete web-based interventions improves adherence and retention (Mohr et al., 2011). Such an approach would need to be balanced with resource costs in order for universal prevention to remain feasible for schools. Automated program emails as well as brief personalized emails and calls from the study investigator were used in the current study to provide supportive accountability, but results suggest these were insufficient in achieving adequate program compliance. Innovative approaches are needed to further identify cost effective
ways of improving recruitment and adherence rates in a universal prevention approach. Peer support models may be used in which trained students provide ongoing encouragement and guidance in using the program. A survey of eHealth experts and website users identified word of mouth as an important method for recruitment (Schneider, van Osch & de Vries, 2012), suggesting that peer-based advertising of preventive services could be a key strategy for improving at least initial enrollment in a universal prevention program. The program might also be integrated with ongoing face to face contact, such as through a class that meets regularly and discusses issues related to using the website. The current results also indicated that more intrinsic/appetitive (versus extrinsic/aversive) reasons for values were related to greater program engagement. Thus, including initial program recruitment and orientation materials that target values processes may help to increase subsequent engagement in the program. Consistent with this, research has found that including a brief motivational interviewing intervention or providing user-oriented brochures designed to increase internal motivation can improve engagement and retention in web-based interventions (Voorhees et al., 2009; 2013).

The results of this study also raise questions regarding the feasibility of a universal prevention approach with college students. Program engagement can be particularly challenging when taking a universal approach given that the intervention needs to be targeted to a more general population and that students are included who are less motivated due to a lack of distress or other risk factors. One potential solution is to implement a more refined program tailoring approach in which program content is matched on key factors such as level of distress and motivation for change. Alternative implementation models may also be utilized such as stepped care approaches (O’Donahue & Draper, 2011) in which users start with a lower intensity intervention and proceed to more intensive steps as needed.

The study results suggest that users who engaged more in ACT-CL tended to improve on relevant psychological flexibility processes. However, overall the intervention did not have an
adequate impact on these processes. One benefit of taking a process-driven approach to intervention development is that these proximal process measures can provide a useful guide for program refinement and to determine initial efficacy. Universal prevention research faces a significant challenge in achieving adequate power to detect prevention effects (Cuijpers, 2003; Munoz et al., 2010). Proximal process measures that are known to be indicative of preventive effects can provide a more sensitive measure to determine the initial feasibility of an approach and to guide subsequent revisions of technologies. Further research is needed to determine what web-based technologies impact psychological flexibility processes and how the ACT-CL content can be further refined to have a greater impact. There has been limited research on implementing ACT to prevent mental health problems and the current results highlight the need for further treatment development to identify how these intervention technologies can be translated into a prevention format.

The current study provided an initial examination of the feasibility of including mobile elements to a web-based ACT program. Recent research has begun to examine mobile-based prevention programs with promising results (Whittaker et al., 2012). In the current study approximately a third of students agreed to receive text messages and these students tended to improve more on psychological flexibility processes at post. As students self-selected whether they would receive text messages, it is unclear the degree to which these results are due to having received additional text messages as opposed to other variables that might be related to being willing to receive texts (i.e., receptiveness to the program, motivation). Further research would benefit from randomizing students to receive or not receive text messages to determine if this feature has an additive effect. Nonetheless, these results provide preliminary support for the added benefit of including text messaging and possibly other mobile app features to ACT-CL and other web-based ACT interventions. Potentially such interventions may enhance generalization of applying ACT skills and concepts throughout one’s day and when encountering stressors.
The current study also provided the opportunity to examine the potential benefit of including supplementary online resources to students in between lessons. Such resources could provide an opportunity for students who are interested to engage more in the program throughout the week. A number of potential tools could be incorporated such as experiential exercises, FAQ sections, self monitoring tools, and other content to gain more depth on a particular subject. However, the results from the current study suggest that students may not engage in such resources. Only 16% of students ended up accessing the additional mindfulness resources, and of those, only a minority engaged at all with the materials. This is indicative in part of broader user engagement issues that were encountered in the trial, but also highlight the challenge in having students continue to engage in program materials between and across lessons. Further research and development is needed to determine if and how additional resources could be provided to students between lessons.

Limitations

There were some limitations to the current feasibility study. The use of a prototype web-based program, which included only a limited set of intervention components, limited the questions that could be asked and the generalizability of results to web-based ACT research. The current study did not allow for a strong test of whether web-based ACT is efficacious in preventing mental health problems given that the lack of results may be due to the use of a more limited intervention. Similarly, the study did not yet answer the question of how acceptable a complete web-based ACT prevention program would be with college students. The full program might include as many as 12 modules and it is unclear whether students would find such a program too burdensome.

In order to maximize statistical power for examining differences between the two active conditions the current study did not include a waitlist comparison condition. This limits the
ability to interpret changes in outcome and process measures over time. For example, a decrease in anxiety might indicate an active intervention effect, but it may also be due to method effects such as regression to the mean or a product of completing self-report questionnaires. Furthermore, a decrease in anxiety scores may have naturally occurred without any intervention and it may even be the case that both interventions had an iatrogenic effect such that participants decreased slower on anxiety than they would have without any intervention at all. This is further complicated in a prevention trial design in which a lack of changes over time may indicate that both program prevented a worsening of depression and anxiety. Determining these effects would require a waitlist comparison condition.

A mental health education website was used as a comparison condition to control for nonspecific and method effects related to accessing a website that provided credible information related to mental health problems. Although the education website controlled for an equivalent number of lessons, this comparison condition did not provide an equivalent control on a number of key factors. The control website had much lower sophistication in areas such as interactivity, multimedia, and program tailoring. The control website was briefer as evidenced by students spending significantly less time on the website. The control program also was not matched on supplementary interventions including follow up emails, additional resources or text messages. These differences may have biased results for ACT-CL, and with more adequate control, the mental health education website may have further outperformed ACT-CL.

The study did not include additional process measures that might account for the positive effects of the mental health education website on outcome and process measures. Without such measures it is difficult to determine whether changes in the control condition were due to nonspecific intervention and method effects or to active intervention effects from the content provided on the website. Given a common goal of increasing treatment seeking through mental health literacy (Jorm, 2012), a measure was included to assess changes in treatment seeking, but
did not find any significant between group differences. Additional measures of mental health knowledge (i.e., ability to identify depression and anxiety disorders, knowledge of prevalence) would have allowed further examination of whether increases in such knowledge related to improvements in measures. Furthermore, a small subset of students highlighted that the control website provided useful information on coping strategies and helped to normalize depression and anxiety. Assessment of normalization of emotions and use of coping strategies provided in the control website would have provided further information regarding the degree to which students improved on these processes in the control condition and whether they accounted for improvements in outcomes.

The study sought to recruit a larger sample to provide adequate power to detect intervention effects relative to an active control condition, particularly given the challenges in detecting effects in universal prevention approaches (Cuijpers, 2003; Munoz et al., 2010). Participation rates were lower than anticipated, which seemed largely attributable to the lack of students willing to participate without receiving research credits. Although a total sample of 228 provides adequate power to detect a between group effect size of .37 (Cohen’s $d$), statistical power was much lower when examining effects for specific subgroups. This was further affected by the low rates of program completion in the ACT-CL condition (85% completed lesson 1 and 55% lesson 2) and the high degree of attrition in follow up analyses (64% completed 1-month follow up and 63% 3-month follow up). Although MMRM provides a robust method for modeling effects with missing data using the full intent to treat sample, the amount of missing data affected statistical power and still raises concerns regarding potential biasing of findings.

A large number of analyses were conducted in order to examine intervention effects within each subgroup as well as to provide a more detailed understanding of program engagement and its relation to changes in psychological flexibility processes. This introduced an inflated risk for type I error. Consistent with this, the study found a number of mixed and inconsistent patterns
of significant and statistical trends, particularly within subgroup analyses. Given power issues, Bonferroni corrections were not applied to correct for the number of tests conducted. However, a conservative approach was taken to interpreting significant effects, such that conclusions were based on the overall pattern of results rather than any one particular finding in isolation. Nonetheless, this highlights an important limitation of the study in accurately interpreting study results and determining whether significant findings were potentially due to Type I errors.

Another limitation was the lack of clinical interviews to determine diagnoses at baseline and follow up assessments. As reducing the future incidence rate of depression and anxiety disorders is the ultimate outcome one hopes to achieve through prevention efforts, accurate diagnosis through clinical interviews is a standard methodological feature for prevention research. Clinical interviews were not conducted due to its feasibility given the sample size and burden on participants. A number of studies have used self-report measures of depression and anxiety symptoms to explore preventive effects (e.g., Zalta, 2011; Muto et al., 2011). Given the feasibility of this assessment approach and the challenges related to conducting clinical interviews, some researchers have recommended examining self-reported symptoms measures as a first step when exploring the efficacy of potential prevention programs (Zalta, 2011). It would be important however to conduct further research examining the preventive impact of ACT-CL on the incidence of depression and anxiety disorders as determined through clinical interviews if the full program is later developed and evaluated.

The study did not have an accurate and reliable means of detecting random responding to the web-based self-report surveys. It is likely that some students did not carefully complete the assessments. To help address this issue, students were asked the degree to which they randomly responded to questions while being informed that this would not affect their participation in the study or compensation in any way. Student who stated that the randomly responded to most or all of the questions on any survey were excluded from all study analyses (n = 4). This reduced the
most severe random responders that could be identified, although there were likely additional 
students who may not have reported that they randomly responded. Thus, there was likely some 
additional statistical noise due to unidentified random responding.

Conclusion

The findings from the current feasibility study indicate that the existing components of 
the prototype ACT-CL program do not outperform an active control website providing general 
educational information on depression and anxiety, including in impacting acceptance, 
mindfulness and values processes. These results appear to be due at least in part to low program 
engagement in the ACT-CL website. However, findings suggests that students who engage more 
in the ACT-CL program tended to improve more on psychological flexibility processes relative to 
students who were less engaged. The results highlight the need for further research on how to 
transport ACT to a web-based prevention format and how to increase user engagement in web-
based interventions, particularly in a universal prevention approach with college students. The 
findings also highlight promising future directions for development including integrating text 
messaging and mobile app features, potential benefits of a more text driven approach, and the 
need to increase user flexibility in completing the program. Overall, these findings can serve to 
further inform the continued development of a web-based ACT prevention program for college 
students.
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APPENDIX A: MEASURES
Demographics

1. How old are you? ____

2. What year are you in college?
   • First year (Freshman)
   • Second year (Sophomore)
   • Third year (Junior)
   • Fourth year (Senior)
   • Fifth year or higher
   • I choose not to respond

3. What is your gender
   • Male
   • Female
   • I choose not to respond

4. What is your ethnic background?
   • Hispanic or Latino
   • Not Hispanic or Latino
   • I choose not to respond

5. What is your racial background? (Choose one of the following)
   • American Indian/Alaska Native
   • Asian
   • Native Hawaiian or other Pacific Islander
   • Black or African American
   • White or Caucasian
   • Other (please specify): _____
   • I choose not to respond

6. For your primary household, please estimate the gross annual income (before taxes) for the last year. If unknown, choose unknown.
   • Less than $20,000
   • $20,000 - $39,000
   • $40,000 - $59,000
   • $60,000 - $79,000
   • $80,000 - $99,000
   • $100,000 or more
   • Unknown
   • I choose not to respond
7. Have you seen a therapist in the past 4 months?
   - Yes
   - No
   - I choose not to respond

8. Have you been on any psychological medications in the past 4 months (e.g., antidepressants, sleep aids, etc...)?
   - Yes
   - No
   - I choose not to respond

9. How much experience have you had with each of the following treatments

<table>
<thead>
<tr>
<th>Treatment</th>
<th>No experience</th>
<th>A little experience</th>
<th>Some experience</th>
<th>A lot of experience</th>
<th>I choose not to respond</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-anxiety medications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpersonal therapy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive Behavioral Therapy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceptance and Commitment Therapy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antidepressants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Acceptance and Fusion Questionnaire for Youth (AFQ-Y)

We want to know more about what you think, how you feel, and what you do. Read each sentence. Then, circle a number between 0-4 that tells how true each sentence is for you.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Not at all True</th>
<th>A little True</th>
<th>Pretty True</th>
<th>True</th>
<th>Very True</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>My life won’t be good until I feel happy.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>My thoughts and feelings mess up my life.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>If I feel sad or afraid, then something must be wrong with me.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>The bad things I think about myself must be true.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5.</td>
<td>I don’t try out new things if I’m afraid of messing up.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6.</td>
<td>I must get rid of my worries and fears so I can have a good life.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7.</td>
<td>I do all I can to make sure I don’t look dumb in front of other people.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8.</td>
<td>I try hard to erase hurtful memories from my mind.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9.</td>
<td>I can’t stand to feel pain or hurt in my body.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10.</td>
<td>If my heart beats fast, there must be something wrong with me.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11.</td>
<td>I push away thoughts and feelings that I don’t like.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12.</td>
<td>I stop doing things that are important to me whenever I feel bad.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13.</td>
<td>I do worse in school when I have thoughts that make me feel sad.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14.</td>
<td>I say things to make me sound cool.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15.</td>
<td>I wish I could wave a magic wand to make all my sadness go away.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16.</td>
<td>I am afraid of my feelings.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17.</td>
<td>I can’t be a good friend when I feel upset.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Five Face Mindfulness Questionnaire

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes your own opinion of what is generally true for you.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>never or very rarely true</td>
<td>rarely true</td>
<td>sometimes true</td>
<td>often true</td>
<td>very often or always true</td>
</tr>
</tbody>
</table>

_____ 4. I perceive my feelings and emotions without having to react to them.

_____ 5. When I do things, my mind wanders off and I’m easily distracted.

_____ 8. I don’t pay attention to what I’m doing because I’m daydreaming, worrying, or otherwise distracted.

_____ 9. I watch my feelings without getting lost in them.

_____ 13. I am easily distracted.

_____ 18. I find it difficult to stay focused on what’s happening in the present.

_____ 19. When I have distressing thoughts or images, I “step back” and am aware of the thought or image without getting taken over by it.

_____ 21. In difficult situations, I can pause without immediately reacting.

_____ 23. It seems I am “running on automatic” without much awareness of what I’m doing.

_____ 24. When I have distressing thoughts or images, I feel calm soon after.

_____ 28. I rush through activities without being really attentive to them.

_____ 29. When I have distressing thoughts or images I am able just to notice them without reacting.

_____ 33. When I have distressing thoughts or images, I just notice them and let them go.

_____ 34. I do jobs or tasks automatically without being aware of what I’m doing.

_____ 38. I find myself doing things without paying attention.
Personal Values Questionnaire

**Personal Value Domain #1: Relationships**

**Instructions:** Think about your relationships with friends, family, and romantic partners. Describe the qualities you would want to have in these relationships. Try to focus on your role in that relationship. Describe how you would treat other people if you were the “ideal you” in these various relationships. While it’s fine to list a global value like “having good or close relationships”, we would like you to focus on writing down specific ways you can act or do things that would make good or close relationships more likely for you. For example, if you want closer and better relationships, it may be accurate for you to list values like “being kind, considerate, supportive & loyal”, or “being open, honest, and responsible”. You decide which qualities are most important to you.

**Please write down your Relationships values here:**

________________________________________________________________________
________________________________________________________________________

Please answer the following questions by circling the number (on the right) that is true for you:

I value this because somebody else wants me to or thinks I ought to, or because someone else will like it if I do. I probably wouldn’t say I value this if I didn’t get some kind of praise or approval for it.

1                      2                  3            4              5
Not at all    Mostly not   Unsure   Mostly      Entirely
for this        for this         of            for this     for this
reason        reason          reason      reason      reason

I value this because I would feel ashamed, guilty, or anxious if I didn’t.

1                      2                  3            4              5
Not at all    Mostly not   Unsure   Mostly      Entirely
for this        for this         of            for this     for this
reason        reason          reason      reason      reason

I value this because I view it as important, whether or not others agree. Although this value may have been taught to me by others, now it is my own heartfelt value.

1                      2                  3            4              5
Not at all    Mostly not   Unsure   Mostly      Entirely
for this        for this         of            for this     for this
reason        reason          reason      reason      reason

I value this because doing these things makes my life better, more meaningful, and/or more vital.

1                      2                  3            4              5
Not at all    Mostly not   Unsure   Mostly      Entirely
for this        for this         of            for this     for this
reason        reason          reason      reason      reason

I value this because I experience fun and enjoyment when I am engaged in the value.

1                      2                  3            4              5
Not at all    Mostly not   Unsure   Mostly      Entirely
for this        for this         of            for this     for this
reason        reason          reason      reason      reason
In the last 10 weeks, I have been this successful in living this value (to acting consistently with this value):

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20% successful</td>
<td>21-40% successful</td>
<td>41-60% successful</td>
<td>61-80% successful</td>
<td>81-100% successful</td>
</tr>
</tbody>
</table>

I am this committed to living this value (to acting consistently with this value):

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all committed</td>
<td>Slightly committed</td>
<td>Moderately committed</td>
<td>Quite committed</td>
<td>Extremely committed</td>
</tr>
</tbody>
</table>

How important is this value to you?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all Important</td>
<td>Slightly Important</td>
<td>Moderately Important</td>
<td>Quite Important</td>
<td>Extremely Important</td>
</tr>
</tbody>
</table>

Right now, would you like to improve your progress on this value?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>A little</td>
<td>Moderately</td>
<td>Quite a bit</td>
<td>Very much</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>A little</td>
<td>So</td>
<td>Quite a bit</td>
<td>Very much</td>
</tr>
</tbody>
</table>
**Personal Value #2: Education-Schooling**

**Instructions:** What kind of student would you be in an ideal world? What kinds of things do you value learning as a person? What qualities do you value bringing to your role as a student, in school or any other places where you learn things that are of great importance to you? Some people value learning to face new challenges, learning different perspectives on important issues, learning better or more efficient ways to do specific things, or learning how to grow as a person. Some people value qualities like being open and receptive to new ideas and perspectives, or making serious and careful considerations of important issues. Regardless of what others want, you should write down the kinds of things you really value learning—and/or qualities you value demonstrating as a student.

Please write down your *Education-Schooling* values here:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Please answer the following questions by circling the number (on the right) that is true for you:

I value this because somebody else wants me to or thinks I ought to, or because someone else will like it if I do. I probably wouldn’t say I value this if I didn’t get some kind of praise or approval for it. 1 2 3 4 5

I value this because I would feel ashamed, guilty, or anxious if I didn’t. 1 2 3 4 5

I value this because I view it as important, whether or not others agree. Although this value may have been taught to me by others, now it is my own heartfelt value. 1 2 3 4 5

I value this because doing these things makes my life better, more meaningful, and/or more vital. 1 2 3 4 5

I value this because I experience fun and enjoyment when I am engaged in the value. 1 2 3 4 5
In the last 10 weeks, I have been this successful in living this value (to acting consistently with this value):

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20%</td>
<td>21-40%</td>
<td>41-60%</td>
<td>61-80%</td>
<td>81-100%</td>
</tr>
</tbody>
</table>

I am this committed to living this value (to acting consistently with this value):

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>Slightly</td>
<td>Moderately</td>
<td>Quite</td>
<td>Extremely</td>
</tr>
<tr>
<td>committed</td>
<td>committed</td>
<td>committed</td>
<td>committed</td>
<td>committed</td>
</tr>
</tbody>
</table>

How important is this value to you

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>Slightly</td>
<td>Moderately</td>
<td>Quite</td>
<td>Extremely</td>
</tr>
<tr>
<td>Important</td>
<td>Important</td>
<td>Important</td>
<td>Important</td>
<td>Important</td>
</tr>
</tbody>
</table>

Right now, would you like to improve your progress on this value?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>A little</td>
<td>Moderately</td>
<td>Quite a bit</td>
<td>Very much so</td>
</tr>
</tbody>
</table>
### Depression, Anxiety and Stress Scale - 21

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I found it hard to wind down</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>I was aware of dryness of my mouth</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>I couldn’t seem to experience any positive feeling at all</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>I experienced breathing difficulty (eg, excessively rapid</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>breathing, breathlessness in the absence of physical exertion)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>I found it difficult to work up the initiative to do things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>I tended to over-react to situations</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>I experienced trembling (eg, in the hands)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>I felt that I was using a lot of nervous energy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>I was worried about situations in which I might panic and make</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>a fool of myself</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>I felt that I had nothing to look forward to</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>11</td>
<td>I found myself getting agitated</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td>I found it difficult to relax</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>13</td>
<td>I felt down-hearted and blue</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>14</td>
<td>I was intolerant of anything that kept me from getting on with</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>what I was doing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>I felt I was close to panic</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>16</td>
<td>I was unable to become enthusiastic about anything</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>17</td>
<td>I felt I wasn’t worth much as a person</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>18</td>
<td>I felt that I was rather touchy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>19</td>
<td>I was aware of the action of my heart in the absence of physical</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>exertion (eg, sense of heart rate increase, heart missing a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>beat)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>I felt scared without any good reason</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>21</td>
<td>I felt that life was meaningless</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
**Adult MHC-SF**

Please answer the following questions are about how you have been feeling during the past month. Place a check mark in the box that best represents how often you have experienced or felt the following:

<table>
<thead>
<tr>
<th>During the past month, how often did you feel ...</th>
<th>NEVER</th>
<th>ONCE OR TWICE</th>
<th>ABOUT ONCE A WEEK</th>
<th>ABOUT 2 OR 3 TIMES A WEEK</th>
<th>ALMOST EVERY DAY</th>
<th>EVERY DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. happy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. interested in life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3. satisfied</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4. that you had something important to contribute to society</td>
<td></td>
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</tr>
<tr>
<td>5. that you belonged to a community (like a social group, or your neighborhood)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. that our society is becoming a better place for people like you</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. that people are basically good</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. that the way our society works makes sense to you</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. that you liked most parts of your personality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. good at managing the responsibilities of your daily life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. that you had warm and trusting relationships with others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. that you had experiences that challenged you to grow and become a better person</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. confident to think or express your own ideas and opinions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. that your life has a sense of direction or meaning to it</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Knowledge Questionnaire

The following questions are meant to test your knowledge about topics that may have been covered in the program (depending on the program that you are assigned to test out). You will likely not know the answers to most of them. That’s OK and expected. Just do the best you can, as it is helpful to the study.

1. Which of these goals is not a SMART goal?
   a. I will study for at least 1-hour after class for the next 4 days
   b. I will be more compassionate to myself this week
   c. I will go out with my friends once this week
   d. I will talk to my roommate about keeping our dorm clean tomorrow afternoon

2. Which of the following would most likely be a value
   a. Never feeling stressed
   b. Connecting with others
   c. Getting a good job
   d. Graduating from College

3. Values are like a
   a. Goal
   b. Bus
   c. Feeling
   d. Direction

4. Values are specific goals and outcomes that one hopes to achieve
   a. True
   b. False

5. When setting a BRAVE goal it is important to consider whether the goal
   a. Is Audacious
   b. Avoids Avoidance
   c. Is Appropriate
   d. Appeals to you

6. Values are
   a. What others tell you to hold as important
   b. Global qualities of ongoing action
   c. Things you have to do
   d. Specific goals and outcomes
7. I will speak in class and feel anxious is an example of
   a. Control strategies
   b. Willingness
   c. Distraction
   d. None of the above

8. A successful way of responding to difficult thoughts and feelings is to
   a. Try to push them out of your mind
   b. Actively notice them without trying to control them
   c. Avoid situations where they come up
   d. Give into them

9. Control strategies refer to the various ways people try to manipulate and control the
   external world to get what they want
   a. True
   b. False

10. If you focus on doing things to get rid of your pain
    a. You won’t suffer as much
    b. You are practicing willingness
    c. You may actually suffer more
    d. You will be able to effectively deal with internal barriers

11. Check all that apply: Which of the following could be an internal barrier for going out
    with your friends
    a. Thinking you won’t have fun
    b. Feeling depressed
    c. Not having any money
    d. Having a class paper due the next day

12. Trying to control your thoughts and feelings can create more suffering and take you
    away from what is important to you:
    a. True
    b. False

13. Willingness is NOT
    a. Resisting, struggling with or trying to get rid of thoughts and feelings
    b. Ignoring or trying to forget about thoughts and feelings
    c. Giving in or passively resigning to thoughts and feelings
    d. All of the above
14. Why be willing to experience difficult thoughts and feelings?
   a. Because it will make these thoughts and feelings go away
   b. Because unwillingness can lead to suffering
   c. Because experiencing as much pain as possible is a way to enlightenment
   d. None of the above

15. While practicing willingness, some things to remember include
   a. Try to push difficult thoughts and feelings out of your mind
   b. Focus on being positive
   c. Give into your thoughts and feelings
   d. Lean into and make room for your thoughts and feelings, even difficult ones

16. Imagine you had a fight with a close friend of yours and you are feeling hurt and angry. You have the urge to avoid your friend, though your friendship with the person is important to you. Which of the following would be a willingness response to this situation?
   a. Convince yourself the fight wasn’t a big deal
   b. Spend time with other friends
   c. Push thoughts about the fight out of your mind
   d. Notice urges and feelings to withdraw and spend time with your friend anyway
System Usability Scale

1. I think that I would like to use this system frequently

2. I found the system unnecessarily complex

3. I thought the system was easy to use

4. I think that I would need the support of a technical person to be able to use this system

5. I found the various functions in this system were well integrated

6. I thought there was too much inconsistency in this system

7. I would imagine that most people would learn to use this system very quickly

8. I found the system very cumbersome (e.g. awkward, difficult) to use

9. I felt very confident using the system

10. I needed to learn a lot about this website before I could effectively use it.
Program Satisfaction

Please answer the following questions regarding the wellness program you completed (ACT on College Life or Healthy Living).

Overall, I was satisfied with the quality of the wellness program.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Mostly Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Mostly Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

I would like to use the wellness program again in the future.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Mostly Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Mostly Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

I think the wellness program would be helpful for college students.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Mostly Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Mostly Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

I would recommend the wellness program to other college students.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Mostly Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Mostly Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

(ACT-CL only) The follow up emails about values and willingness I received from the program were helpful.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Mostly Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Mostly Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

(ACT-CL only) The mindfulness resources I received through the email link were helpful.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Mostly Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Mostly Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>
The text messages I received from the ACT on College Life program were helpful.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Mostly Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Mostly Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

If you did not go through the entire program (i.e., complete both lessons) please describe why.

- 0 knew it already
- 0 not interested
- 0 no time
- 0 not engaging
- 0 could not access program
- 0 other: ____________________________________________
- 0 I went through the entire program

What did you like best about the wellness program?
____________________________________________________________________________________
____________________________________________________________________________________

What did you like least about the wellness program?
____________________________________________________________________________________
____________________________________________________________________________________

How would you have liked the wellness program to be different?
____________________________________________________________________________________
____________________________________________________________________________________
Overall, how would you describe your participation in this survey today? (Your answer to this question will not affect your participation or compensation from this study in any way)

- I answered every question carefully and honestly
- I answered most questions carefully and honestly
- I randomly responded and/or did not respond honestly to about half of the questions
- I randomly responded and/or did not respond honestly to most questions
- I randomly responded and/or did not respond honestly to any questions
APPENDIX B: ACT-CL TEXT MESSAGE AND FOLLOW UP EMAIL
CONTENT
Text messages sent to ACT-CL participants

Text sent 3 days after completing Lesson 1

“This is a text from ACT on College Life. Take a moment right now and reflect on the actions you’ve taken today that were in line with your values and what values-based actions you can take later today. Checking in with your values throughout the day can help vitalize your day and keep you connected to your valued direction.”

Text sent 6 days after completing Lesson 1

“This is a text from ACT on College Life. Take a moment to consider your most important value and why it matters to you. See if you can just connect with this value for a moment. If you feel motivated, think of a SMART goal you can take linked to this value today.”

Text sent 3 days after completing Lesson 2

“This is a text from ACT on College Life. The next time you experience a difficult internal barrier, take a moment to practice willingness. Let go of controlling it and actively notice the experience with curiosity. See what happens when you simply lean into the experience, without giving in or fighting it.”

Text sent 6 days after completing Lesson 2

“This is a text from ACT on College Life. The next time you experience a difficult internal barrier, take a moment to practice willingness. Let go of controlling it and actively notice the experience with curiosity. See what happens when you simply lean into the experience, without giving in or fighting with it.”
Hello {Name},

Congratulations on completing the first lesson of the ACT on College Life program! This is a follow up email to check in on the goal you set and to provide a few helpful suggestions as you continue to work with your values.

Here is the goal you set for this week: {User’s goal from lesson 1}

How are you doing on your goal? We encourage you to continue working with your goal this week. If you find yourself having difficulty with it, you may want to consider whether the current goal is SMART and whether you might modify it so it works better for you.

Exploring your values is an ongoing process and your values may change over time. Here’s an exercise students often find helpful as they continue to work with identifying and developing their values.

Here's what to do:

1. Take some time to consider a person you admire.

2. Ask yourself why you admire him or her. Are there particular qualities of his or her actions (ways of being in the world) that stand out? Notice what these qualities say about your values and what you want to stand for in your life.

3. If you find yourself admiring what someone possesses (e.g., money, beauty, athleticism), see if you can find the value underneath that: why do you value that attribute? For example, money can help you provide for a family (value: connection), give you a sense of security (value: safety or autonomy), etc.

4. What could you do today to bring your actions closer in line with this person's behavior you admire? Remember, this is about bringing a similar valued quality to your actions, not necessarily doing the exact same thing.

Good luck!

-The ACT on College Life Team
Email sent 4 days after completing lesson 1 of ACT-CL

Subject Line: While you’re brushing your teeth

Hello {Name},

Only three more days until you can begin the second lesson for the ACT on College Life program!

Here is the goal you set for this week: {User’s goal from lesson 1}

How are you doing on your goal?

As you continue to work with your values, it's important to take the time to acknowledge ways you are acting consistently with your values. This can help keep you motivated and identify values-based actions you can continue to build off of.

Here's what to do:

1. When you are brushing your teeth at night, take that time to do a quick tally in your head of the different ways you "lived your values" that day.

2. Notice the small things as well as the larger and more significant actions. Also, notice whether there were any broader patterns in your actions that are linked to your values maybe how you engaged in your different classes that day or how you interacted with others. It's fine to notice places you didn't live as consistently with your values, but we're really focusing here on how you DID live your values.

3. Try this out for three days and just see how it works for you. You may find yourself engaging in more values-based actions or identifying places you could engage in your values throughout the day or just enjoying brushing your teeth a bit more ???

Good luck!

-The ACT on College Life Team

Music and Life: http://www.youtube.com/watch?v=ERbvKrH-GC4&feature=player_embedded
Click on the link above to view a brief video that illustrates the importance of savoring the process of one's actions rather than only focusing on the final outcome.
Email sent 2 days after completing lesson 2 of ACT-CL

Subject line: NAME your barriers

Hello {Name},

Here is the goal you set to practice willingness this week: {User’s goal from lesson 2}

How are you doing on your goal?

In the last lesson you learned about how leaning into internal barriers, although sometimes difficult and scary, can help to reduce unnecessary suffering and engage with your values. However, you may still feel somewhat unsure of how exactly to do this.

Here is a helpful skill you can use to practice leaning into difficult emotions.

The NAME technique:

1. **Notice** the emotion: You might notice where you feel it in your body, the thoughts and urges that come along with it, how it changes as you continue to notice it.

2. **Acknowledge** it by name: Simply label the emotion, stating it to yourself. For example, "here is anxiety."

3. **Make** room for it: Let go of trying to control the emotion and create a space where you can lean into the experience. You might use your breath and imagine breathing into the emotion. Or imagine it as a physical object you could compassionately hold.

4. **Expand** awareness: Broaden your attention and see what else you notice in the moment with your 5 senses (what you can see, hear, feel, taste, smell), while you continue to stay in contact with the emotion.

Give this skill a try the next time you find yourself experiencing a difficult emotion (e.g., feeling angry, lonely, ashamed, sad, anxious, etc??). Notice how it works for you and whether practicing this way of relating to your emotions reduces unnecessary suffering or empowers you to engage more in actions that are important to you.

Good luck!

-The ACT on College Life Team

The Unwanted Party Guest: [http://www.youtube.com/watch?v=VYht-guymF4](http://www.youtube.com/watch?v=VYht-guymF4)
Click on the link above to view a brief video that illustrates how focusing on controlling internal barriers can be problematic and how you can practice willingness with your "unwanted guests."
Email sent 4 days after completing lesson 2 of ACT-CL

Subject line: What’s next?

Hello {Name},

Here is the goal you set to practice willingness this week: {User’s goal from lesson 2}

How are you doing on your goal?

As you finish up with the ACT on College Life program, you may be wondering how you can continue to build upon and apply the skills you learned. Here are some suggestions:

1. **Use a journal:** It can be helpful to write down your experiences as you continue to explore how to apply values and willingness to your life. You can also use this journal to set SMART and BRAVE goals to push yourself to apply these skills and to work on building the life you want to live.

2. **Create some reminders:** Some of these skills may not feel needed now, but could be important later. In fact, a major goal of this program is to provide you with skills that can be helpful if you run into challenges in the future. We encourage you to create some reminders so you can come back to these skills later. For example, you might write some points down or save the lesson summaries to your computer.

3. **Get a book:** There are several ACT books available, which you can use to learn more about the ACT skills and how to apply them in your life. We'd recommend Hayes, S. C., & Smith, S. (2005). Get out of your mind and into your life. Oakland, CA: New Harbinger.

Good luck!

-The ACT on College Life Team
Subject Line: Practicing Mindfulness

Hi {Name},

Congratulations on completing the first lesson of the ACT on College Life program! As you probably know by now, there is a one week waiting period between lessons. This is to give you a chance to practice the program skills and to work on your values-based goal. We also use this waiting period to provide you with a few additional skills we have found to be helpful for students like yourself.

A skill that is particularly useful is mindfulness. We highly recommend that you click on the link below, where we have prepared a few pages to explain what mindfulness is, how it’s useful and how you can practice this week.

[LINK]

Thank you again for participating in the project!

-The ACT on College Life Team
ACT-CL mindfulness resource email sent after participants completed lesson 2

Subject Line: Continuing Your Mindfulness Practice

Hi Kerry,

Congratulations on completing the second lesson of the ACT on College Life program!

As you wrap up with the program, we would like to provide you with a few more resources that we think may be helpful for you in continuing to build your mindfulness skills.

We highly recommend that you click on the link below, where we have prepared a few pages to learn how mindfulness can help with practicing willingness as well as to get access to additional exercises to continue developing your skills with mindfulness.

LINK

Thank you again for participating in the project!

-The ACT on College Life Team
APPENDIX C. PROGRAM SCREEN SHOTS
**ACT-CL Lesson Screenshot Examples**

**Website homepage**

**Lesson 1**

**Lesson Components**
- Introduction
- Welcome
- College hopes and dreams
- Defining values
  - Values in a direction
  - Summary
  - Review
- What are your values?
  - Values card sort
  - Values writing exercise
  - What’s your headline?
- Goal setting
  - SMART Goals
  - BRAVE Goals
  - Review
  - Rate your values success
  - Goal setting worksheet
- Wrap up
  - Going further
  - Lesson summary

**BRAVE goals**

- B: Bold
- R: Responsible
- A: Avoids avoidance
- V: Valued direction
- E: Empowering

Set goals that work towards things that matter to you, but you may have been putting off or having trouble getting yourself to do. Notice whether your goal is really something you are already achieving in your life and avoid an area that is more valued to you, but may feel too difficult or scary. Choose a goal that will instead push you to approach something that is valued, but you may have been avoiding.

For example, approaching a difficult topic with a close friend.

**Example of text element (defining BRAVE goals)**
Control strategies

Control strategies are the various ways people try to avoid, suppress, fight with or otherwise try to control the occurrence/intensity of their internal barriers.

Click on the examples listed below to learn more about control strategies and how they can sometimes lead to problems.

Example of interactive graphic element (control strategies examples)
Lesson 1

Introduction
Welcome
College hopes and fears

Defining values
Values as a direction
Summary
Review

What are your values?
Values end sort
Values writing exercise
What’s your headline?

Goal setting
SMART Goals
BEAR Goals
Review

Rate your values success
Goal setting worksheet

Wrap up
Going further
Lesson summary

Next: Rate your values success

Review

Please answer each question regarding SMART & BRAVE goals.

Question 1

How could you make the goal “I will relax more” SMART?

- I will take time to relax at least once this week
- I will take a 1-hour bath every day this week no matter what
- I will take a relaxing bath
- I will take a 30-minute bath to relax twice this week

Example of quiz

“Be the change you wish to see in the world.”

- Mahatma Gandhi

Example of animation (introduction)
Example of animation (passengers on the bus metaphor)
Example of interactive element (values bull's eye exercise)

**Values Bull’s Eye**
Your three top-rated values are listed on the dart board. For each value, place a dart on the board in each area that best represents where you stand today.

![Diagram of a dart board with areas labeled: passion, intimacy, romance, and values. Each area has a dart placed in the center.]

**Example of interactive element (values card sort)**

**Step 1: Sort the 45 cards into the three importance bins below.**

Drag each of the 45 cards to the appropriate bin based on how important the value is to you personally. Each of the importance bins must have exactly 15 cards in order to proceed to the next step. You can use the “Decide later” bin to temporarily hold cards that you have not decided how to sort yet.

**Spirituality**
To grow and mature spirituality

![Diagram showing a card sort with categories: Reliability, Honesty, Passion, Openness, Growth, Adventure, Curiosity, Knowledge, Science, Self-control, and Non-conformity. Cards are placed in bins labeled: Very Important to me, Important to me, Less Important to me, and Decide later.]

**Example of interactive element (values card sort)**
Review the values you listed as very important across each card sort step. This list can help give you a sense of what matters to you and the range of different values you may hold as very important.

**Example of interactive element (summary from values card sort)**

**Example of interactive element (breath holding practice exercise)**
ACT-CL Mindfulness Resource Screen Shot Examples

Example: Welcome page

Example: Instructions with a link to access a breathing mindfulness exercise
Example: Description of how mindfulness can help with defusion and acceptance

Example: Written instructions for a labeling mindfulness exercise
Going Further With Your Mindfulness Practice

We encourage you to continue to work on developing your mindfulness skills as you wrap up your participation in the ACT on College Life program.

We generally recommend that you practice a mindfulness exercise for at least 5 minutes, 3 to 5 times a week. Building your skill with mindfulness will be really helpful in improving your ability to practice willingness with internal barriers and engage in your values.

The links below provide some additional audio recordings and written scripts you can use to continue practicing mindfulness:

- Working with difficult experiences: Download a 7 minute audio narrated exercise to practice mindfulness of difficult internal experiences by clicking here.
- Breathing mindfulness: Download the 5 minute audio narrated breathing mindfulness exercise by clicking here. You can download written instructions by clicking here.
- Leaves on a stream: Download written instructions for a mindfulness exercise designed to help you step back and notice thoughts as just thoughts by clicking here.
- Labeling Your Passengers: Download written instructions for the labeling your passengers exercise by clicking here.

Example: Going further page with additional links to download other mindfulness exercises
Healthy Living Lesson (Control Website) Screen Shot Examples

Example: Welcome page
Example: Interactive T/F quiz question

Example: Interactive exercise to identify symptoms of depression
Student Story: How I Survived Depression

Most people who meet me now wouldn’t believe that 2 years ago I was so depressed that I would spend hours scraping the paint off my bedroom wall with my fingernails.

I’d say my life probably wasn’t much worse than most peoples’. The problem was, I was sick with depression. I thought my life was worthless and pointless. I had this voice in my head telling me over and over that I did not fit in, did not belong here.

Once I was walking along the street actually feeling good. Then, something just clicked. Nothing spectacular happened, one moment I was fine and the next I wasn’t. The tears came and they would not stop.

When I got home I remember thinking it was time to end it, but my rational mind was coming through the depressive thoughts. I could see it was my depression that spawned those thoughts. I knew they were ridiculous. I knew then that I needed help.

Example: Student story of struggling with depression

Lesson Summary

Here is a brief summary of what we covered in lesson 1. You can navigate back to any of the previous pages using the back button and you can return to the program at any time using the link that was provided to you.

- Depression is a common disorder
- Characteristics of depression differ across people and can include a variety of emotional, physical, behavioral and cognitive symptoms.
- The causes of depression also vary a lot and can include life changes, maladaptive patterns of behavior, cognitive factors, and physical influences.
- If you or someone you know is struggling with depression we recommend seeking help as well as considering using one or more of the tips we provided for dealing with depression in this lesson.

Example: Lesson summary
Example: Illustrative description of social anxiety disorder

What is Social Phobia/Social Anxiety Disorder?

“In any social situation, I felt fear. I would be anxious before I even left the house, and it would escalate as I got closer to a college class, a party, or whatever. I would feel sick at my stomach—it almost felt like I had the flu. My heart would pound, my palms would get sweaty, and I would get this feeling of being removed from myself and from everybody else.”

“When I would walk into a room full of people, I’d turn red and it would feel like everybody’s eyes were on me. I was embarrassed to stand off in a corner by myself, but I couldn’t think of anything to say to anybody. It was humiliating. I felt so clumsy. I couldn’t wait to get out.”

“I couldn’t go on dates, and for a while I couldn’t even go to class. My sophomore year of college I had to come home for a semester. I felt like such a failure.”

Example: Cartoons integrated throughout the lessons
Example: Basic educational information regarding coping strategies
Example: Basic information regarding coping strategies