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# THE ACCEPTABILITY OF USING MOODGYM TO TREAT DEPRESSION IN ADOLESCENTS: A PILOT STUDY

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THE ACCEPTABILITY OF USING MOODGYM TO

TREAT DEPRESSION IN ADOLESCENTS: A PILOT STUDY

By

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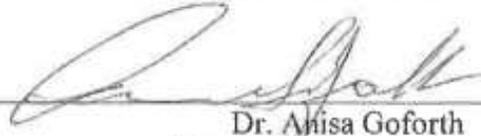
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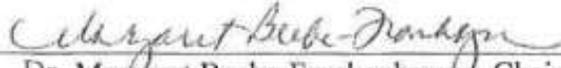
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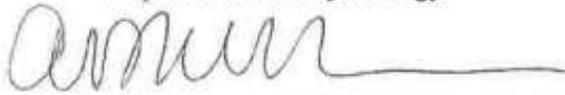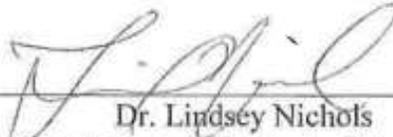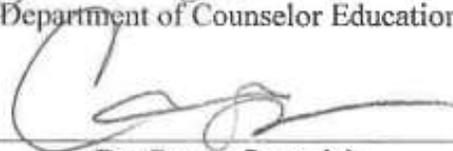
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The Acceptability of Using MoodGYM to Treat Depression in Adolescents: A Pilot Study

Chairperson: Dr. Margaret Beebe-Frankenberger

   Depression rates are high among adolescents, yet most young people do not receive treatment. Alternatives to in-person treatment are needed which are cost-effective and widely accessible. Teens use technology at high rates, but innovative methods of online treatment have not been widely researched in the United States. MoodGYM is a free, internet-based program designed to prevent depression in adolescents which has shown promise in research studies in Australia. To date, no studies with MoodGYM have been published in the United States. This pilot study was designed to evaluate the acceptability of usage of MoodGYM at home by adolescents to treat depressive symptoms. Recruitment initially began in the schools, with school psychologists soliciting students to participate in the study. Despite extensive efforts, only two school psychologists agreed to participate, and no students were recruited in schools. Final recruitment was accomplished through online social networking, and the online consent and recruitment process was found to be acceptable overall. Thirty-five (35) participants completed the initial survey, with ten participants completing the four modules of MoodGYM included in the study. Participants completed 2.35 modules on average. Adherence to MoodGYM was measured in several unique ways, including time spent on modules, characters entered into exercises, and surveys on usage. MoodGYM was found to be generally acceptable to adolescents. Participants on average responded positively to social validity measures given both pre- and post-intervention. The sample was disproportionately rural, and rural participants completed about half a module more of MoodGYM. Contributions, limitations and future directions are discussed.

Dedication

I would like to dedicate this dissertation to the memory of my mother, Robin Sumner, who always let me know how proud she was of me.

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I am grateful to my dissertation committee—Dr. Lindsey Nichols, Dr. Allen Szalda-Petree, Dr. Cameo Stanick, and Dr. Anisa Goforth. I appreciate their patience, support, and helpful comments!

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To my boyfriend, Phil Bowen, for providing endless amounts of support and love as I finished this. He always encouraged me when I was exhausted and kept me going even when I had no participants. I love you and I'm so lucky to have met you!

To Detective Whiskers, thanks for sitting on the desk and "helping" me every day I worked on my dissertation.

I would also like to acknowledge the sincerity and dedication of my participants, who genuinely wanted to help other adolescents with depression and were willing to try this intervention even with their own struggles.

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CHAPTER 1

INTRODUCTION

Depression is a common psychological disorder in adolescents, with research indicating that up to one out of three girls and one out of five boys will have at least one episode of depression by age 18 and middle to late adolescence is the average age of the first appearance of depressive symptoms (Merrell, 2008). Depression is devastating in many realms of an adolescent's life and is associated with negative, life changing outcomes, including: poor friendship and romantic relationships (Rudolph & Lambert, 2010), decreased school achievement and cognitive functioning (Huberty, 2009; Machoian, 2005), decreased self-efficacy (Weisz, Sweeney, Proffitt, & Carr, 1993), and suicidal ideation and attempts (Rudolph & Lambert, 2010). Even mild symptoms of depression leads to reduced life functioning and increases the risk for later depressive disorder and other diagnoses. (Fergusson, Horwood, & Ridder, 2005; Hammen & Rudolph, 2002; Rudolph and Lambert, 2010). In addition, Humensky et al. (2010) found that subclinical symptoms of depression in adolescents were associated with reductions in school performance and more negative subjective thoughts about school.

Although rates of depression are high and the negative outcomes numerous, most youth diagnosed with depression do not receive treatment. In a large nationwide survey, the Substance Abuse and Mental Health Services Administration (SAMHSA, 2014) found that only 40% of youth who needed treatment for depression received it. This lack of treatment is particularly pronounced in rural areas of the United States. Studies have reported that as few as 10% of adolescents with significant depressive symptoms living in rural areas had received mental health counseling in the last year (Curtis, Waters, & Brindis, 2011). Stigma, lack of privacy, and the

potential conflict of multiple relationships are all barriers to treatment in rural areas  (Rainer, 2010).

An extant research literature suggests that technology-based treatment could be used to fill the gap between the need for and access to mental health services in the United States, particularly in rural areas. Because of their technical savvy, young people may prefer the internet as a communication method (Proudfoot, 2004). Recent usage surveys have demonstrated just how "plugged in" modern teens are. According to the Pew Research Center (2015), 92% of teens aged 13 to 17 reported going online daily. Interestingly, 24% described themselves as going online "almost constantly." Almost three-fourths of teens have access to a smartphone, and 91% of teens go online at least "occasionally" from mobile devices (Lenhart, 2015). According to another large study of more than 2,600 teens, those aged 13 to 18 used more than six and a half hours of screen media a day. "Screen media" includes spending time watching TV, playing video games, searching the internet, and using a computer, tablet or smartphone (Common Sense Census, 2015). Technology-based interventions could potentially attract adolescents and use a chunk of this screen time to fight depression.

Although high tech programs have huge potential as tools to prevent and treat depression, there is a surprising lack of high quality, research-based, and widely available interventions developed in the United States. One program called Project CATCH-IT (Van Voorhees et al. 2009) has been developed and tested in the United States and shows some promise. Further studies are being conducted on CATCH-IT in the United States; however, there is no free version available to the public, although the authors suggested there would be at some point. Other countries such as Australia have made the mental health of their young people a priority and developed free, high quality online tools to combat depression. One such tool is MoodGYM

(https://moodgym.anu.edu.au/moodgym), which is a free and easily accessible web-based program. MoodGYM is based on the principles of cognitive behavioral therapy (CBT) and contains five modules which are designed to teach skills that are known to prevent depression in young people age 16 and older. MoodGYM has shown promise in several school-based and community studies (i.e. Calear, Christensen, Mackinnon, & Griffiths, 2013; Calear, Christensen, Mackinnon, Griffiths, & O'Kearney, 2009;Sethi, Campbell, & Ellis, 2010; Sethi, 2013). However, no published research studies have examined the use of MoodGYM in a United States sample. In addition, mental health professionals seem to be largely unaware of the program.

A tool like MoodGYM is only useful if it is disseminated, and one potential method of distribution is having trusted mental health professionals in schools share the program with students and parents. School psychologists, with their high level of training and integration into school systems, are a natural choice to promote mental health through innovative programs like MoodGYM. As the National Association of School Psychologists (NASP; 2015) explained: "School psychologists are uniquely trained to deliver high quality mental and behavioral health services in the school setting to ensure all students have the support they need to be successful in school, at home, and throughout life" (p. 1). School counselors and other mental health professionals in the schools, as well as community mental health providers, could also assist in implementing new interventions. A program like MoodGYM has the potential to help students become more successful both in and outside of school, as well as in the future.

While school psychologists are trained to help with mental health issues, they often face barriers to providing direct care, such as having a high number of students in the schools they serve. Charvat (2005) found an average ratio of 1:1,482 of school psychologists to students in U.S. schools. There is also a shortage of school psychologists in practice in the United States,

with some reporting a shortage as high as 9,000 (Curtis, Hunley, Chesno Grier, 2004). Although school psychologists might be limited in the amount of direct services they can provide, a variety of services can be provided under a multi-tiered system of supports (MTSS). School psychologists are increasingly involved in service delivery under this type of system in regards to mental health issues. MTSS involves three tiers of support: Tier 1 is focused on the universal promotion of mental health wellness as well as the prevention of future problems (NASP, 2015). Tier 2 involves "direct and indirect services to address emerging mental and behavioral health problems and prevent risky behaviors" (NASP, 2015, p. 3). Tier 3 is the most intensive level of support and it involves "direct and indirect services to address identified mental and behavioral health problems" (p. 2). Tier 3 can involve such services as cognitive behavior therapy. MoodGYM has the potential to become integrated into MTSS as a Tier 2 support to help prevent the development of depression in those who are at-risk. It can also be used as a Tier 3 support for a student who is diagnosed or struggling with symptoms of depression. When a school psychologist becomes aware of a student in need of extra supports because of depressive symptoms, they can provide a recommendation to complete MoodGYM modules that teach CBT skills and can augment other counseling within an MTSS framework. Other mental health professionals such as school counselors or social workers could also serve in this role. Students would benefit from collaborative mental health systems being developed and used in school systems.

This type of referral system is explored in the current study, which examined the feasibility of school psychologists providing recommendations to students to participate in this study and complete MoodGYM modules. Only a few studies for online treatments for depression have used schools for recruitment (Attwood, Meadows, Stallard, and Richardson, 2012;

Lillevoll, Vangberg, Griffiths, Waterloo, and Eisemann, 2014). School psychologists who participated in the current study provided valuable feedback on the recruitment process. In addition, the current study eventually expanded recruitment methods to include online social networking, which no other published studies in this area have done. The current study sought to evaluate the acceptability of this recruitment and consent process for adolescents. The study is also unique because of its inclusion of rural adolescents.

The current research project is a pilot study for the usage of MoodGYM at home by adolescents with depressive symptoms. Most studies using MoodGYM had participants complete the program at school, youth centers or universities (Calear, Christensen, Mackinnon, Griffiths, & O'Kearney, 2009; Ellis & Campbell, 2011; Lillevoll et al., 2014; Lintvedt et al., 2013; O'Kearney, Gibson, Christensen, & Griffiths, 2006; O'Kearney, Kang, Christensen, & Griffiths, 2009; Sethi, 2013; Sethi, Campbell, & Ellis, 2010). More research is needed to explore having adolescents using online interventions at times and places of their choosing. This flexiblity takes advantage of the accessibility of the online medium and may appeal to adolescents who are used to accessing content "on-demand." If MoodGYM is effective when used in this way, it has the potential to have large public health implications, particularly in rural areas that lack local mental health wellness resources. Adolescents could at any time access a free, research-based tool to treat their depressive symptoms; this would all be online, where adolescents already spend much of their time.

A primary focus of the current study is to evaluate the acceptability of the MoodGYM intervention, including its social validity, with adolescents. Previous studies on MoodGYM and adolescents have not examined the acceptability of the intervention in as much detail. The current study used both questionnaires and open-ended responses to gather data from the

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participants on their experiences using the program. This information is crucial in knowing whether adolescents will complete and benefit from MoodGYM.

The current study also sought to examine adherence rates to MoodGYM. The study is unique in that it relied on several different measures of adherence. Adolescents self-reported whether they finished the modules and how much effort they put forth. Adolescents were also asked to time themselves while completing MoodGYM modules to more accurately gauge their usage. In addition, actual data from MoodGYM was gathered in order to assess how many exercises participants had completed and how many characters they had entered into exercises as a measure of effort. This detailed adherence data is unique among studies with MoodGYM. Importantly, it offers a comprehensive view on how adolescents used MoodGYM and provides in-depth information on whether they considered it an acceptable and effective intervention. To further explore this question, the current study sought to examine the relationship between social validity and adherence to MoodGYM. Finally, the study sought to examine the relationship between social validity and the change over time in the adolescent participants' depressive symptoms.

CHAPTER 2

LITERATURE REVIEW

**Depression During Late Adolescence and Young Adulthood**

**Defining Adolescence and Young Adulthood**

The divide between adolescence and young adulthood is often murky, with differing and sometimes overlapping categorizations. As societal roles and the concepts of adolescence differ between cultures, there is no universal definition or age range (Sawyer et al., 2012). The World Health Organization (WHO, 2014) defines adolescence as between the ages of 10 to 19. In regards to health-related data, Sawyer et al. (2012) explained that researchers typically define three age categories: early adolescence (10 to 14), adolescence (15 to 19), and young adulthood (20 to 24). The prominent *Journal of Research on Adolescence* declares adolescence to last until age 19 (Arnett, 2000). However, Curtis (2015) argued that conferring legal status at age 18 necessitates a change in category from adolescent to adult, while others contend that reaching age 18 does not necessarily mean that transition has been made (Sawyer et al, 2012).

Arnett (2000) developed more precise definitions of adolescence and adulthood. He explained that "contemporary scholars generally consider adolescence to begin at age 10 to 11 and to end by age 18 or 19" (p. 476). Arnett concluded in modern times, it makes sense to delineate adolescence as ages 10 to 18, and he asserted that most current scholars would agree with him. Arnett outlined his reasons as follows: age 18 is the time when most young adolescents finish high school, leave home, and reach the legal age of adulthood. Arnett argued that adolescence is distinct from his concept of "emerging adulthood," which he specified as the ages between 18 and 26. Of note, there is an overlap in Arnett's theories—age 18 belongs both to the

adolescent and emerging adult category. Arnett (2007) also acknowledged that although his theory has gained general acceptance, there remains some resistance and criticisms.

**What is Emerging Adulthood?**

Arnett (2010) emphasized that emerging adulthood was different from adolescence on both a theoretical and practical basis. In industrialized societies, marriage and parenthood have generally been shifting to a later age, creating a unique period (for some) before these responsibilities are undertaken. Arnett outlined that emerging adulthood is characterized by freedom and challenges in education, love and work; openness and possibilities are crucial factors. The highlight of Arnett's definition is that emerging adulthood is a period of opportunity. There is also much demographic instability for many, including frequent moves and the pursuit of education. Arnett found that the transition can be subjective, with young people usually not declaring themselves adults until they *feel* self-sufficient. These feelings can be even more important than milestones such obtaining a job, moving out of their family's household, or parenting. The author reiterated that the transition between life periods is gradual, with the course of development individualized. Arnett also clarified that his concept was primary one that applies to industrialized cultures and is not universal.

In 2007, Arnett further refined his theory by proposing five components of early adulthood. He defined these as: "the age of identity explorations, the age of instability, the age of feeling in-between, and the age of possibilities" (p. 69). Of note, Arnett cited research that emerging adulthood tends to be marked with improved well-being, indicating "most people adapt successfully to its developmental challenges" (p. 71). He also indicated that as a group, young adults are generally highly optimistic about their future. However, Arnett acknowledged

that some struggle with the newfound freedoms and develop identity issues which can lead to anxiety and other mental health difficulties.

### Prevalence of Depression in Adolescents and Young Adults

Many adolescents and young adults experience depression at high rates as they cope with changing developmental roles. The Substance Abuse and Mental Health Services Administration (SAMHSA) conducted a yearly large national survey with data from over 67,000 individuals, and they found that depression rates are increasing in both adolescent and young adult populations (SAMHSA, 2015). Based on the most recent data from 2014, 11.4% of adolescents 12 to 17 had experienced at least one Major Depressive Episode (MDE) in the last year. This rate was about three times higher for girls than boys (17.3% vs 5.7%). Of all those with an MDE in the last year, most (58.8%) did not receive treatment and 8.2% had severe impairment. SAMHSA also found that depression increased steadily from ages 12 to 17. In 16 and 17 year olds, the year prevalence rate of an MDE was 14.6%, indicating the later high school years are of particular concern for depression prevention and intervention (SAMSHA, 2014).

When examining the same data from SAMSHA, depression generally improved in young adults 18 to 25. In 2014, the rate of young adults who had experienced a MDE in the last year was 9.3%. This was again sharply divided by gender: 6.9% for males and 11.6% for females. SAMSHA further examined the 18 to 25 age group with important results (Center for Behavioral Health Statistics and Quality, 2015). Young adults aged 18 and 19 have the highest rates of depression in the overall 18 to 25 group. The MDE prevalence rate for age 18 was 9.8% (13.1% for females and 6.9% for males). The MDE prevalence rate for age 19 was even higher at 10.7% (14.7% for females and 7.0% for males). The rates decline after age 20 and never reach those levels again.

Based on the SAMHSA data, other mental health indicators are also higher for ages 18 and 19 as compared to the 20 to 25 age range (Center for Behavioral Health Statistics and Quality, 2015). According to 2014 data, 7.5% of 18 to 25 year olds had suicidal thoughts in the last year. However, this rate rises to 9.2% for 18 year olds and 9.6% for 19 year olds. In addition, 2.3% of 18 to 25 year olds made a suicide plan in the last year. This rate rises to 3.5% for 18 year olds and 2.6% for 19 year olds. In terms of treatment, 53.9% of all young adults with serious mental illness received treatment. (Serious mental illness includes depression as well as other mental illnesses.) In comparison, 41.2% of 12 to 17 year olds received treatment for depression, so young adults received treatment at higher rates than adolescents. Still, this is significantly less than the 63.7% of adults aged 26 to 44 who received treatment for serious mental illness. Those above 45 have even higher treatment rates (77.9%). In summary, despite having higher rates of depression and suicidal thoughts, many adolescents and young adults go without treatment for depression and other serious mental illness, and these populations are vastly underserved when compared to other age groups.

Rohde, Lewinsohn, Klein, Seeley, and Gau (2013) conducted a unique data analysis examining depression in childhood, adolescence, emerging adulthood, and adulthood. Longitudinal data ($N = 816$) from the Oregon Adolescent Depression Project was used. Adolescence was defined as ages 13 to 17, while emerging adulthood was identified as ages 18 to 24. The overall rate of a first incidence of a major depressive disorder (MDD) episode is higher during the emerging adulthood years (24%) than it is in adolescence (19%). Given a childhood MDD episode, the reoccurrence rate in adolescence was 38%. Given an MDD episode in childhood or adolescence, the reoccurrence rate for emerging adults was 46%. In terms of gender, being female significantly predicted the first episode of major depressive disorder in all

four age categories. The average duration of a MDD episode was approximately 24 weeks in both adolescence and emerging adulthood. Adolescents with MDD had a suicide attempt rate of 19%, while this was lower at 8% for emerging adults. Rohde and colleagues suggested that future depression research focus on the crucial period of young adulthood to reduce both first occurrence and reoccurrence rates. The researchers suggested the development of prevention strategies to both lower the incidence rate and reduce the negative effects of depression.

Galambos, Barker, and Krahn (2006) found inconsistences in depression rates for young adults, with outcomes similar to the SAMHSA results. The authors reported that well-being generally increases during young adulthood, as defined by ages 18 to 25. The key indicators were the rise of self-esteem and the decrease in depression. However, further examination of the data reveals that depressive symptoms were highest and self-esteem lowest at ages 18 and 19. The results of the study highlighted that young adults aged 18 and 19, although defined age-wise as being emerging adults, have diminished psychological well-being as compared to adults age 20 to 25. This aligns with the findings from SAMHSA and suggests that there are specific concerns with this age group of 18 and 19 year olds as compared to both younger and older populations.

**Coping Strategies: Adapting to Changes**

Although examining larger data trends is important, some authors have emphasized that adolescents and young adults have great variation in how their depressive symptoms develop (Costello, Swendsen, Rose, & Dierker, 2008). There are many developmental pathways involved in this process, especially during these times of growth and transition. Schulenberg and Zarrett (2006) emphasized that emerging adulthood has more changes for young adults than any other transitional period.The researchers reported an interesting finding that depressive affect

decreases during emerging adulthood while the cases of MDD actually increase, making this a unique and sensitive period for mental health. The authors believe these inconsistencies are due to the complexity of this time period, with transitions and social transactions which are unique to individuals with differing results. Young adulthood is a time of stress which may test the coping capacity of some individuals, and all of the changes may trigger or continue a mismatch between a person and their environment, leading rise to pathology in some cases. Some young adults are going to struggle with their new roles while others are going to flourish. Schulenberg and Zarrett described mental health as a "moving target": if the systems all line up, a person can be well-adjusted, but if there is a mismatch, psychopathology can occur. Some individuals may only be able to adapt to some changes, but at some point, their abilities to cope and adapt may be overloaded, which can lead to depression. They may begin to over-rely on maladaptive coping methods, creating negative lifelong patterns (Schulenberg & Zarrett, 2006).

One important group who experiences major transition is adolescents moving from high school to college; this time may be a crucial period to build coping strategies. Conley, Kirsch, Dickson, and Bryant (2014) conducted a study with college freshmen measuring their psychological well-being and distress at three times over their first year in college. Time 1 was a week before college started, Time 2 was midway through the academic year, and Time 3 was at the end of the academic year. The authors found there was a significant decrease in psychological well-being from Time 1 to Time 2, but it plateaued to a lower level at Time 2. However, there was a significant increase in psychological distress (including depression) from Time 1 to Time 2 which continued through Time 3. The authors summarized that starting college can be a difficult and critical milestone in the transition to adulthood. The months before college starts or the first year of college seem to be an optimal time to intervene as psychological distress

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continually rises during this period, and does not recover to pre-college levels. The authors suggest we must do more to intervene during this period, including directly teaching young adults psychological and social skills. Prevention programs for those students making the transition could improve both mental health and academic outcomes. Focusing on stand-alone interventions like MoodGYM could be a good strategy; Gulliver, Griffiths, and Christensen (2010) explained that adolescents and young adults may prefer self-help because the transitions increase independence and self-reliance.

Masten et al. (2004) emphasized similar points in regards to intervening and building resiliency during the transition to adulthood. The authors proposed that there might be a small period of opportunity in which intervention is crucial. Carbonell, Reinherz, and Beardslee (2005) emphasized that people's ability to cope develops over time—as someone starts to become a young adult, they gain skills to evaluate a situation and decide how to successfully cope with it. As young adults develop as individuals and within relationships, they can create positive coping abilities which can carry them through difficult transitions. Young adults could also be directed away from maladaptive paths at the same time. Carbonell et al. emphasized the importance of these coping strategies by asserting that "people's eventual ability to begin adulthood in a well-adjusted and self-actualizing way depends in part on their coping and the resources available to them (p. 396)." Masten et al. suggested that more research be done in providing coping strategies and intervention to young adults. Based on their data, SAMSHA (2014) found adolescents who have experienced major depression are more likely to have poor school performance and delinquent behaviors. This can weaken their foundation to succeed as adults. SAMSHA also emphasized the importance of intervention during this transition period, identifying it as a serious and wide-reaching public health issue which requires attention.

**Depression in Rural America**

The research on depression prevalence in rural populations in the United States is sparse and at times inconclusive. In one of the largest reviews, Probst et al. (2006) examined data from more than 30,000 people, age 18 and over. The 12 month prevalence rate of depression in rural areas was 6.1%, which was significantly higher than that in urban areas (5.2%). However, Breslau, Marshall, Pincus, and Brown (2014) conducted a more recent analysis to determine if mental disorders were more common in urban as compared to rural areas of the United States. They examined data from 2009-2011 from more than 55,000 adolescents and 100,000 adults. The authors found that for adolescents, there was no association between living in a rural area and depression. For adult depression rates, it was found there no difference between large urban and rural areas. However, both small metropolitan and semi-rural areas had higher depression rates than both rural and urban areas.

Other researchers have found that rates of depressive symptoms are higher in rural areas than the national average (Curtis et al., 2011; Peden, Reed, & Rayens, 2005), and that adolescents living in rural areas report more depressive symptoms than those living in suburban areas (Heck et al., 2004). Curtis, Waters, and Brindis (2011) used the Center for Epidemiologic Studies Depression Scale (CES-D) to measure depressive symptoms in a sample of 663 adolescents living in rural California, with an age range of 13 to 17. Almost 40% of the rural sample reported experiencing significant depressive symptoms in the last seven days. While 17.5% of adolescents reported they felt they needed psychological counseling, only 10.7% had received mental health counseling in the last year. Peden et al. (2005) measured depressive symptoms with the CES-D in 320 adolescents from rural Kentucky and Iowa, ages 14 to 18. The authors found that 34% of their sample had a high level of depressive symptoms, with an average

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CES-D score of 14. In comparison, the National Longitudinal Study of Adolescent Health found that the average score on the CES-D was 12.2, with 29% of the sample ($N$ = 13,568) reporting depressive symptoms (Rushton, Forcier, & Schectman, 2002).

Rueter, Holm, Burzette, Kim, & Conger (2007) conducted a study focused on mental health of young rural adults, aged 19 to 23. The authors reviewed data from two large research projects and found that 24.3% of young adults had experienced a psychiatric disorder in the last year. About 4.2% had experienced an MDE, with that rate sharply divided by gender, with females at 6.5% and males at 1.5%. About half of those with an affective disorder had sought help from a mental health professional. Of note, the average age of onset of major depression was 17.4 for major depression, and this was similar for other disorders. The authors noted that mental illness may increase during this critical transition to adulthood, which may make the included changes and decisions even more difficult.

Fontanella et al. (2015) conducted a recent analysis comparing the rates of youth suicides between rural and urban areas. The authors used mortality data from 1996-2010 from young people age 10 to 24. The researchers reported an alarming disparity between rural and urban areas, with the rates of rural youth suicides double that of urban ones. This held true for both males and females. Of note, the differences between rural and urban suicides appear to be growing over time. In addition, SAMHSA recently released statistics on estimates of suicidal thoughts among young adults in the last year (Lipari, Hughes, & Williams, 2016). Young adults were defined as ages 18 to 25. Data was provided on both a national and state level. The national data from 2013-14 suggested that about 7.4% of the young adult population reported having suicidal thoughts in the last year. Of note, and because it is considered a largely rural state, Montana's estimate was significantly above that at 8.5%, which was the third highest in the

nation. Fontanella et al. suggested that the suicide rates are a significant public health issue which should be addressed. They proposed telemedicine and school-based interventions as possible ways to combat high rural suicide rates.

**Treatment in Rural Schools**

In regards to younger populations, approximately 9 million children live in rural areas, with almost 20% of public school children attending rural schools. In the state of Montana, approximately 75% of schools are rural, with 86% of those in rural school districts (Johnson & Strange, 2009). Large numbers of students attend rural schools, making them a logical target for mental health care, with school psychologists and counselors leading the charge. However, rural school psychologists usually have a higher student case load and more students in special education, resulting in more time spent on assessment and less time for other activities such as consultation and counseling (Beebe-Frankenberger, 2008). In their survey of rural school psychologists, Clopton and Knesting (2006) reported almost half (47%) had difficulty meeting the needs of students in their district. In providing counseling, multiple relationships in small towns are also a major concern among school psychologists. When schools cannot provide mental health services, turning to community services is the next step, but the majority of school psychologists (57%) reported that they "sometimes" or "frequently" lack referral sources for local child mental health services. Indeed, there is a serious shortage of mental health providers in the United States: 34.5% of all counties (not just rural counties) do not have a licensed psychologist on record (American Psychological Association, 2016). Even when there are mental health practitioners in small town, stigma and the lack of privacy can prevent people from seeking treatment (Rainer, 2010). In a survey of depression treatment of more than 4,000 rural children and adolescents from North Carolina, Angold et al. (2002) found that only 36% of the

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sample who had a diagnosis of depression received mental health care, and only 14.6% of those who received treatment visited a mental health specialist rather than a general practitioner. This indicates a lack of adequate, specialized care for rural children with depression.

<div align="center">**Computer-Based Treatment for Adolescent Depression and Anxiety**</div>

In order to fill the considerable gap between the need for treatment and access to treatment, some researchers have proposed using technology such as computer-based therapy to deliver treatment (Christensen, Reynolds, & Griffiths, 2011; Griffiths & Christensen, 2007; Nelson & Bui, 2012; Radunovich & Wiens, 2012; Rainer, 2010; Smalley & Warren, 2012; Velasquez, Banitt Duncan, & Nelson, 2012). Computer-based therapies are typically web-based and interactive, and they may or may not include therapist support. Psychological treatments for anxiety and depression are one of the most popular computer-based interventions (Velasquez et al., 2012). The most common type of these treatments is computerized cognitive behavior therapy (cCBT), which was created to deliver an evidence-based treatment for depression and anxiety in a more accessible format (Richards & Richardson, 2012). For children and adolescents with anxiety and depression, cognitive behavioral therapy has been described as the "treatment of choice" (Compton et al., 2004, p. 930). In a meta-analysis, Reinecke, Ryan, and DuBois (1998) found that CBT is effective in treating depression in adolescents both in the short and long term. Using a computerized CBT program may increase even treatment fidelity by providing a standardized way of administering an evidence-based treatment (Wright et al., 2005).

**cCBT for Adults**

More evidence for treatment of depression using cCBT is available for adults than for children. In meta-review, Foroushani, Schneider, and Assareh (2011) found general support for cCBT for depression, especially for certain programs, including MoodGYM. The authors also

found that cCBT for depression and anxiety is no less effective than similar in-person therapy. In another large meta-analysis, Richards and Richardson (2012) found an average pooled effect size of $d = .56$ across 19 studies, which included cCBT programs as well as other computerized therapies such as online self-help through websites. The researchers included both young adults and adults in their analysis, although the focus was on older adults. Richards and Richardson found the drop-out rates from treatments to be 57% across 40 studies. When there was no therapist or administrative support, the drop-out rates were higher (74%). The effect size for effectiveness was also lower for nonsupported programs ($d = .36$). Despite these differences, the authors concluded that the overall evidence for adults supports "the efficacy and effectiveness of computer-based psychological treatments for depression, in diverse settings and with diverse populations" (p. 329).

In another meta-analysis, Andrews et al. (2010) also reported positive findings for cCBT in treating anxiety and depression. The authors identified 22 studies which used control groups, and they found an effect size of $g = 0.88$ for cCBT, with positive results in both the short-term and the long-term. The researchers found adherence rates of 80% to the various programs, which was much higher than the rate reported by Richards and Richardson (2012). Andrews et al. reported that 10 of the studies measured satisfaction rates, with a median of 86% saying they were satisfied or very satisfied with the interventions. The authors ultimately concluded that cCBT is "an efficacious and acceptable treatment" (p. 4). Reasons given for acceptability by participants included the convenience of the programs, the privacy of the treatment, and being able to work at their own pace.

Renton et al. (2014) conducted an evaluation of online interventions for depression for adults. The most common method of treatment was cCBT. The authors identified 32 programs

for inclusion in their review, but only 12 studies had any published randomized controlled trials supporting them. However, the authors concluded that the research studies which have been completed have been "generally of strong quality with adequate samples sizes" (p. 18). The authors evaluated the programs on several criteria, including "accessibility, usability, tools, and support" (p. 3). The researchers reported that the quality of the interventions varied considerably and recommended more research studies be conducted to continue to build an evidence base for these types of computerized treatments. The researchers did not report on effectiveness or acceptability of the programs. Renton et al. recommended that future studies focus on increasing the accessibility of the programs, including removing registration barriers like fees or required referrals.

**cCBT for Rural Populations**

Vallury, Jones, and Oosterbroek (2015) conducted a meta-analysis on cCBT for rural populations, including children, adolescents and adults. The authors included 11 studies in their paper, nine of which were from Australia and two from Scotland. The overall results were that cCBT had equal effectiveness for rural and urban populations. In terms of adherence, results were mixed, with rural location predicting higher adherence to the interventions in some studies, and lower adherence in other studies. One key finding was that cCBT had more acceptability among rural versus urban participants. The authors found evidence that this may be because cCBT addressed concerns about privacy and stigma, which have been found to be important to rural residents. Another reason might be the lack of alternative resources in rural communities as opposed to options available in urban areas.

**cCBT for University Students**

  Davies, Morriss, and Glazebrook (2014) conducted a meta-analysis on computer and internet interventions designed to treat depression and anxiety in university students. The interventions included cCBT. The authors analyzed information from 17 studies, all of which were randomized controlled trials. Nine interventions were cCBT. The studies were conducted in different environments, with six groups of participants picking their own location (home, school, etc.). The mean age of the participants was approximately 22, which indicates that many of these students were near the end of their college career. The researchers analyzed the studies by their design; they separately examined groups with active controls, inactive controls, and alternate interventions. The results were mixed, with the best results found for inactive controls. In comparison, depressive and anxiety symptoms generally improved in these trials; however, that was not the case for studies with active controls or comparison interventions. Only a few studies calculated clinically significant change, and it was present in participants when compared to control groups. Like with adults, the researchers concluded that computerized interventions can alleviate symptoms of depression and anxiety under some conditions, which makes this type of treatment promising for university students. This is particularly true for cCBT, which was included in 13 of the 17 studies for this meta-analysis.

  In the same analysis, Davies et al. (2014) included important information on adherence and acceptability of the interventions to university students. Twelve of the studies provided drop-out rates, which ranged widely from 7.2% to 44.2%. Five studies included information on why students had dropped out. These included "personal time constraints, personal reasons, participants felt better after receiving some intervention modules, and participant requested face-to-face therapy instead" (p. 6). Eight of the included studies also examined acceptability and

satisfaction of the various interventions. Subjects indicated that programs were generally

"usable, satisfactory, credible, and found to be moderately-to-highly useful and helpful" (p. 8).

Thus, cCBT for university students was found to be effective when compared to inactive controls

and generally acceptable. Dropout rates varied considerably, but they were lower than rates of up

to 80% reported in other studies (i.e. Christensen, Griffiths, & Korten, 2002).

**cCBT for Children, Adolescents, and Young Adults**

There is growing evidence that computerized cognitive behavior therapy (cCBT) for

depression and anxiety is effective for children, adolescents, and young adults, although research

of a higher quality is needed (Richardson, Stallard, & Velleman, 2010; Rickwood & Bradford,

2012; Sethi et al., 2010; Spence et al., 2011). Richardson et al. (2010) conducted a meta-analysis

on cCBT programs designed to prevent and treat depression and anxiety in children and

adolescents. The authors identified 10 different studies which used six programs, including

MoodGYM. There was a focus on participants under the age of 18, although subjects ranged

from age 7 to 25. The results were promising—all studies showed that participants had

significant improvements in depression and/or anxiety and other outcomes such as self-esteem.

The authors reported that from between 30% and 78% of participants in the studies no longer

met diagnostic criteria for depression and/or anxiety. However, adherence was often low, with

approximately 33% to 70% of participants completing all sessions of the programs. There was

limited evidence on symptoms at follow-up, but the evidence of improvement was generally

promising. Ultimately, Richardson et al. concluded in 2010 that there was too little evidence at

that time to "draw any substantive conclusions about the effectiveness of cCBT for the treatment

of prevention of anxiety or depression in children in adolescents" (p. 286).

In 2015, Pennant et al. conducted a similar, updated meta-analysis with more substantive and positive results. The authors took a broader approach than Richardson et al. (2010) and included online interventions for anxiety and depression which were not cCBT, rather using problem-solving therapy and interpersonal psychotherapy. The age range included children and "young people" up to age 25. Pennant et al. included 27 studies in their review; 14 of these were cCBT, covering 10 different programs. Seven of the studies focused on participants with elevated depression scores, and the cCBT interventions improved their self-rated scores in comparison to control groups. In conclusion, the authors found that both anxiety and depression "improved with medium effect sizes in mild to moderately anxious or depressed populations" (p. 12). The authors also found smaller effect sizes for more general populations in the studies. This was only for the cCBT programs—there was little evidence of effectiveness in the other computerized interventions.

Ebert et al. (2015) conducted a recent meta-analysis on computerized treatments in youth, this time focusing on only cCBT studies which were randomized controlled trials. The participants were defined as "youth" from age 6 to 25, and they had to have elevated symptoms of anxiety or depression. The authors included 13 studies which were focused at treating depression, anxiety, or both. Two studies were conducted in the United States, for the programs "Camp-Cope-A-Lot" and "Blues Blaster," but both of these were designed for children under the age of 15. The rest of the studies were conducted in Australia, New Zealand, Sweden, the United Kingdom, and the Netherlands. Ebert et al. reported overall effect sizes for outcome measurements: overall anxiety and depression ($g = 0.72$); anxiety ($g = 0.68$) and depression ($g = 0.76$), and interventions targeting both anxiety and depression ($g = 0.94$). When studies with samples above age 18 were removed, the overall effect size for anxiety and depression dropped

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to .61, suggesting the cCBT interventions may be more effective for young adult populations. Overall, the authors concluded that "cCBT for youth was associated with significant and moderate to large effects for the symptoms of anxiety and depression" (p. 10). Based the increased evidence base, Ebert et al. presented as more confident in their findings than authors of previous meta-analyses.

**Computerized Programs for Depression for Older Adolescents**

Several cCBT programs for older adolescents and young adults have specifically targeted depression. SPARX (Smart, Positive, Active, Realistic, X-factor thoughts) was designed for adolescents aged 12 to 19 who are seeking help for depression (Merry et al., 2012). SPARX is a fantasy game with seven modules which are delivered in a timeframe of four to seven weeks. The program is on CD-ROM and is not freely available on the internet. The user selects an avatar and advances through a series of challenges designed to teach CBT principles. The authors conducted a randomized, controlled study in New Zealand with a SPARX treatment group ($n = 94$) and a treatment-as-usual control group ($n = 93$). Some participants completed SPARX at home, while others completed it in a clinic. There was minimal contact with a therapist after recruitment, with adolescents only receiving one short phone call a month after starting the intervention. Depression was measured with the Children's Depression Rating Scale-Revised (CDRS-R), which is a self-report measure that has been used widely to assess depression in adolescents. For the CDRS-R raw scores, the authors found that there was a significant reduction of 10.32 points in the treatment group and a 7.59 reduction in the treatment-as-usual group at post-intervention. The authors concluded that SPARX was as effective as treatment-as-usual at reducing depression and anxiety symptoms, with positive effects still present at a 3-month

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follow-up. The authors suggested that SPARX could be easier and less costly than treatment-as-usual for adolescents, which was primarily in-person therapy in this study.

Master Your Mood (Gerrits, van der Zanden, Visscher, & Conijn, 2007) is a group online chat program which is designed to prevent depressive symptoms in adolescents age 16 to 25. The program is based on Lewinsohn's *Coping with Depression* course, which is an effective group treatment for preventing depression in adolescents (Cuijpers, 1998). Master Your Mood has 10 chat sessions, during which material from the lessons appeared on the right side of the screen, while the participants and therapist provided comments and chatted on the left side of the screen. Participants were assigned homework, and the therapists provided reminders through text messages and emails. The authors conducted a pilot study in the Netherlands, where the program is named "Grip op je dip online." Fifty participants (out of 140) completed seven or more sessions, and after the intervention, these participants had lower scores on the CES-D. The mean initial score for this group was 32.6, while the mean score at the end of the course was 18.7. Although these results are promising, they should be interpreted with caution as there was no control group in this study.

A larger study was conducted in 2012 with 244 participants, who were again 16 to 25 years old (van der Zanden, Kramer, & Gerrits, 2012). There was a waitlist control group and the authors found that the intervention group showed a reduction in depressive and anxiety symptoms at three months. The majority of the intervention group also showed reliable and clinically significant change, suggesting Master Your Mood is a promising online treatment for young people for both depression and anxiety. Master Your Mood has a website (http://www.gripopjedip.nl/nl/Home/) which offers more information on depression and the program. The webpage and program are in Dutch. The webpage states that the program is free,

and adolescents can be put on a waitlist for the intervention. Master Your Mood is one of the only free and readily accessible cCBT treatments for adolescents, although it is not available in English.

Project CATCH-IT (Competent Adulthood Transition with Cognitive-Behavioral and Interpersonal Training) is an online intervention with 14 modules (Van Voorhees et al., 2009). It is based on "behavioral activation, cognitive behavioral therapy, interpersonal psychotherapy, and community resiliency concept model" (p. 25). It is designed as a preventive intervention for adolescents age 14 to 21 with subthreshold depression. The researchers conducted a randomized, clinical study in primary care settings in the South and Midwest United States with physicians helping to administer the program. Two groups both completed CATCH-IT, but their pre-intervention interactions with their physician varied. Before completing the intervention, one group ($n = 40$) received brief advice for one to two minutes (BA group), while the other group ($n = 43$) received a motivational interview for five to 10 minutes (MI group). These interactions were designed to increase motivation to complete CATCH-IT. The MI group also received three "motivational phone calls" (p. 25) from a social worker throughout the intervention. The BA group did not receive any additional support. The researchers did not include another control group because the study was focused on identifying which interview format was better for engaging adolescents. Participants were also paid $75 to $100 for completing the study, which may have created additional motivation to complete the intervention. The authors found that CES-D scores, thoughts of self-harm, and hopelessness were reduced from pre-intervention to 6 weeks and pre-intervention to 12 weeks for participants.

For the above study, Gladstone et al. (2014) provided more information on how participants interacted with CATCH-IT. This is of note because this type of adherence data is

rare in the literature. The authors included precise measurements including total time spent on the website, total time spent reading the stories, and total number of days using the website. The authors relied on timestamps rather than self-report, increasing the reliability of their data. The researchers also measured the number of modules completed, and they defined a completed module—at least one exercise or survey had to be finished. In addition, the authors measured the number of log-ins into CATCH-IT and the percentage of exercises completed.  The number of characters entered into each exercise was also calculated. The authors found that only one adherence measurement—duration of time spent on website—predicted lower CES-D scores. The study by Gladstone et al. analyzed their program usage more precisely than any other reviewed study.

Although Van Voorhees et al. (2009) stated that a version of CATCH-IT is available for free for the general public, the URL given in the article did not work (http://catchit-public.bsd.uchicago.edu), and the author's attempts to find the CATCH-IT online through Google were not successful. However, studies are continuing with CATCH-IT in Chicago and Boston with  5-year, randomized clinical trials (Wellesley Centers for Women, 2013). The studies are multi-million dollar ones, sponsored by the National Institute of Mental Health and the Centers for Disease Control, among other groups (Trice, 2012). An adaption of CATCH-IT called CURB (Chicago Urban Resiliency Building) has been developed for African-American and Hispanic adolescents living in "tougher, more violent Chicago neighborhoods" (Trice, 2012, para. 19). CURB has also been "culturally and ethnically adapted with a hip-hop vibe" (Trice, 2012, para. 19). Although CATCH-IT does not appear to be publically available at present, large studies are currently under way which may lead to the wider dissemination of the program if it is effective. Because many adolescents are treated for depression by a general practitioner, a

program like CATCH-IT could have great use in a rural community; an interview of only a few minutes by a physician could motivate adolescents to complete an effective depression prevention program.

Carrasco (2016) conducted a recent study focusing on the acceptability of a newly developed video game designed to alleviate depressive symptoms in adolescent females. This was a small, pilot study with 15 girls, with an age range of 12 to 18 years old. Five psychotherapists in Chile, working in either private practice or with public health organizations, agreed to participate in recruitment for the study. All participants were chosen by their psychotherapists and were exhibiting mild to moderate depressive symptoms. Parents had to provide consent for minor participation. The game was called *Maya* and it was designed by psychotherapists and based on CBT and interpersonal therapy. The game was based on a story and players had to use reasoning to make decisions to move forward in the narrative. Informational text and feedback were also provided to users. Participants could use the program as many times as they wanted, but most only used it once, with four participants using it twice. The average play time was approximately 12 minutes. No effectiveness data was provided, as the study was focused on acceptability. The researchers developed a short acceptability Likert scale in addition to conducting interviews. The authors concluded that most participants generally accepted the intervention, but four patients did not find the game helpful as part of their overall treatment for depression. Carrasco (2016) suggested that although this was a simple game, the results of the study indicated that video games and other novel media may be a viable method to treat depression.

Manicavasagar et al. (2014) conducted a study with an online positive psychology program designed for adolescents. Although the intervention was not based on cCBT, outcome

measurements focused on depression and some of the recruitment was done in schools, making the research relevant to the current study. The study included participants aged 12 to 18 years old ($N = 235$) and parent consent was obtained for students under age 16. Recruitment was done both through schools and youth mental health centers in Australia. The researchers emailed and/or mailed information packet that explained the study to organizations, principals, or school counselors. Schools and organizations were asked to distribute flyers or promote the study in other ways such as placing a notice on an organization website. The positive psychology program was called *Bite Back* and it was an open access website with information, exercises, and links. There were also features for online comments and discussion boards. There were two groups in the study: one who used Bite Back ($n = 120$) and a control group ($n = 115$). The control group used other mostly entertainment websites which were designed similarly to Bite Back but did not include positive psychology content. Participants in both conditions used the websites for six weeks.

In the above study, Manicavasagar et al. (2014) used depression as an outcome variable by administering the DASS-21 both pre- and post-intervention. There were significant reductions in depressive symptoms for the entire intervention group. However, researchers further divided the intervention group by usage, identifying a high usage group who "visited the website for 30 minutes or more during each week of the intervention period or three times or more during each week of the intervention" (p. 13). These users had even more benefit from the program, while those participants who used the program less did not have significant improvement in depression symptoms. More specific adherence data (i.e. number of exercises completed or average time using the program) were not provided. Retention was 58% after six weeks for the intervention group, with 42% completing the post-questionnaires. The researchers also measured

acceptability of the program and generally found it to be high. The authors found through qualitative analysis that adolescents "generally enjoyed Bite Back and found it interesting and easy to use" (p. 13). The results of the study by Manicavasagar et al. (2014) suggested that other online interventions not based on cCBT may be engaging and effective at improving depressive symptoms in adolescents. Of note, Bite Back is an online open access program which is free to use.

Rice et al. (2016) conducted a study using another online intervention with a positive psychology approach. The study included participants aged 15 to 24 ($N = 42$) who were either in partial or full remission from depression. The program was focused on both preventing depression and decreasing relapse. Recruitment was completed through three youth mental health clinics in Australia and parental consent was obtained for those under age 18. The program was called *Rebound* and was based on principles of positive psychology and mindfulness, while taking a strengths-based approach. The program included online social networking between participants, psychosocial interventions, and moderation by both peers and clinicians. There was no control group. Attrition was low, with almost 93% of participants completing follow-up data. The authors measured acceptability and approximately 84% of participants rated Rebound as helpful. Usage was described as high, with approximately 72 logins and 51 social networking posts per person. The study was not focused on the effectiveness of the intervention; however, the authors found that the number of participants in full remission from depression significantly increased after the intervention. In addition, the five participants who were in full remission from depression remained in full remission at the 12 week follow-up. The study by Rice et al. provided recent research supporting that computerized interventions can

be acceptable to adolescents, and they may also be effective at preventing depression and limiting relapse.

**School-Based cCBT Studies**

Attwood, Meadows, Stallard, and Richardson (2012) conducted a small study on cCBT for depression and anxiety in adolescents age 10 to 16. The study is of note because of its school-based recruitment and intervention. The school identified students who were having "emotional health problems," and the school nurse obtained child and parent consent for participation in the study. The school did not keep track of how many students were asked to be in the study or the attrition rates. The cCBT program was called "Think, Feel, Do," and it consisted of six, 45-minute sessions and was implemented by the school nurse in a one-to-one setting. The program was designed to be implemented with the help of any professional, who did not need a background in mental health. It was unclear though how much guidance and assistance was provided by the school nurses in completing the program. Results demonstrated that there were significant reductions in depressive and anxiety symptoms after the intervention. The authors reported that satisfaction with Think, Feel, Do was moderate to high, with most participants indicating they enjoyed it and would tell a friend about it. Although this was a small study, the findings suggest that professionals like school nurses can successfully recruit and obtain consent for adolescents to complete a cCBT intervention in a school setting.

Stasiak, Hatcher, Frampton, and Merry (2014) conducted a pilot and feasibility study investigating cCBT for depression in eight high schools in New Zealand. The study is of note because adolescents with depressive symptoms self-referred to school counselors, who screened and monitored the students while they completed the intervention at school. Students needed elevated depression scores as indicated on self-report to participate. The age range was 13 to 18,

with the mean age being approximately 15. The researchers used an intervention called "The Journey," which is based on cCBT and uses a "fantasy game-like environment" (p. 388). There are seven modules which are about 25 to 30 minutes each. The study was a randomized, controlled trial, with the control group receiving a matched computerized psycho-educational program. Participants were given four to six weeks to complete the seven modules of The Journey. The outcome measures were depressive symptoms, including self-report and the results of an administration of a semi-structured interview by school counselors. The researchers found that there were more reductions in depressive symptoms in the intervention versus control group.

In the previous study, Stasiak et al. (2014) were also investigating the feasibility of school counselors being able to screen and gain consent from students. The counselors screened 50 participants and 9 did not provide consent to be in the study. In New Zealand, adolescents can give consent to be in a research study if they are 16 years or older. In some cases, students under age 16 did not participate in the study because of a lack of parent consent, but it was unclear how many times that happened. Adherence rates were high (94%), with all but one student completing the entire program. In regards to acceptability, about 90% of participants reported that they liked The Journey or that it was okay, and 90% would recommend it to others. Stasiak et al. concluded, based on the results of this pilot study, that school counselors could effectively administer a cCBT intervention in a school setting, with students experiencing a significant reduction in depressive symptoms and being generally accepting of the program. This cCBT study is significant as it is one of the only conducted with adolescents in a school setting.

### MoodGYM Computer-Based Intervention

MoodGYM (https://moodgym.anu.edu.au/moodgym) is one of the most highly supported computerized CBT interventions for adolescents with anxiety and depressive symptoms, with

several studies examining the effects of the program in high schools (Calear, Christensen, Mackinnon, & Griffiths, 2013; Calear et al., 2009; Lillevoll et al., 2014; O'Kearney et al., 2006, 2009; Vangberg, Lillevoll, Waterloo, & Eisemann, 2012). MoodGYM is a free and interactive tool created by the Australian National University Centre for Mental Health Research. It is recommended for ages 16 and over. MoodGYM is designed to prevent depression and teach coping skills rather than to treat individuals who have clinical levels of depression (Australian National University, 2013). The program teaches key components of CBT for depression in five modules: *Feelings*, *Thoughts*, *Unwarping*, *De-stressing*, and *Relationships*. Each module contains exercises to be completed during the module, homework exercises to be completed during the week, and a workbook which records progress throughout the program. The modules are designed to be completed in order, with each module estimated to take 30 to 45 minutes to complete (Christensen, Griffiths, Korten, Brittliffe, & Groves, 2004). There are 28 exercises and 13 quizzes in total.

MoodGYM includes several key components of CBT as specifically adapted for adolescents in the research literature. Wilkes (1994) emphasized helping adolescents identify and explore negative thoughts, with homework exercises to test the accuracy of thoughts. The *Thoughts* and *Unwarping* modules of MoodGYM are focused on these tasks. Wilkes also suggested including examples to illustrate concepts, which MoodGYM does through its inclusion of characters. Weisz and Kazdin (2010) recommended that adolescents be taught to schedule pleasant activities to boost mood, and MoodGYM includes activity scheduling in both the *Unwarping* and *Destressing* modules. Weisz and Kazdin also advised teaching adolescents problem-solving and how to deal with stress, which are also components of the *Destressing* and *Relationships* modules of MoodGYM.

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According to the clinician's manual, MoodGYM was designed to prevent depression, but website statistics indicate that users on average have elevated anxiety symptoms as compared to the general population (Christensen et al., 2004). Some studies have found some reduction in anxiety symptoms in adolescents after using MoodGYM (Calear et al., 2009; Sethi et al., 2010). CBT for anxiety and depression includes many overlapping components, such as a focus on identifying thoughts, learning how to regulate thoughts and feelings, and relaxation techniques (Merrell, 2008).  However, the tripartite model (Clark & Watson, 1991) identified physiological symptoms as a unique part of anxiety. While MoodGYM includes a relaxation component in Module 4, it does not specifically tie the exercises to the reduction of anxiety symptoms. The clinician's manual does not offer information on which modules were designed for depression and which were designed for anxiety (Christensen et al., 2004). Although MoodGYM was not specifically designed to treat anxiety, it may be a useful treatment for anxiety symptoms, which commonly co-occur with depressive symptoms.

**MoodGYM Measures**

**Goldberg Depression and Anxiety Scales.** MoodGYM includes the Goldberg Depression and Anxiety Scales (Goldberg, Bridges, Duncan-Jones, & Grayson, 1988), which were developed to be used by general practitioners to assess the severity of anxiety and depression symptoms in the last month. Users complete these assessments as a pre-test, then again at the beginning of the each module, and at the end of the program as a post-test. The assessments must be completed before the user can continue so progress can be measured throughout treatment. Total scores for both anxiety and depression range from 0 to 9. The test was normed with data from a community sample of 7,500 adults in Australia ranging in age from 20 to 64 (Christensen, Griffiths, & Groves, 2004; Jorm, Dear, Rodgers, & Christensen, 2003).

Norms are provided, and they are based both on gender and age, with statistics given only for ages 20, 40, and 60. There were no adolescents included in the norming sample. After the assessment, MoodGYM provides tailored and automatic feedback and places the user in one of four ranges for depression and anxiety: low, middle, middle to high, and high to very high. Those with high to very high depression or anxiety are advised to seek professional help if they find their symptoms overly distressing.

**"Warpy Thoughts Quiz**." The "Warpy Thoughts Quiz" (Parslow, Christensen, Griffiths, & Groves, 2006) is another key assessment in MoodGYM. There 42 items which address seven areas of dysfunctional thinking (Christensen et al., 2004). These are termed the areas of vulnerability and include the need for approval, the need to be loved, the need to succeed, the need to be perfect, the sense of feeling deserving, the sense of being able to influence all things, and the sense that happiness is contingent on external things. The Warpy Thoughts Quiz is completed as a pre-test before Module 1, again in Module 2, and finally as a post-test at the end of MoodGYM. After the initial assessment, the user receives a "total vulnerability profile," (Christensen et al., 2004, p. 47) with a percentage for each of the seven areas. This feedback is individualized for each user and provides idiographic information on strengths and weaknesses. Although norms with means and standard deviations are available for each area, the percentages given to each user cannot be compared to that of other users. The norms are based on 153 users, age 22 to 32 years, with no adolescents included in the sample.

Completion of Goldberg scales and the Warpy Thoughts Quiz is required for a user to progress through the modules, and the results of these assessments guide work in later modules. The rest of the exercises are optional, meaning a user can advance to the next page without filling in any text in the blank spaces. MoodGYM is designed to target dysfunctional thoughts,

with the goal of reducing emotional distress, and each module targets different components of CBT. There is also a behavioral component weaved into later modules which includes relaxation training, problem-solving, and activity scheduling (Christensen et al., 2004).

**MoodGYM Module Descriptions**

  **Module 1.** The first module, *Feelings*, introduces the basic tenets of CBT by emphasizing the connection between events, thoughts, feelings, and behaviors. Users are introduced to six characters that have unique thought patterns and feelings, some of them adaptive and some of them maladaptive. Participants identify negative thoughts in the characters through several interactive exercises. Other exercises ask users to think of personal examples, including taking a quiz on the automatic thoughts (i.e. "things always go wrong for me") they have experienced in the last two weeks. Another exercise requires participants to think of the last time they were very upset, and then identify the triggering events and resulting cognitions. Participants are given a homework assignment for the next week to write down three events that were associated with positive or negative feelings, and then to identify the cognitions, emotions and behaviors associated with that event.

  **Module 2.** The second module, *Thoughts,* focuses on identifying thinking errors, which the program labels as "warpy thinking" or "warped thoughts." Users learn ways to challenge these distorted thoughts by examining the reasons behind their thinking (Christensen et al., 2004). In addition, MoodGYM includes components of pleasant activity scheduling in the "self-esteem" section of this module. As homework, participants are told to spend 10 minutes every day in the next week doing something they enjoy, such as riding a bike, going to the gym, answering emails, and going to the movies. MoodGYM also recommends spending "5 minutes

every day being as nice to yourself as you would to a friend who has problems with their self-esteem."

**Module 3.** The third module, *Unwarping*, contains 10 exercises, the most of any module. Exercises are focused on learning ways to attack distorted thinking and build self-esteem. This module also offers strategies on how to address the areas of vulnerability identified by the Warpy Thoughts Quiz. There are numerous pages to read, but users are advised to read the ones that most apply to them. The module ends with a 318 item Pleasant Event schedule in which users rank how many times they have done an activity in the last month, and how much they enjoyed it. Users are then encouraged to incorporate the activities they enjoy into their life.

**Module 4.** The fourth module, *Destressing*, is focused on identifying sources of stress, including conflicts with parents, and learning how to cope with them. There is a "Life Whacks" exercise. Life whacks are major events that happen which are stressful, such as being in a car accident or having a family member die. Users indicate if the event ever happened to them, and how distressing it was. There are health questions on pregnancy and abortion for women. There is also the "Mum and Dad Quiz" with questions measuring relationships with parents. Users rate if their mother and/or father were verbally or physically abusive towards them. After taking the quiz, the user is given scores for the indifference, over-controlling, and abuse scales. The Mum and Dad Quiz was developed by researchers in Sydney (Paker et al., 1997).

The fourth module also focuses on relaxation and includes a page on "What Happens to Your Body During Stress," and there is an animation of a man's heart beating rapidly, with him sweating. MoodGYM does not discuss any other possible physiological responses to stress. Links to three relaxation exercises with audio tracks are given at the end of the module; these include progression relaxation, guided imagery, and "mediation by musical composition." The

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program warns that those with high levels of anxiety and depression may be distressed rather than calmed by the exercises. Participants are not prompted to rate their mental or physical levels of distress before or after the exercises, and the program does not describe a direct connection between relaxation exercises and decreased physiological arousal.

**Module 5.** The fifth module, *Relationships*, addresses typical emotional and behavioral responses to relationship breakups and provides more ways of contesting the related distorted thoughts. The module also provides a simple model of problem-solving and works through an example problem with one of the characters. This is the shortest module, with only one exercise to complete.

## MoodGYM Research Studies

**Adolescents.** In a study with MoodGYM and adolescent boys ($N = 78$), O'Kearney et al. (2006) focused on the reduction of depression and did not measure anxiety symptoms. The authors assessed depressive symptoms in the last week using the CES-D, which was administered at pre-intervention, post-intervention, and at follow-up 16 weeks later. The sample was from a nonclinical population, and the boys (ages 15-16) were all from a single, private school in Australia. The researchers included both an intervention ($n = 40$) and a control group ($n = 38$), but assignment to the groups was not random because teachers had to agree to supervise the use of MoodGYM in the classroom. Based on this, a school coordinator chose three groups to complete MoodGYM and three groups to participate in their normal curriculum. The intervention group completed MoodGYM during their "tutor groups period", a 45-minute block which normally focused on "personal development activities" (p. 46). Classroom teachers supervised the sessions, but did not answer questions about the content of MoodGYM or

depression.  The intervention group was instructed to complete the five modules of MoodGYM over five weeks while the control group attended the tutor group as usual.

The results did not show any significant differences between the mean CES-D scores of the intervention and control group either at post-intervention or follow-up (O'Kearney et al., 2006). However, adherence rates were low, with only 40% of the boys completing three or more modules of MoodGYM. For those who did complete three or more modules, a moderate effect size ($d = 0.34$) was found in depressive symptoms immediately after completion of MoodGYM; although these results were not sustained over time. O'Kearney et al. (2006) suggested that it would be most cost-effective to target adolescents who have high depressive symptoms rather than administering MoodGYM to an entire school population.

O'Kearney et al. (2009) conducted another study using MoodGYM with 157 adolescent girls aged 15 to 16 in a single-sex school. The researchers also measured depressive symptoms with the CES-D at pre-intervention, post-intervention, and at a 20-week follow-up. The authors used a controlled design based on the school's personal development classes. That is, the first three classes to finish their regular curriculum received the intervention, while the other classes served as the control group. The intervention group ($n = 67$) was instructed to complete MoodGYM over six weeks in the classroom, while the control group ($n = 90$) attended the personal development class as usual. The intervention group was supervised by teachers. Immediately following the intervention, the researchers found no significant differences between the intervention and control groups on depressive symptoms. However, at the 20-week follow-up, the authors reported a moderate effect ($d = 0.46$) favoring the intervention group. The effect was found to be the stronger for girls who started the program with clinically high CES-D scores ($d = 0.92$). Adherence rates were again low, with only 30% of the girls completing three or more

modules. The authors found that improvements in depressive symptoms were not related to the number of modules completed, thus suggesting a low treatment dosage of MoodGYM may still be effective. The researchers also found that girls who completed less than three modules had significantly higher levels of depression pre-intervention than those who completed three modules or more, suggesting that it may be difficult for those with high levels of depression to complete MoodGYM. O'Kearney et al. suggested that low adherence might be due to the length of MoodGYM or the group administration format of the study, and a shorter intervention administered at home may create higher adherence rates.

Calear et al. (2009) conducted a randomized, wait-list controlled study with 1,477 girls and boys from 30 schools across Australia. Participants ranged in age from 12 to 17 at the start of the study. Researchers measured depressive symptoms with the CES-D, but they also measured anxiety with the Revised Children's Manifest Anxiety Scale (RCMAS). Students completed the assessments one week before the intervention, post-intervention, and at a 6-month follow-up. The authors reported that the sampling process was stratified, with schools being identified as public or private and then as metropolitan and rural. After this classification, schools were then randomly assigned to the intervention group ($n = 563$) or the wait-list control group ($n = 914$). The intervention lasted for five weeks, with students instructed to complete one module of MoodGYM per week. The program was classroom-based, with teachers supervising the children and answering questions as needed. The teachers received a manual with instructions, but were not required to attend any training.

Calear et al. (2009) found that the participants in the intervention condition showed a significant reduction on anxiety scores on the RCMAS at both post-intervention and the 6-month follow-up. The effect sizes for reduction in anxiety symptoms ranged from small to moderate (*d*

= 0.15 to 0.25). For depression symptoms, only males demonstrated a significant reduction immediately after the intervention; scores on the CES-D symptoms were 2.64 points lower than the control group ($d = 0.43$). Likewise, the authors found a significant difference in depressive symptoms for males at the 6-month follow-up. This represented a mean reduction of 2.15 points lower on the CED-S ($d = 0.31$) when compared to the control group. Females did not have any significant reductions in depressive symptoms at either post-intervention or follow-up. Calear et al. reported 33% of all participants completed all 5 modules of MoodGYM, while 62% completed 3 or more modules. The authors reported that mean of 3.16 modules were completed ($SD = 1.68$).

In addition, Calear et al. (2013) also analyzed adherence based on the number of exercises completed in MoodGYM for the sample described above. High adherence in this study was described as completing 20 out of 29 MoodGYM exercises, and only 15% of the sample was in the high adherence group. Those with low adherence (85%) completed less than 20 exercises. The authors analyzed outcomes based on the level of adherence: those in the high adherence group had larger intervention effects for anxiety at both post-test and follow-up. For depression, both boys and girls in the high adherence group demonstrated higher intervention effects at post-test and follow-up when compared to the low adherence group. While girls did not have significant intervention effects for depression when the entire sample was considered, those who completed more exercises generally showed more benefit from MoodGYM. In addition, those students with higher levels of depression before the intervention completed more exercises on average, and the authors suggested that may be because MoodGYM was more relevant to them. Of note, the researchers reported that those students from rural schools were more likely to complete MoodGYM exercises, and on average they completed 1.79 more exercises than those

from urban schools. The researchers suggested that higher adherence rates may be because of a lack of mental health resources in rural areas or "a preference for self-help programs" (p. 243) in this population. In conclusion, the authors suggested targeting use of MoodGYM to those groups who may have the highest adherence rate to maximize benefit from the program.

Neil et al. (2009) compared adherence rates from the above school-based study with adherence rates from a sample of community adolescent users ($N = 7,207$) who accessed MoodGYM spontaneously. In the community sample, adolescent users were age 19 or younger, and almost 20% reported being from a rural area. School-based users completed significantly more modules than the community based group: 89% of community users did not complete a single module. School-based users completed significantly more exercises ($M = 9.4$, $SD = 6.84$) than the community users ($M = 3.1$, $SD = 3.85$). However, the authors found that if community users completed at least two modules, they were as likely to complete the same amount of exercises as the school-based sample. Thus, strategies to get community users engaged are important in the effectiveness of MoodGYM. The authors concluded that having a supervised setting with monitoring can result in higher adherence and engagement with MoodGYM. The researchers also suggested that decreasing the amount of material in MoodGYM could boost adherence. Having higher scores on the Goldberg Depression Scale pre-intervention predicted higher adherence for the community sample. A targeted intervention for users with high depressive symptoms could have strong intervention effects.

Lillevoll, Vangberg, Griffiths, Waterloo, and Eisemann (2014) conducted a randomized, controlled study using MoodGYM in four Norwegian high schools. The study was a feasibility one examining in-school recruitment of participants, who then completed MoodGYM on their own time. The selection of the schools was not random, with administrators volunteering to

participate. Researchers made presentations on mental health to students along with information on MoodGYM and the study. Students could then consent to take an initial survey, with the option to also participate in a trial of MoodGYM. There were drawings for iPods as incentives to participate. Students were between ages 15 to 20. Of note, in Norway, adolescents aged 16 to 18 can give consent to participate in research. Individuals under age 16 require parent consent, but the law also states that if students want to participate without notifying their parents, this should be respected. Some students in the study were going to turn 16 within the school year, and the researchers explained that no parent consent would be requested because this could present an obstacle to participation.

In the above study, Lillevoll et al. (2014) conducted a large baseline survey with 1,337 students. Outcome measurements included the Norwegian versions of the CES-D, the General Self-Efficacy Scale (GSE), and the Rosenberg Self-Esteem Scale (RSES). Approximately 53% of those taking the baseline survey opted to complete a MoodGYM trial, and those students had higher depressive scores on average. Subjects were asked to complete MoodGYM on their own time, which differed from previous studies with high school students, who completed the program in school. The researchers were examining the efficacy of MoodGYM as well the effect of weekly reminders on usage of the program. There were standard reminders, in which students received a weekly reminder and an introduction to the topic. Researchers also created customized reminders which included some introductory material as well as feedback from the baseline survey. There were four groups in the study: MoodGYM with no email reminders ($n = 180$), MoodGYM with standard email reminders ($n =176$), MoodGYM with customized reminders ($n = 175$), and the control group ($n =180$). However, of this total intervention group of 527, only 8.5% ($n = 45$) logged in and used MoodGYM. Only three participants completed all five

modules. Approximately 70% in the intervention groups completed the final survey. Attrition was high and adherence to the intervention was quite low in the study, bringing into question the effectiveness of the recruitment methods and the intervention dosage.

Perhaps as a result of low adherence to MoodGYM in their study, Lillevoll et al. (2014) found that there was no significant effect for depression or self-esteem, even in those participants with elevated depression scores. Neither of the types of email reminders had a positive effect on adherence. The authors surveyed students and the main reasons for not participating were lack of time, forgetting about the study, or doubting the usefulness of MoodGYM. The only significant finding was those students with higher academic grades were more likely to start MoodGYM. In conclusion, Lillevoll et al. found many challenges in conducting a study using a self-directed online intervention with high school students. They suggested that the best way to disseminate programs like MoodGYM might be through a universal program conducted at school, as done in previous studies. The previous research findings for MoodGYM have suggested that more guidance for students increases the uptake of the program.

Vangberg, Lillevoll, Waterloo, and Eisemann (2012) used data from the baseline survey in the previous study to examine whether self-efficacy and other personality factors are connected with MoodGYM usage. The authors suggested an exploration of the personality factors of users may provide insight as to which users may be motivated to complete the program. The authors examined differences between users and nonusers, and they found that the personality factor of "Reward Dependence" predicted use of MoodGYM. This personality trait suggests that individuals may prefer to keep themselves more isolated and may also have difficulty relating to others. The researchers concluded that users who were more likely to use MoodGYM might be better suited to a self-help approach because of personality characteristics

like Reward Dependence. As a secondary exploration, the researchers also investigated the relationship between depressive symptoms (as measured by the CES-D) and usage of MoodGYM. They found that those users with higher depressive symptoms were more likely to use the program. Vangberg et al. conducted a more in-depth personality analysis which suggested that adolescents with high depressive symptoms may have more difficulty working towards long-term goals, which could help explain the frequent lapse of adherence to MoodGYM over time in many different studies. Of note, the researchers also found that females were much more likely to use MoodGYM than males.

**University Students.** Sethi et al. (2010) conducted a study on the effectiveness of MoodGYM with 38 first year undergraduates at the University of Sydney, Australia. The sample was described as "adolescent" (p. 144) and ranged in age from 18 to 23. The authors measured anxiety and depressive symptoms before and after treatment with the Depression Anxiety Stress Scale (DASS-21), the Kessler Psychological Distress Scale (K10), and the Automatic Thoughts Questionnaire (ATQ 30). To be included in the study, participants could not be receiving treatment for depression, and they had to have mild to moderate levels of depression or anxiety. Those with high levels were eliminated from the study. This was a randomized controlled trial with three experimental groups: MoodGYM only ($n = 9$), MoodGYM in combination with in-person CBT ($n = 9$), and in-person CBT only ($n = 10$). There was also a control group ($n = 10$) which received no intervention. For all intervention groups, the treatment included five sessions over three weeks. The MoodGYM only group was instructed to complete one module per session, and they worked on MoodGYM at a university office rather than at home. A researcher demonstrated MoodGYM to them and also answered questions during the intervention, so the MoodGYM only group had some in-person technical support. The second experimental group

spent half of the session receiving CBT, and the second half using MoodGYM at their own pace. For in-person therapy, a researcher conducted manualized therapy with participants.

Sethi et al. (2010) found that the combination of MoodGYM plus in-person CBT was the most effective intervention for reducing anxiety and depressive symptoms. However, both MoodGYM only and the in-person only group had significant reductions in anxiety symptoms, distress caused by anxiety and depression, and automatic negative thoughts when compared with the control group. The in-person group was more effective than MoodGYM only. The authors suggest that the use of MoodGYM in conjunction with in-person therapy should be explored, but they also highlighted the utility of MoodGYM when used by itself, particularly with populations who do not have ready access to treatment. In particular, the researchers suggested that future studies target the use of MoodGYM in rural and urban community populations. This study examined the use of MoodGYM in a controlled environment with a researcher always present versus MoodGYM completed at home. Sethi et al. stated there was no attrition in the study, but they did not provide adherence statistics for MoodGYM in any condition. Participants received course credit after the five weeks, which may have influenced their motivation to complete the intervention.

Sethi (2013) conducted a similar study using MoodGYM with young adults recruited from youth community centers and universities in Australia. Subjects were described as young adults from ages 18 to 25, with a mean age of approximately 20. The researcher was examining the usage of MoodGYM versus in-person CBT. This was a randomized, controlled trial ($N = 89$) with four groups: in-person CBT ($n = 21$), MoodGYM only ($n = 23$), MoodGYM in conjunction with in-person CBT ($n = 22$), and a control group ($n = 23$). The DASS-21 was again used to screen for participants having mild to moderate levels of depression and/or anxiety. Of note, the

researchers first recruited participants from community centers by contacting the management of these centers. Less than half of the centers contacted showed interest in the study and there were other obstacles such as youth not being interested in the study or the study being perceived to be too long. The researchers then began recruiting from an undergraduate course at the University of Sydney to have enough participants. In the end, 23 adolescents were from youth centers and 66 from university centers. Participants were excluded if they were receiving other treatment, including medication.

For the above study, Sethi (2013) conducted the treatments in private rooms either at the youth centers or universities. There were five sessions over five weeks, with each session lasting one hour. Participants worked at their own pace on MoodGYM, so they were not required to complete one module a week. The outcome measures were again the K10 and the Dass 21, with pre- and post-questionnaires given. The author found that MoodGYM did not significantly reduce depressive symptoms in as compared to the control group, while the in-person therapy group showed improvements as compared to the control group. However, MoodGYM users showed significant reductions in anxiety. There was no significant difference between the in-person group and the MoodGYM group on anxiety measurements. The most effective treatment for depression and anxiety was the combination of in-person CBT and MoodGYM, which is similar to the results of the previous study by Seth et al. (2010).

Of significance, Sethi (2013) reported a zero attrition rate, which coincides with the findings from the study by Sethi et al. (2010). This may be due to the highly structured settings of the interventions in treatment rooms. Participants worked at their own pace during MoodGYM, and no adherence data was provided, making it difficult to know how much of the program was actually completed. Sethi (2013) noted some limitations of MoodGYM, including

that it "may be unsuited to candidates with lower literacy levels or those who find written expression a challenge" (p. 255). The authors made the conclusion that the results may suggest that "some treatment is better than no treatment" (p. 255), meaning that although MoodGYM may not be the most effective treatment option, it can help those who have an unmet mental health need.

Ellis and Campbell (2011) conducted a study with university students which compared the usage of MoodGYM with an online support group called MoodGarden. Subjects were aged 18 to 25 (*M* = 19), and 77% were female. There were three experimental groups: MoodGYM (*n* = 13), MoodGarden (*n = 13)*, and a control (*n = 14)*. Psychological distress (K12), dysfunctional thoughts, CBT literacy, anxiety symptoms and depressive symptoms (DASS-21) were the outcome measurements. For each group, there were five sessions of one hour over a period of three weeks. Sessions were conducted with a researcher at a university. The number of modules completed was not recorded, making it difficult to gather precise adherence information. The authors found that the MoodGYM significantly improved anxiety and CBT literacy as compared to the control group. In comparison, MoodGarden improved anxiety but not depressive symptoms.

Ellis and Campbell (2011) included information on participants' perceptions of using MoodGYM. About half of participants agreed that MoodGYM was helpful and they would use it in the future. Approximately 70% said they would recommend it to others. However, only about one third of MoodGYM users reported they actually enjoyed using it, which might suggest some issues with content or engagement. The researchers also included some information from qualitative, open-ended questions which was not formally analyzed. The most common positive

theme was that the program enabled participants to identify and challenge negative thoughts. A common negative theme was the MoodGYM's monotony, length, and redundancy.

Lintvedt et al. (2013) conducted a controlled, randomized study with university students ($N = 163$). Participants in the intervention group completed all five modules of MoodGYM on a weekly basis and were also given unlimited access to an informational website, while the control group was placed on a waiting list. The sample included undergraduate as well graduate students at the university, and the mean age was approximately 28. The age range was not given, but the participants were described as "young adults." To be included in the sample, university students had to self-report elevated symptoms of stress. Adherence statistics were given: about one out of three participants in the intervention group reported that they had completed an average 3.1 modules of MoodGYM. The researchers found that the intervention reduced both depressive symptoms (CES-D) and negative thoughts in these young adults. There were no reminders given so this was a completely unsupported intervention. Lintvedt et al. suggested that MoodGYM could be used as a "low-cost intervention for reaching a large number of people" (p. 10). The authors reported a drop-out rate of 37%, meaning this percentage of participants failed to take the follow-up survey. The authors also reported user satisfaction rates, but these are to be interpreted with caution as the questions asked about both MoodGYM and the informational website. Still, about 80% of users reported that the websites were useful or very useful and that they had learned something from the websites. About 90% of users reported that they would recommend the websites to others, and about 35% reported they had changed their behavior because of the MoodGYM.

**Adults.** Several studies have been conducted using MoodGYM with adult samples. Although some 18 and 19 year olds were included in these studies, the mean age of participants

was typically much higher. However, there are two studies conducted with adults which will be discussed because of their exploration of the acceptability of MoodGYM. This data is much more comprehensive than that provided in the research with adolescents. Examining this data provides more information on what type of individuals may benefit from using MoodGYM, possible barriers to using the program, and the most helpful aspects of the intervention. This acceptability data is relevant to the current study, as it may inform further research with adolescents.

Phillips et al. (2014) conducted a MoodGYM study with adults which focused on reducing workplace depression. For recruitment, three employers directed workers to the study, which they completed on their own time. In order to join the study, participants had to have some depressive symptoms which affected their work. Subjects had to be at least 18, with a mean age of approximately 42. Subjects were randomized into two groups: one who completed MoodGYM ($n = 318$) and a control group ($n = 319$). The control group was directed to access five mental health websites. The intervention lasted five weeks and participants were directed to complete all modules of MoodGYM. All participants received 10 minute phone calls each week designed to boost engagement in the study. The primary outcome measure was a measure of general well-being, with depression and anxiety levels as a secondary measure. The researchers found that neither group had improvement on the primary measurement, but both groups' depressive symptoms were reduced over six weeks. MoodGYM was not shown to be superior to the informational websites. In summary, the authors reported that half of the subjects in both conditions improved to subthreshold levels of depression. Phillips et al. measured adherence to MoodGYM by assigning scores based on how much of the five modules subjects had completed. They found that 106 participants completed less than one module of MoodGYM, 117 completed

one to two modules, and 90 completed three or more modules. In total, that means about 70% of the sample completed two modules or less. This shows difficulties in adherence in this study, which the authors acknowledged as a limitation.

Schneider, Foroushani, Grime, and Thornicroft (2014) examined the acceptability of MoodGYM using data from the above study. The authors measured the perceived importance of computerized self-help. Participants were also asked to give open-ended responses on why they liked or disliked MoodGYM and to compare it to other types of care provided by a general practitioner, psychologist, etc. The researchers measured both baseline responses and compared them to answers at six or 12 weeks. They conceptualized this as comparing *expectations* to *actual experiences*. Subjects generally found online self-help to be important at both baseline and six and 12 week follow-up. About 60% of subjects thought online self-help was equally or more acceptable than in-person help, with this belief being sustained more over time for MoodGYM than self-help websites. The authors also performed qualitative analyses on comments from participants on possible barriers to using MoodGYM. These comments fell into four categories: intrinsic issues, technical problems, perceptions of computerized CBT, and issues concerning the study or intervention. Some identified intrinsic barriers were lack of time, motivation, and being distracted. In summary, Schneider et al. noted that most subjects had generally positive comments about MoodGYM and online self-help.

HØifØdt et al. (2013) investigated the usage of MoodGYM with therapist support in a randomized, controlled trial ($N = 106$). Study participants were 18 to 65 ($M = 36.1$), were mildly to moderately depressed, and recruited from primary care. The study is of note because of its adherence and acceptability data as well as qualitative information. Participants completed modules at home, visited with a therapist, and received email support between sessions. The

intervention schedule was flexible and occurred over seven weeks. For those in the treatment

program, there were significant effects above the control group for depression and anxiety which

were maintained at six month follow-up. The researchers reported that there was 60% adherence

to the program, which was defined as finishing MoodGYM and attending all seven therapy

sessions. The mean number of modules finished was 3.8. The authors further broke it down: 86%

of the treatment group completed two or more modules. In terms of treatment satisfaction,

participants gave higher ratings to the combined treatment with both MoodGYM and therapist

support than with MoodGYM alone. In summary, about 50 to 60% of subjects positively rated

"the benefit of the program, the usefulness of the exercises, and the relevance of the thematic

content" (p. 12), indicating that MoodGYM was generally acceptable to this adult population.

HØifØdt et al. reported relatively high adherence rates in this adult subject group, but this may

be due to the level of support provided in this study.

Lillevoll et al. (2013) performed qualitative analysis from interviews with 14 participants

from the above study. The focus was finding the aspects of the treatment which were helpful to

participants. The authors discussed which types of individuals were more likely to be successful

with MoodGYM and other similar treatments, and they found that those who take an active

approach and are fully engaged with the programs tend to be more successful. Those who were

more passive and not willing to practice and review concepts were less successful. The

researchers suggested the different attitudes may be due to expectations of treatment, with some

questioning the effectiveness of online interventions and therefore not fully engaging in the

program. The patients in this trial were asked to talk about their motivation to complete treatment

and their opinions of MoodGYM. Patients reported finding hope in taking an active approach to

improve their depression. They appreciated how readily accessible MoodGYM was to facilitate

them taking action. In terms of the intervention itself, participants were generally more satisfied with the parts of MoodGYM which were traditional CBT than those which were more tailored to relationships. It was important for them to be able to find relevance in the material to their lives. Some subjects discussed how MoodGYM "made them more aware of their negative thinking and that this awareness opened up for further reflections about the validity of those thoughts, and how such thoughts are incorporated into a negative cycle that also includes feelings and actions" (p. 6). Ultimately, those who perceived MoodGYM positively tended to move in a direction of self-acceptance. Overall, Lillevoll et al. concluded that those who benefit most from MoodGYM use it as an impetus to self-therapeutic activity. This sheds light on those types of individual who may benefit from the program—those who find the material useful and are willingly to actively engage with it. This attitude may be connected to higher rates of pre-intervention acceptability.

**Adherence to MoodGYM**

The question of how to measure adherence in MoodGYM is a crucial one. None of the studies discussed here included statistics on the amount of time spent on modules; thus, time was not considered as a measure of adherence. Christensen et al. (2006) recorded the length of the time each user spent on MoodGYM, but the researchers were unable to calculate how long each user spent on the modules. Because the program does not have an idle function, some users were logged in for days, presumably with no activity. Some studies included the percentage of exercises completed as a measure of adherence, while others included the number of modules completed. However, it was unclear how completing a module was defined, if all exercises had to be done or if a user merely had to click through the pages. It is unclear how many characters or words need to be entered into blank fields for an exercise to be considered done. Neil et al. (2009) suggested that computerized interventions should precisely record user activity in order to

more accurately measure adherence. Measuring time spent on modules is important because a user could also spend considerable time reading the modules but not complete exercises, and still show some benefit from the program.

Christensen, Griffiths, Mackinnon, and Brittliffe (2006) explored ways to shorten MoodGYM by testing the effectiveness of different combinations of modules. The outcome variable was the Goldberg Depression Scale, measured both pre-intervention and post-intervention. This was a randomized control trial with adults ($N = 2,794$). There were six versions of MoodGYM: Version 1 was described as "brief CBT" (p. 1739), and included only module 1. Version 2 was modules 1 and 5. Version 3 was modules 1, 4, and 5. Version 4 was modules 1, 2, and 5, with modules 1 and 2 being described as "extended CBT" (p. 1739). Version 5 had modules 1, 2, 3, and 4, while Version 6 had all six modules. Christensen et al. (2006) found that Version 1 or 2 were not effective at reducing depressive symptoms, suggesting that more than two modules are needed for MoodGYM to have an impact. Combinations with modules 1 and 2 (Extended CBT) had the best outcomes. Surprisingly, Version 6 (with all 5 modules) did not result in the largest symptom reduction. Version 5 (modules 1, 2 and 5) had the largest effect size of any of the combinations. This included Extended CBT and problem-solving. However, adherence rates were again low in this study, with 70% of participants failing to complete even one module after the initial assessments.

Christensen et al. (2006) suggested that lack of adherence was due to overall length of MoodGYM rather than its contents. A shortened version of MoodGYM may increase adherence and result in greater intervention effects than the entire program. Ellis and Campbell (2011) also emphasized that if programs are text-based with a lot of reading but no interaction with others, this may limit engagement. This is a factor to consider as MoodGYM is text-heavy and

completed without a social element. Vangberg et al. (2012) noted that the low adherence rates in

MoodGYM should prompt further exploration into the types of adolescents who might be more

willing to complete the program. The researchers also suggested that low adherence to online

interventions may be in part because of the control that users have to start or end the program at

will. This could create a lack of commitment to finishing all of MoodGYM.

Christensen et al. (2006) suggested other methods of increasing engagement with

MoodGYM, including providing tracking and monitoring of participants with emails or

telephone calls. In their school-based study, Calear et al. (2009) suggested that automated

reminders may increase adherence to the program. Studies with adults have examined whether

therapist or administrative support for computerized therapy improves intervention outcomes.

After conducting an analysis of studies of computerized CBT for depression, Talbot (2012)

concluded that as long as some level of contact and support is provided to users of computerized

therapy, no direct therapist support is required. Likewise, Richards and Richardson (2012)

conducted a meta-analysis of computerized adult treatments for depression, and they found that

"support of some administrative type, not delivered by a mental health professional and not

having the aim of being therapeutic, works equally as well as therapist-supported studies" (p.

339). Talbot further outlined the possible functions of administrative support, which he termed as

"nonguidance contact" (p. 64). This was defined as "any contact with participants that does not

involve assistance in the application of specific therapy techniques, but rather use of ongoing

symptom monitoring, prompts such as emails or phone calls to monitor or encourage adherence,

or reminders to complete outcome measures" (p. 64). It has been noted that this support could be

automated (Christensen, Griffiths, & Jorm, 2004; Richards & Richardson, 2012; Talbot, 2012).

The research suggests that primarily self-guided computerized treatments with only automated or administrative support can be effective.

## Acceptability of Online Interventions

Authors have reported "satisfaction and acceptability are generally high among people who undertake cCBT" (Vallury, Jones, & Oosterbroek, 2015, p. 8). In a survey of young people and their parents, about 1 out of 4 children were interested in using a computer program to help them deal with distress, and 88% would prefer to use the program at home if given a choice (Stallard, Velleman, & Richardson, 2010). The same study found that about 3 out of 4 parents would want their children to try a computer program to help them with distress and worries, with anonymity sited as a possible benefit. Only about 1 out of 3 parents noted any concerns about this type of treatment, with concerns focused on quality of information given, personal safety, and the lack of in-person contact and support. In four separate studies of computerized CBT for anxiety and depression, children and parents reported moderate to high levels of satisfaction, with participants reporting that anonymity was important (Richardson et al., 2010). Some concerns reported were the length of the program, the difficulty of the material, and a lack of time to complete the intervention.

Although cCBT services may be acceptable to adolescents, some studies suggest that they may not be their preferred mode of treatment. Bradford and Rickwood (2014) conducted a study concerning adolescent preference for mental health services. The researchers surveyed a school-based population of 15 to 19 year olds ($N = 231$) to test the popular notion that adolescents would prefer online services. However, Bradford and Rickwood found that only 16% of their sample would prefer online services as compared to face-to-face services. (Online services were defined as internet chat, therapy, and self-help courses like MoodGYM.) Males

were significantly more likely to prefer online services versus in-person services. Those participants who preferred online interventions noted their anonymity and ease of access. The authors reported that about two thirds of the sample would rather have in-person help. Despite this preference, most adolescents reported their intention as to not seek help at all. In summary, at least for this sample in Australia, most adolescents would prefer face-to-face help and many are unlikely to seek help, even if online services are available.

## Summary

The line between adolescence and young adulthood is often unclear, with 18 and 19 year olds sometimes grouped in either category. Research indicates that this is an age group that deserves special attention in regards to depression: they are undergoing unique developmental challenges as they move from late adolescence to young adulthood, and maladjustments to these changes can cause psychopathology. Statistics from SAMHSA indicate that 18 and 19 year olds have higher depression rates than other young adults ages 20 to 25. Research also indicates that rural populations in the United States have high rates of depression yet a lack of services, and computerized treatments like cCBT could help fill that gap. Several research studies suggest that cCBT has potential to be an effective treatment for adults, university students, and adolescents. Although adherence rates are often low, acceptability has generally been high. For young adult populations, there have been several studies, some with MoodGYM, that have suggested that cCBT is an effective and acceptable treatment for this population. These computerized interventions have the potential to treat depression in 18 and 19 year olds, particularly in rural areas. Few studies have explored school-based or online recruitment, although these methods have much potential to reach tech-savvy young adults. Although there is a small evidence for

cCBT, more work is needed to explore this potentially wide-reaching treatment for adolescents

and young adults.

CHAPTER 3

METHODS

**Mixed Methods, Concurrent Embedded Design Feasibility Study**

Eldridge et al. (2016) defined the fundamental purpose of a feasibility study: it "asks whether something can be done, should we proceed with it, and if so, how" (p. 8). Orsmond and Cohn (2015) identified a similar main question to be answered by a feasibility study, focusing on "Can it work?" (p. 1). They identified one of the primary objectives of a feasibility study as determining whether appropriate participants can be recruited. This question encompasses many areas, such as the length of time it takes to recruit participants, whether the inclusion criteria are too inclusive, and whether professionals are willing to help with recruitment. Moreover, they identified the appropriateness of data collection as another objective, including such aspects as whether participants have the capacity and time to complete the measures.

Measuring the acceptability of the procedures and interventions is crucial in a feasibility study (Orsmond & Cohn, 2015). Acceptability can be measured in several methods, such as retention and follow-up rates and adherence data. This also includes practical matters such as if the treatment will fit into the daily lives of study participants and whether it will take too much time and effort to complete. The intervention itself should be evaluated in terms of acceptability and appeal to the participant.

Acceptability data is a key component of a concept called social validity, and many aspects of social validity are similar to objectives identified in feasibility studies. Wolf (1978) defined social validity as having three components: social significance of goals, social acceptability of procedures, and social importance of the effects of the intervention. Socially significant intervention goals are ones that make a practical and meaningful difference in the

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lives of the participants (Lane & Beebe-Frankenberger, 2004). Social acceptability can also be

termed "treatment acceptability" and focuses on the practical implementation of procedures and

the intervention itself. To have treatment acceptability, the intervention must be minimally

invasive and reasonable to participants (Lane & Beebe-Frankenberger, 2004).  Social importance

examines consumer satisfaction with the results of the treatment (Wolf, 1978).  It is crucial to

assess the components of social validity before an intervention takes place to determine the

expectations for the intervention. Social validity should also be measured at the end of an

intervention to assess whether these expectations have been met, and to what degree (Lane &

Beebe-Frankenberger, 2004). The acceptability of intervention procedures and satisfaction with

the intervention may be highly related to the effectiveness of the treatment (Wolf, 1978). When

interventions are considered more socially valid, they are more likely to be accepted and widely

adopted (Francisco & Butterfoss, 2007)

Another important aspect of a feasibility study is to evaluate the potential of the

intervention of being successful with its selected population (Orsmond & Cohn, 2015). Because

feasibility studies are initial studies, this exploration is preliminary, but it can still be based on

quantitative data. Data should be examined to determine if there were expected changes in the

outcome variables and to what degree. This information will establish if the intervention has the

promise of being successful in the future with a similar population.

Feasibility studies have multiple components, often including qualitative research

(Eldridge et al., 2016). The inclusion of both  quantitative and qualitative methods to examine

research questions constitutes a *mixed methods* design (Johnson, Onwuegbuzie & Turner, 2007).

The purpose of such a study can be defined as developing "breadth and depth of understanding

and corroboration" (Johnson et al, p. 123). Often researchers embed qualitative components

within a larger quantitative study. When such data is collected concurrently, this can also be termed a *concurrent embedded* design (Creswell and Plano Clark, 2011).

In a feasibility study, qualitative feedback from participants can provide data which indicates the likelihood that intervention may be successful in the future (Orsmond & Cohn, 2015). This can illuminate possible obstacles to recruitment or implementation of the intervention which might make it difficult to conduct future studies on the same topic. Social validity can be evaluated by using questionnaires or rating scales (Lane & Beebe-Frankenberger, 2004); however, if all questions are closed with categorical or Likert-type scales, this may simplify the data and not allow subtle, subjective data to emerge about the intervention (Leko, 2014). Open-ended questions can add a layer of complexity that allows participants to voice their thoughts about the study without the constraints of close-ended questions.

**Acceptability and Social Validity of MoodGYM to Adolescents**

The current study is a feasibility one which will examine the acceptability of the usage of MoodGYM at home by adolescents. The acceptability of the recruitment process to school and other mental health professionals was explored. The acceptability of the recruitment, consent, and intervention components for adolescents were examined using a mixed methods approach, with both quantitative and qualitative data being collected simultaneously. However, the main focus is on the quantitative data with some open-ended questions embedded to add depth and breadth to the quantitative information. This approach can be described as a concurrent embedded design within an overall mixed methods approach. The social validity of the intervention for both adolescents was measured, and the relationship between social validity and intervention adherence was examined. The relationship between adherence and change in depressive symptoms over time was also analyzed. This study sought to answer three feasibility

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and two research questions, presented below. The feasibility questions were used to explore the practicality of study recruitment, procedures and intervention as executed in this study. The research questions were used to examine data from the study in regards to social validity, adherence, and depressive symptoms.

**Feasibility Question One**

*What is the acceptability of the recruitment process for mental health professionals?*

**Feasibility Expectation One.** This is an exploratory question as previous studies have not used this research design. However, it is anticipated that sufficient professionals will be willing to recruit to obtain the sample size goal of 20 to 24 adolescents.

**Feasibility Question Two**

*What is the acceptability of the recruitment, consent and screening process for adolescents?*

**Feasibility Expectation Two.** This is an exploratory question as previous studies have not used this research design. However, it is anticipated that the process will be generally acceptable to adolescents as measured by researcher-created surveys.

**Feasibility Question Three**

*What is the acceptability of the intervention to adolescents?*

**Feasibility Expectation Three.** Based on previous research, it is expected the intervention will be generally acceptable to adolescents as measured by intervention adherence rates and researcher-created surveys. However, because the intervention will be conducted at home rather than at a clinic or school as has been done in previous studies, this question is also exploratory.

**Research Question One**

How is the social validity of the intervention related to adherence rates?

**Hypothesis One.** Higher levels of social validity will be associated with higher

adherence rates to the intervention for adolescents.

**Research Question Two**

How is the social validity of the intervention related to changes in depression symptoms

over time?

**Hypothesis Two.** Higher levels of social validity will be associated with more reduction

in depressive symptoms for adolescents.

**Qualitative Methods**

Participants were asked a series of open-ended survey questions to gather more

information on the feasibility of the recruitment process and the MoodGYM intervention. The

questions focused on their experiences in the study (what did they like best, what did they like

least, what additional information could have been given, etc.) The goal was to gather more

information on the experiences of participants to support or augment the quantitative data. Open-

ended responses allow participants to give a voice to any concerns which may affect the

practicality of the intervention. They also allow participants to discuss positive experiences in the

study, which may inform future research.

Data were analyzed using an inductive approach. According to Patton (1980), this

"means that the patterns, themes, and categories of analysis come from the data; they emerge out

of the data rather than being imposed on them prior to data collection and analysis" (p. 306).

Inductive can be described as "data-driven" (Braun & Clarke, 2006, p. 83). Within that

framework, the data was analyzed using a thematic analysis approach, using the phases of

thematic development as described by Braun and Clarke (2006). The survey responses were initially coded using an exploratory open coding approach (Corbin & Strauss, 2014). The codes were verified through an inter-coder agreement check as recommended by Creswell and Plano-Clark (2011). This was completed by my dissertation advisor. Codes were then used to create themes by aggregating and collating similar codes (Braun & Clarke, 2006). According to the phases as described by Braun and Clarke, themes and sub-themes were further defined, named, and reviewed in an ongoing iterative process. Themes were evaluated in terms of how they informed the feasibility research questions.

## Distinguishing Features of the Study

This is the first study using MoodGYM in the United States with adolescents. Although MoodGYM is a free and readily available intervention with some research base, it has not been tested in the United States in published studies. Second, this is one of the only studies using school-based recruitment and computerized Cognitive Behavioral Therapy (cCBT). Attwood et al. (2012) had school nurses recruit children with emotional problems in a small study using cCBT, while students self-referred to school counselors in the study by Stasiak et al. (2014). However, in these studies, the schools were pre-selected to participate in the research. In the current study, the researcher used email to recruit school and other mental health professionals to participate in the study. Thus, the current study focused more on soliciting practitioners to recruit for the study. Third, the study used online methods such as Facebook, Twitter and Tumblr to recruit students for the study. No other published studies with cCBT in adolescents have used online recruitment methods. Fourth, adolescents completed MoodGYM at home rather than at school or in a clinician's office. Only Lillevoll et al. (2014) had high school students complete MoodGYM on their own in a location of their choosing. The rest of the studies with MoodGYM

and adolescents or young adults were completed at a school, clinician's office, or university. Fifth, this study measured adherence to MoodGYM in several ways: participants self-reported time spent on modules and the researcher also measured the number of modules completed, the number of exercises completed, and the number of characters entered into exercises. These are more extensive adherence measures than previous studies of MoodGYM. Sixth, this study used qualitative research methods in the form of open-ended survey questions. While some previous studies with adolescent cCBT have briefly explored acceptability, this study has far more qualitative data. Finally, the extensive focus on social validity makes this study unique among the studies on adolescent cCBT, including MoodGYM.

## Measures

### Pre- and Post-Questionnaire

**Revised Children's Anxiety and Depression Scale (RCADS).**The RCADS was used to assess depression and anxiety symptoms in participants (Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000).  The scales of RCADS have been found to be structurally similar to DSM-IV categories (Chorpita et al., 2000). The RCADS was found to have generally strong internal consistency, with the scale for MDD at .87 (Chorpita, Moffitt, & Gray, 2005). The RCADS is a self-report questionnaire with 47 items. There are scales corresponding to several anxiety disorders, including Separation Anxiety Disorder, Social Phobia, Generalized Anxiety Disorder, and Major Depressive Disorder (MDD). There are also total scales for Anxiety and for Total Anxiety and Depression. Items including the choices "Never," "Sometimes," "Often," and "Always," and they are scored 0 to 3. T-scores are derived from the raw scores based on gender and grade. The method used to collect these data was that participants completed the RCADS in an online survey before the intervention, and then again in an online survey after the

intervention. Of note, the RCADS was normed on a sample with an age range up of to 17 and 18 in two studies (Chorpita et al., 2000; Chorpita et al., 2005). Students through Grade 12 were included. The results for the current study were scored using the norms for Grade 12. Scoring is done through an Excel spreadsheet provided by the publisher. T-Scores below 65 are considered in the average range, scores from 65 to 69 are considered at the borderline clinical threshold range, and scores 70 or above are considered in the clinical threshold range. Scores above 80 are reported as >80. The current study used the RCADS to measure changes in depressive symptoms over time. Achenbach and Rescorla (2001) in their manual for the widely used Achenbach System of Empirically Based Assessment (ASEBA) for child psychopathology recommend the use of raw scores in statistical analysis in order to capture the true variation in the scales. In the current study, raw scores from the RCADS were used to measure differences in depressive symptoms as t-scores have a truncated range and raw scores may capture slight differences in scores over time.

**Researcher-Created Surveys**

The researcher created six online surveys for use in this study. The Pre-Intervention Survey was the initial survey completed by participants. The Part 1 Follow-Up Survey was completed after Module 1 of MoodGYM was finished. The Final Survey was completed three weeks after the completion of Module 1 of MoodGYM. There was also a Follow-up Survey which was to be completed separately after finishing Modules 2, 3, and 5 of MoodGYM. There was also a Non-Participation Survey on the study website which was anonymous. Participants could provide brief information on why they did not want to be in the study by selecting from a list of options or providing their own reasons. In addition, there was an online survey completed by mental health professionals who agreed to participate in recruitment. Question types on

surveys included multiple choice, categorical (yes/no), Likert scales, and open-ended.  Copies of all surveys can be found in the Appendices. Outlined below are the content areas of surveys.

**Social Validity Measures.** The researcher has developed acceptability measures for the adolescents to complete before and after the MoodGYM intervention. These were modeled on the forms created by Lane and Beebe-Frankenberger (2004).  Participants ranked items on a Likert scale and contained items such as:  "The intervention will be easy for me to stick with." The same questions were administered after the intervention, but in a retrospective way.  For example, "The intervention was easy for me to stick with." If students ended the intervention early, they were asked to provide feedback via survey as to why (i.e. this intervention took too much time; the program was too difficult, etc.).

**MoodGYM Intervention Acceptability.** Participants were asked to disagree or agree with several statements regarding their experience using MoodGYM. These included statements such as "I thought MoodGYM was helpful" and the "Reading was too hard." Participants also had to rank different aspects of MoodGYM such as the quizzes and reading. They were given the option of rating these on a Likert scale from "Very Poor" to "Very Good." The surveys were developed based on the components of MoodGYM and are unique to this study.

**Treatment for Depression**. Participants were asked to describe any past or current treatment for depression. They were also asked to identify any online programs they had completed to treat depression. In the Final Survey, participants were asked if they had received any treatment for depression during the study. If so, they were asked to describe the treatment, and if they had discussed the MoodGYM material with a counselor.

**Academic Information.** Participants were asked to estimate how many hours a week they spend in extracurricular activities, their high school GPA, and their college GPA, if applicable.

**Demographic Information.** Participants were asked for their age, gender, and ethnicity. There were questions on whether the participants had graduated high school and what year. Participants were asked to give location information such as what high school they attended, the location of their high school, where they currently reside, and if they attend college.

**Acceptability of Study Procedures.** In the Pre-Intervention Survey, participants were asked to rate on a Likert scale if they had felt comfortable signing the consent form and completing the survey online. They were also asked about the study website and the ease of completing the initial survey and signing up for the study. Users were also prompted to identify how they learned about the study. They were also asked what they felt were the best ways for adolescents to learn about the study, with both multiple choice and open-ended responses. Participants were also asked to provide their reasons for taking part in the study; they could select from a list and/or give responses to open-ended questions.

On the Final Survey, participants were asked to disagree or agree with statements such as "I am glad I was given a flyer or web link for this study" and "I felt comfortable completing the intervention online." Participants were also asked a series of open-ended questions to provide qualitative input on their experience in the study (i.e. "How did you feel about being in the study?")

**Adherence and Fidelity Measures**

Several different methods were used to measure how much participants adhered to MoodGYM. First, users were asked to time themselves completing each module and report the

time in a survey. As a fidelity measure, they had to report whether they used MoodGYM the entire time and how confident they were in the accuracy of the time they reported. After each module, participants answered a series of questions about how they used MoodGYM; this was used to determine how and to what degree they were following the intervention as designed. There were questions such as, "I answered the quizzes truthfully" and "I read the feedback from the quizzes." Participants had to rate on a Likert scale how much they agreed with these statements. As another fidelity measurement, at the end of the Pre-Intervention and Final Survey, there were questions asking how honestly participants had answered the questions.

The researcher recorded other adherence measurements based on data feedback from the MoodGYM program. The researcher obtained by participant consent the username and password for each participant and therefore had access to the MoodGYM "workbook" contents. The workbook contains a record of all modules, exercises and quizzes completed in MoodGYM. Exercises were both multiple choice and open-ended. The number of modules and exercises completed were recorded. An exercise was considered completed if responses were selected (multiple choice), or any characters were entered into the field (open-ended). The researcher also recorded the number of characters entered into all open-ended responses as a measure of effort on the exercises.

## Participants

A total of 35 participants completed the Pre-Intervention Survey. Two participants completed the consent form and the first survey, but did not complete Module 1 of MoodGYM or the Part 1 Follow-Up Survey. There were 33 participants who completed the Part 1 Follow-up Survey. A total of 25 participants completed the Part 2 survey, regardless of how many modules of MoodGYM they completed.

Two participants were excluded from data analysis from the Pre-Intervention and Part 1 Follow-Up Survey as it was determined they had the same IP address. The RightSignature program collects IP addresses as part of its verification procedures. The same user likely tried to sign up twice from the same location, putting the integrity of these data in question, and thus it was excluded.

Demographic information is based on data from the Pre-Intervention Survey, completed by 33 participants. The mean age of participants was 18.53 ($SD = 0.51$). When asked about their gender, 23 (69.7%) participants identified as female, while seven (21.21%) identified as male. The option of "other" was provided, and three (9.09%) participants identified with this category. Participants could give more information, and one participant described himself as "identifying as male but designated as female at birth." Another described themselves as "genderfluid/ questioning" while another stated they were "non-binary but female-aligned."

Participants were allowed to identify more than one ethnicity. The majority of the sample, 26 (78.79%) participants, identified as White/non-Hispanic. There were seven (21.21%) participants who identified as Hispanic or Latino, five (15.15%) who identified as Asian or Pacific Islander, two (6.06%) who identified as Black or African-American, and one (3.04%) who identified as American Indian or Alaska Native.

The overwhelming majority of participants had graduated from high school (n=30, 90.91%). When asked what year they graduated from high school, two (6.1%) had graduated in 2014, 17 (51.2%) had graduated in 2015, and eight (24.2%) had graduated in 2016. There were six participants (18.2%) who left the item blank or answered "N/A." Participants were asked if they took AP classes, and 21 (65.63%) responded that they had, while 11 (34.38%) indicated

they had not. Likewise, participants were asked if they took honors classes: 23 (71.88%) reported they had, and 9 (28.13%) reported they had not.

Curiously, there were several demographic questions which were left blank by all participants, including: 1) What high school did you attend? 2) In what city and state was your high school? 3) In what city and state do you reside in, if different from above? 4) Do you currently attend college? 5) Are you going to start college in the fall? There could be many reasons for these questions going unanswered. One possibility: the previous page contained directions of "You are not required to answer any questions," so participants may have skipped these questions because they felt uncomfortable providing their exact location and the questions had just been described as optional. Because of these missing data, it was difficult to discern how many participants were in high school and how many were in college. However, another question in the survey may shed light on this: "If you currently attend college, what is your GPA?" There were 22 respondents who responded to this question; thus we can assume that at least 22 (66.7%) of the participants were in college. The mean college GPA self-reported by these 22 respondents was 3.42, with a standard deviation of 0.50. Participants were also asked about their high school GPA, with 32 responding ($M = 3.55$, $SD = 0.50$), 22 of which were currently in college. This leaves the researcher with the assumption that 10 of the participants were currently in high school or were post high school and did not attend college.

Although participants did not provide their location information, location information was important for the study. The researcher accessed this information by IP address.   As part of the signature verification process, RightSignature recorded the IP addresses of the signers. Internet resources were used to find the approximate location of the participants from these IP addresses. It was discovered that five of the participants who completed the Pre-Intervention

survey were outside the United States; countries included Scotland, Australia, Norway, England

and Canada. This occurred despite the researcher's website stating that only participants from the

United States were allowed. Tumblr is an open access website used around the world, and there

was no way to ensure only adolescents from the United States would see the links to the study's

website. Location could only be determined from the IP address on the consent form, and this

information was not gathered until after the study was completed. The decision to include the

five participants in the analyses was made because their data provides valuable information on

the acceptability and social validity of the recruitment and intervention process, regardless of

their location.

Geographical information was gathered on the remaining 28 of 33 participants. There

was at least one adolescent from the following states, and those states for which there were more

than one participant are indicated by number after the state: Arizona, California ($n = 2$),

Colorado, Georgia, Illinois, Kansas, Maine, Massachusetts, Minnesota ($n = 3$), Missouri, New

York, North Carolina, Pennsylvania ($n = 3$), Oregon, South Carolina, Tennessee ($n = 2$), Texas

($n = 2$), Virginia, Washington, West Virginia, and Wisconsin.

A main focus of the study was rural populations, thus locations were analyzed for their

rurality in the following manner. Guidelines from the U.S. Census Bureau (2010) were used. The

Census uses population information to divide the country into urban and rural areas. The Census

defines three categories as: urbanized areas (population 50,000 or greater), urban clusters

(population 2,500 to 50,000), and rural areas (population less than 2,500). Nationwide statistics

in these 3 categories (2010) were : 71.2%  live in urban areas, 9.5% in an  urban cluster, and the

remaining 19.3% is considered rural. Thus, as of the data from 2010, 80.7% of the country lives

in either urban areas or urban clusters and 19.3% in rural. The U.S. Census data was used to

identify locations of participants in the current study as urban or rural. Approximately 35.7% of participants were in an urban area and 21.4% were in an urban cluster. The remaining 42.9% were in a rural area. This means 57.1% of the sample was classified as being in an urban area or urban cluster. When compared to the national statistics, the sample from the current study had more than twice the percentage of rural participants. Those in urban clusters were also more than double the national percentage. In summary, this sample was far more rural than the national population as reported by the U.S. Census Bureau.

## Recruitment Procedures

As will be described in this section, numerous iterations of recruitment approaches were attempted before successfully gaining a method that resulted in participants. Recruitment was originally designed to be done, with school administrator consent, through school psychologists and other school mental health professionals like counselors and social workers Outside mental health agencies treating youth and families were also to be involved. Flyers were created to be distributed to students who professionals felt could benefit from the intervention. Flyers were also to be posted in schools and/or mental health facilities. The flyers linked to the study website, which contained information for adolescents and parents on the study. There was also a page for professionals, which explained more about the study and the process of recruitment.

Recruitment began in Montana. A directory of all Montana high schools was accessed via the Montana Office of Public Instruction  and emails were sent to every school psychologist, counselor or social worker whose email address could be located on the school's website. Some emails had to be sent through the school's email server on a form on their website. There were no inquiries/replies from school professionals in response to these messages.

Two school psychologists in Montana agreed to post and distribute flyers for the study. The school psychologists were from the Missoula County Public School district (urban) and the Glasgow Public School District (urban cluster). School Principals provided permission to the Institutional Review Board (IRB) through email. The two school psychologists were both known to the researcher before the study, and they were therefore not recruited from the researcher's email campaign. One psychologist presented the study and intervention opportunity to a high school health class learning about depression. At the end of the presentation, the school psychologist talked about the study and distributed small flyers. The feedback the psychologist received from the presentation was that students were interested in the study, but they expressed concerns about needing parent permission and the security of their data and privacy. There was ultimately one email inquiry to the researcher from a high school student, who wanted to know if parent permission was necessary. There was no response after the researcher indicated it was. The concern from adolescents about parent permission may be an indicator of a barrier to this type of intervention recruitment that requires parental consent. Adolescents were sensitive about parental knowledge of either the adolescent's concern about depressive symptoms or wanting to try an intervention independent of the parent.

As an alternative to the previous statewide recruitment method, a brief presentation was made at the Montana Association of School Psychologists (MASP) conference. Interested school psychologists provided their email addresses to learn more about the study. The researcher later emailed follow-up information with more information on recruitment and a link to the study website. There were no responses to these emails. This approach may be a barrier because although professionals were interested immediately, when offered at another time when they were back to their communities of practice, they either didn't have time because of typically

crammed daily schedules or were no longer interested. In retrospect, a request for a longer presentation time at the conference that would include an overview of the recruitment website, a demonstration of ease to sign up, and the advantages to the intervention may have benefited recruiting.

Once this second approach did not yield participants, the researcher took the approach of contacting national and state psychology organizations so they could disseminate information to their members about the study. This was a possible method of reaching many professionals (and possible recruiters) at once. The researcher created a Facebook page with information on the study and a link to the study website. When allowed by consent of each organization, the researcher posted information on the Facebook "visitor's wall" of these organizations. Members could see these posts when they visited the organization's Facebook page. The researcher also requested that organizations "Share" links to the study on Facebook so as to be seen by more professionals. National organizations contacted included the National Association of School Psychologists (NASP), Division 16 of the American Psychological Association, and School Social Work Association of America. An effort was made to contact the school psychology organizations of every state in the U.S., although some did not have Facebook pages, respond to messages, or allow wall postings. Although some state organizations posted the study website to their Facebook wall, no school professionals contacted the researcher via Facebook or email as a result of these efforts. The researcher also posted to the message board of the NASP rural school psychology group with no results. The unsuccessful result of this type of recruitment was not readily apparent to the researcher. Perhaps professionals don't access these pages very often and when they do, it is for specific information.

Yet another method of recruitment was tried.  An email was sent to the listserv of the Illinois School Psychology Intern Consortium (ISPIC), which was distributed to interns and program directors. The researcher was on a year-long internship with the ISPIC in Illinois at this time and had direct access to professionals.  The researcher also made a presentation on MoodGYM at a social-emotional showcase sponsored by ISPIC. This was a professional development event attended by school psychologists, counselors, social workers, and ISPIC interns and supervisors from many different areas of Illinois. At the end of the presentation, the researcher explained the study and set up a table with flyers for professionals, which directed them to the study website to learn more about the recruitment process. No professionals inquired about the study after the presentation. It may be that having a way to sign professionals up at the end of the presentation or during the larger event may have gained the partnership of mental health professionals in recruiting adolescents with depressive symptoms.

At about the same time, the researcher contacted the chief of the Montana Children's Mental Health Bureau. The researcher was provided with a list of email addresses of the directors of mental health agencies in Montana serving youth and families. The directors were contacted via email and asked if they would help recruit participants for the study by telling clients about the study and/or distributing flyers. No participants were recruited from these agencies.

The barriers to recruiting participants using the aforementioned methods are not readily evident.  Once adolescents were presented with the opportunity, their concern seemed to be about parental permission.  Professionals expressed interest and asked questions when presented in person, but it is unclear why no professional took the step of signing up and handing flyers to potential adolescents who would benefit from intervention for depressive symptoms. Perhaps it

is concern with an online intervention, but at this point, the researcher had very little feedback. One school psychologist indicated that, indeed, parent consent was an obstacle.

Taking the above into consideration and since no participants were recruited from these attempts, it was decided to switch to recruiting only 18 and 19-year-old participants, who would not need parental consent and who could "self-refer". Moreover,18 and 19 year olds can still be considered adolescents, which is in line with the original intent of the study. Recruitment efforts shifted to focus on students who had turned 18 but were still in high school, or who had just graduated from high school. This recruitment was started in early May to maximize the chances that there would be 18-year-old high school seniors. It was thought school professionals would want to be more involved in recruitment if they knew parent permission would not be required for adolescents to participate in the study.

Another Facebook page was created with updated information on the study, and the researcher conducted another campaign posting to national and state psychology organization pages. It was also decided to continue emailing individual school mental health professionals, including school psychologists, school counselors, and school social workers. Email addresses were found from school websites. If more than one professional existed at the same school, a few were chosen at random to email so as not to overwhelm the schools. Many schools were considered but did not have any contact information for mental health professionals. Due to the lack of responses, principals were eventually emailed as well. Professionals in other relevant positions were contacted, such as adjustment counselors and Directors of Student Services.

Recruitment began in Montana, but it also focused on other states given the lack of response for the first email campaign. This recruitment effort initially began in some of the most rural states, including Vermont, Maine, South Dakota, North Dakota, and Iowa. Initially towns

with populations from between 20,000 and 50,000 were emailed. This was based on the Census Bureau's definition that Urbanized Areas have a population of more than 50,000 (U.S. Census Bureau, 2010). Because of difficulty in obtaining participants, recruitment eventually shifted to include states and areas that were not considered rural. As the school year progressed with no participants, recruitment started just focusing on schools which were still in session. In total, professionals from 18 states, 100 cities, and 140 high schools were contacted. There were 423 recruitment emails sent in total. No responses were received from any school professionals expressing interest in the study.

Because there was no response from high school professionals or mental health organizations serving adolescents, age 14-18,it was decided to expand recruitment to 18 and 19-year-olds students in college, particularly incoming students who had recently graduated from high school. Emails were sent to several university orientation programs requesting that they consider sending emails or using other methods to inform students about the study. The University of Montana responded and indicated flyers could be distributed at orientation, but because of location, the researcher was unable to do so. Emails were sent to clinical directors of several college counseling centers in consideration of posting or distributing flyers and/or telling incoming students about the study; however, only two health centers responded with interest and no participants were gained from these methods.

Finally, and because of the extensive recruitment efforts and lack of interested and/or willing professionals, it was decided to begin recruiting participants using online methods. Even if they were not recruited through the schools, participants were still needed in order to explore the acceptability and social validity research aspects of this study. Several reputable and prominent organizations about teen depression were contacted through email or Facebook to

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request consideration for dissemination of information, including posting on their websites. These included Erika's Lighthouse, To Write Love on Her Arms, the Jed Foundation, and Transition Year. Emails were either not answered or requests were denied.

The researcher created a Twitter page and Tweeted to several organizations focused on mental health, asking for them to re-tweet a link to the study website. The researcher used the study's Facebook page to post on the visitor's walls of such sites as the National Alliance on Mental Illness (NAMI) or depression and anxiety support groups. The researcher also requested that organizations re-post links to the study, with limited response. The researcher posted on several Reddit message boards for depression and anxiety. There were no participants gained through these methods.

The *only* successful method of recruitment was sending emails to relevant blogs on the popular website Tumblr. Tumblr is a "microblogging" site, where anyone can make a personalized blog with a unique URL they choose. Users can post a series of short thoughts or articles, photos, videos or music—sometimes several times per day. Users "follow" other blogs, and Tumblr then shows them the posts of those other blogs in a feed. A main activity on the site is "reblogging" someone else's posts onto one's own blog. Users are also able to send each other emails and instant messages, and submit material for another blog to consider posting. One reason Tumblr was selected is its popularity. By some estimates, it has 550 million monthly users, 280 million separate blogs, and an average of 120,000 new blogs signed up for per day, with 69% of users being Millennials (Smith, 2016). From her clinical work with adolescents, the researcher was also previously aware of the large number of adolescents and young adult's blogging on the site, as well as the large number of blogs that were devoted to serious subjects— including a myriad of mental health issues.

The researcher made efforts to find appropriate blogs who would post a link to the study website. Blogs were primarily found using a variety of keyword searches made within Tumblr itself, but also from some blogs that the Tumblr site itself automatically suggested based on recent searches. The researcher also located some secondary blogs found through analyzing relevant blogs and some from Google searches of keywords within Tumblr. Terms searched within Tumblr were primarily centered on depression and anxiety in teens. However, to reach enough different blogs in order to attain enough data, the researcher also searched a variety of synonymous terms of issues that were related to young adults and depression and anxiety, and terms that were frequently comorbid with depression and anxiety.

Some search terms used included "depression", "anxiety", "teen anxiety", "teen depression", "young adult depression", "young adult anxiety", "adolescent depression", adolescent anxiety", "mental health", "mental illness", "sadness", "mental illness recovery", "mentally ill", "teen depression blog" "anxiety blog", "Bipolar", "bipolar II", "Bipolar 2", "suicide support", "suicide help", "therapy", "anxiety disorder", "PTSD", "social anxiety", "Cyclothymia", "depression blog", "self-care", "panic attack", "teen addiction", "self harm", "self harm help, **"**LGBT depression", "recovery", "anxiety help", "depression help", "panic attack help", "panic disorder", "ED", "Eating Disorder", "Eating Disorders", "Bulimia", "Anorexia", "BPD", "addiction", "drug abuse blog", "addiction blog", and "addiction recovery."

The researcher messaged blogs which were appropriate and asked them to re-blog links to the study on their sites, thus allowing them to be viewed by all the site's followers. Their site's followers could then re-post to their blogs as well. In total, 428 unique Tumblr blogs were messaged. There were 304 follow-up emails sent to the blogs who did not re-post. Thus, there were 732 messages sent on Tumblr asking blogs to post the study website.

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Participants were asked on the Pre-Intervention survey where they had learned of the study. None reported learning about it from flyers or professionals at schools or other mental health professionals. All participants reported they had been recruited through Tumblr.

## Intervention Procedures

Modules 1, 2, 3 and 5 of MoodGYM were included in the intervention for this study. Module 4 was excluded. In their study, Christensen et al. (2006) found that modules 1, 2, and 5 were the most effective combination of modules of MoodGYM, even more effective than all five modules. However, the treatment dosage of three modules may not be strong enough. Module 3 was added to this combination to increase treatment dosage and to provide ways to contest the distorted thinking uncovered in Module 2; otherwise, the adolescent does not learn ways to cope with these thoughts. Module 4 was excluded due to concerns over the content of the "Life Whacks" and "Mum and Dad" quizzes, as described earlier. These quizzes may be distressing for adolescents as they contain questions on physical and emotional abuse by parents. Participants were not provided with counseling or other nontechnical help from the researcher during the study. Some participants were receiving outside counseling, but most were not. It was thought that these parental relationship patterns may be best explored when the participants could have additional support if needed. Module 4 is not referenced in Module 5, and it can be easily excluded without adjustments to the other modules.

The current study consisted of two parts. Part 1 consisted of signing the consent form, completing the Pre-Intervention survey, completing Module 1 of MoodGYM, and completing the Part 1 Follow-up Survey. After Part 1, participants received a $10 gift card. Part 2 of the study was the completion of Modules 2, 3 and 5 of MoodGYM. Participants were directed to

complete one module a week. They could choose to end participation in the study at any time. They could then complete the Final Survey and were able to receive a $10 gift card.

Posts on Tumblr directed participants to the study website. From there, participants could read more about the study, including requirements and more information on the intervention. If adolescents were interested in the study, they were instructed to email the researcher. The researcher responded with a form email which provided detailed steps to sign up for the study. The first step was for the participants to email the researcher their birth dates. This served as a reminder that participants needed to be 18 or 19 to complete the study. Participants were provided with a link to a consent form to be signed online through the RightSignature service (https://rightsignature.com/). They were also provided with an ID number to enter into the consent. Participants had to review the form and sign electronically by drawing their signature with a mouse. They also selected the date of signature and provided their name. RightSignature recorded a timestamp and the IP address of the participant to certify the signature.

Participants were then directed to complete the online Pre-intervention Survey through SurveyMonkey (https://www.surveymonkey.com/). Participants were directed to enter their ID code rather than their name into the survey. The survey could be completed at their own pace, although it needed to be completed in one session. There were no required questions to advance to the next screen. The Pre-Intervention Survey was estimated to take 10 to 15 minutes to complete.

The next step was for participants to complete Module 1 of MoodGYM. The researcher registered each user for the site and provided a username and password which did not contain any identifying information. On the form email, users were directed to a researcher-created webpage with more instructions on completing Module 1. Participants were advised to complete

Module 1 in one session and to time themselves while working on it; an online timer was provided on the website. Participants were directed to only work on MoodGYM while they were timing themselves. The website also included tips on navigating MoodGYM. The first module was estimated to take a half hour to 45 minutes to complete.

After completing the first module, users were directed to complete the Part 1 Follow-Up Survey. This was again done through a SurveyMonkey link. Users reported how long they had used MoodGYM and answered various other usage questions. The Part 1 Follow-Up Survey was estimated to take 5 to 10 minutes to complete. At the end of the survey was a description of Part 2 of the study. Users indicated whether they wanted to participate in the study or if they were unsure. After the survey was completed and the researcher confirmed completion, users were directed to email the researcher and identify which $10 gift card they wanted (Amazon, Playstation, etc.) The researcher emailed the gift card within 24 hours.

If participants indicated they were not interested in completing Part 2 of the study, they were informed they could still take the online Final Survey in three weeks and receive a $10 gift card. The Final Survey contained follow-up questions on acceptability and fidelity of the intervention and the RCADS and it was estimated to take 10 to 15 minutes to complete. One day before the three week mark, participants were sent a reminder email with a link to the Final Survey, as well as their ID number. Participants emailed the researcher after completing the Final Survey to receive their gift card, which was again emailed within 24 hours.

If participants indicated that they were interested in completing Part 2 of the study, or indicated they weren't sure, the researcher emailed them a researcher-created webpage with instructions on how to complete Part 2 of the study. Participants were directed to complete Modules 2, 3, and 5 of MoodGYM over three weeks. They were directed to skip Module 4, and

directions were given to do so. Another timer was provided for participants to time themselves while completing the modules. A link was given to a Follow-up Survey, which was to be completed after every module. The Follow-Up Survey contained usage questions such as how long they worked on the module and was estimated to take two to three minutes to complete. At the end of the Follow-up Survey, users had to indicate if they wanted to continue using MoodGYM. If so, they were reminded of directions; if not, they were told to email the researcher to take the Final Survey.

Participants were directed to finish the modules in three weeks; however, to encourage completion of the modules, they were also told they could complete the modules in less than three weeks as long as a Follow-up Survey was completed after every module. If participants finished the modules early, the researcher informed participants that they could take a Final Survey to receive their gift card. This was to be given three weeks from the time Module 1 was completed. Thus, everyone was directed to take the Final Survey three weeks after they completed Part 1 of the study, regardless of how much MoodGYM they had completed. All emails contained the number for the Boystown National Hotline, as well as a link to the study's Hotline Numbers number page.

A series of reminder emails were sent to participants who elected to complete Part 2 of the study. If participants had completed Module 2 within a week of Module 1, no reminder was sent. If they had not completed Module 2 by six days after the completion of Module 1, participants were sent an email with their username, password, ID number, and links to the Part 2 directions and MoodGYM. This pattern was completed for the completion of Module 3. Reminders for Module 5 were sent approximately 20 days after the completion of Module 1.

Participants were prompted to complete Module 5. However, they were also told they could complete the Final Survey and receive the gift card even if they had not completed Module 5.

The reminder emails encouraged participants to complete one module a week, but participants were also told they could stay in the study and work at their own pace even if they did not complete a module a week. Thus, to encourage completion of the modules, participants could complete the modules at a slower or faster pace and remain in the study. However, after three weeks, all participants were directed to stop working on MoodGYM and take the Final Survey. If participants had expressed a desire to complete Part 2 but had not completed additional modules, they received an email 20 days after they finished Module 1 with a link to the final survey.

Users were directed to email the researcher if they encountered technical difficulties. There were a few glitches with the usernames and passwords and surveys which were fixed without compromising the fidelity of the intervention. MoodGYM was down a few times for a brief period of time, and participants were told to try again later to complete the modules. No users emailed the researcher and expressed feeling upset. No participants inquired about extra help or requested counseling from the researcher. Users did not ask for referrals or other online resources to help with their depression or anxiety; however, hotline numbers and links to other referrals were available at all times on the study website.

CHAPTER 4

RESULTS

The following section is organized by study research question and provides results within the context of each research question.

**Feasibility Question One**

The study sought to answer the following question: What is the acceptability of the recruitment process for mental health professionals?

Contrary to what was predicted, there were not sufficient professionals willing to recruit for the study to obtain the planned 20 to 24 participants. Extensive efforts were made to engage mental health professionals to recruit participants for the study. (Please see Chapter 2, Methods, for more details.) Only two school psychologists in high schools in Montana agreed to participate. Neither school psychologist was able to successfully recruit participants.

The two school psychologists who participated provided feedback on the acceptability of the recruitment process, which provides more information for this research question. The school psychologists completed an online survey which contained both Likert-scale and open-ended questions. Although the results cannot be analyzed statistically, results of the survey are summarized to gain more information on recruitment in the schools, in particular, reasons why recruitment efforts may not have been successful.

The two school psychologists who were surveyed provided details on how recruitment was done in their schools. One school psychologist indicated he guest spoke in health class about depression and mood disorders, and he discussed the study in the resources section. After the presentation, he distributed small flyers to approximately 60 students. He also told an additional five students about the study and displayed 10 flyers around the school. The displayed flyers contained tabs for the students to remove if they were interested in the study. The school

psychologist noted on the survey that all the tabs had been removed from the flyers. The other school psychologist reported giving eight flyers to students and telling another five about the study without giving them a flyer. She reported displaying seven flyers around the school, but she did not notice if students took any tabs off the flyers. The school psychologist reported talking to parents about the study before talking with students. She noted that sometimes parents said no to the intervention.

When asked why he wanted to help recruit students for the study, one psychologist responded that he was "looking for treatment modalities to better meet the needs of students." The other school psychologist mentioned personally knowing the researcher and wanting to provide support for "some of our most at-risk students." When asked why an online treatment for depression, anxiety or stress would be useful for students at the school, one psychologist responded, "Many students do not have transportation to and from appointments. They also still struggle with some of the stigma associated with seeking treatment." She added, "Additionally, so many students are constantly connected to wi-fi/phones/i-pads, online treatment is an attempt to meet them where they're at." Another psychologist liked the idea of online treatment, but he stated that unless students "are intrinsically motivated your attrition rate is going to be very high without a physical presence to be accountable to."

The two school psychologists were asked to rate statements on the acceptability of the recruitment process. The response options were strongly disagree, disagree, neutral, agree or strongly agree. The results are presented in Table 1.

Table 1

*School Psychologist Recruitment Acceptability Survey (N = 2)*

| Statement | School Psychologist 1 | School Psychologist 2 |
|---|---|---|
| I think it's a good idea for school psychologists/counselors to give flyers for this study. | Agree | Strongly Agree |
| Students were interested in participating in the study. | Agree | Neutral |
| I felt comfortable giving a flyer to a student. | Agree | Agree |
| I felt comfortable giving the study website to a student. | Agree | Agree |
| The recruitment process was acceptable to students. | Agree | Agree |
| The intervention would be acceptable to students. | Neutral | Strongly Agree |
| I felt comfortable asking my principal for permission for the school to participate in the study. | Agree | Strongly Agree |
| I felt comfortable displaying flyers about the study around the school. | Agree | Strongly Agree |
| I would feel comfortable answering questions about the study from students. | Agree | Strongly Agree |
| I would feel comfortable answering questions about the study from parents. | Agree | Strongly Agree |
| I would be willing to participate again in recruitment for a similar project. | Agree | Strongly Agree |

School psychologists were asked to rate statements about online interventions using the aforementioned 1 to 5 scale. Results are presented in Table 2.

Table 2

*School Psychologist Online Intervention Acceptability Survey (N = 2)*

| Statement | School Psychologist 1 | School Psychologist 2 |
|---|---|---|
| Online interventions are safe and secure. | Neutral | Strongly Agree |
| Online interventions are helpful. | Neutral | Strongly Agree |
| Online interventions are acceptable to parents. | Neutral | Agree |
| Online interventions are acceptable to students. | Agree | Strongly Agree |
| I would feel comfortable recommending an online intervention to a student. | Agree | Agree |
| I would feel comfortable recommending an online intervention to a parent. | Agree | Agree |

School psychologists were also asked to select the best methods of recruitment for this type of study. They could pick more than one response. Their responses are outlined in Table 3.

Table 3

*School Psychologist Endorsements of Proposed Recruitment* Methods (*N* = 2)

| Proposed Method of Recruitment | School Psychologist 1 | School Psychologist 2 |
| --- | --- | --- |
| School psychologists and counselors giving study information to students | | X |
| Posting flyers in schools | X | X |
| Outside therapists/counselors | | X |
| Internet Ads | X | |
| Facebook | X | X |

School psychologists were asked open-ended questions about the barriers for recruiting students in schools for a study like this. The response to each open-ended question is listed in Table 4.

Table 4

*School Psychologist Responses to Open-Ended Question on Recruitment* (*N* = 2)

| Open-Ended Questions |
| --- |

Question 1: In your opinion, what do you think the barriers are for trying to recruit students in schools for a study like this?
- Response 1: 1. Teens being embarrassed about visiting with a parent or adult 2. Getting mental health professionals to be comfortable with internet interventions
- Response 2: Stigma. Not being familiar with the treatment or the person doing the research

Question 2: For students who are under age 18, do you think having to obtain parental consent could be a barrier for participation?
- Response 1: Absolutely.
- Response 2: Yes, but necessary.

Question 3: Are there reasons you think students might have been reluctant to participate in this study?
- Response 1: I think embarrassment about having to talk with a parent about depression for permission and I had at least one student make a comment about not texting the suicide hotline because then they would forever have their phone number.
- Response 2: Unsure.

Table 4 continued

| Open-Ended Questions, continued |
| --- |

Question 4: How do you think parents at your school would feel about their child being in this study?

- Response 1: Opinions would range from grateful for resources to frustrated that their child thought they even needed it.
- Response 2: Some would love the additional supports, others would shy away from it thinking that treatment would get tied to school.

Question 5: Please list any suggestions you have for improving the recruitment process.

- Response 1: I would also suggest possibly providing a script for students on how to approach their parents about participating in the study, especially if they haven't talked to them about feeling depressed before.
- Response 2: ?

## Feasibility Question Two

The study sought to answer the following question: What is the acceptability of the recruitment, consent and screening process for adolescents?

To answer this question, data were gathered from participants on the Pre-Intervention Survey ($n = 33$), which was taken before MoodGYM was completed. Data were also gathered on the Final Survey ($n = 25$), which was taken after MoodGYM was completed.

**Pre-Intervention Survey**.

Prior to the intervention, participants ($n = 33$) were asked to rate a series of statements concerning the consent and recruitment process. The items were scored on a scale from 1 to 5, ranging from strongly agree = 5 to strongly disagree = 1. In the tables, participants are described as "agreeing" with a statement if they endorsed "agree" or "strongly agree." The results are presented in Table 5.

Table 5

*Pre-Intervention Survey: Ratings of Consent and Recruitment Process (N = 33)*
Items rated on a scale from 1 = strongly disagree to 5 = strongly agree.

| Statement | Mean (Standard Deviation) | % Agreed | % Neutral | % Disagreed |
|---|---|---|---|---|
| I was comfortable signing a permission form online. | 4.21 (.89) | 88% | 3% | 9% |
| The study website (onlineteenstudy.org) explained a lot about the study. | 3.94 (.93) | 79% | 9% | 12% |
| I was comfortable completing the survey online. | 4.39 (.70) | 93% | 3% | 3% |
| This survey did not take too long. | 4.36 (.65) | 97% | | 3% |
| Signing up for this study was not difficult. | 4.45 (.67) | 97% | | 3% |

Participants were asked what they thought were the best methods for telling students about the study, and they were allowed to select more than one option. There were 32 responses—one participant skipped this section. Twenty participants (62.50%) endorsed that school psychologists/counselors should post flyers in schools. Fourteen participants (43.75%) indicated that school psychologists/counselors should give flyers to individual students. Sixteen participants (50%) agreed that outside counselors or therapists should tell students about the study. Thirty participants (93.75%) endorsed that researchers should post about the study on social media, and 17 (53.13%) agreed they should post on websites about the study.

Participants (*n* = 33) were asked which social media sites were best for getting out word on the study. They were allowed to select more than one option. Thirty (30) participants (90.91%) selected Tumblr, 25 participants (75.76%) selected Facebook, 17 participants (51.52%)

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selected Twitter, eight participants (24.24%) selected Instagram, and one participant (3.03%) selected Pinterest.

**Post Intervention Survey**

On the Final Survey, participants were asked additional questions on recruitment. While 33 participants completed the initial survey, only 25 completed the final survey, and the *n* ranges from 23 to 25 on the responses. Results are presented in Table 6.

Table 6

*Final Survey: Ratings of Study and Recruitment Process (N = 23-25)*
Items rated on a scale from 1 = strongly disagree to 5 = strongly agree.

| Statement | Mean (Standard Deviation) | % Agreed | % Neutral | % Disagreed |
|---|---|---|---|---|
| I would still choose to be in this study if I could go back in time. | 4.20 (.96) | 80% | 12% | 8% |
| I am glad I was given a flyer or a web link for this study. | 4.08 (.86) | 76% | 20% | 4% |
| I think it's a good idea for researchers to post on social media about this study. | 4.54 (.51) | 100% | | |
| I am glad I learned about this study on social media. | 4.17 (.92) | 84% | 8% | 8% |
| I think counselors at university health centers should tell students about this study. | 4.21 (.78) | 79% | 21% | |
| I think students should be told about the study at college orientation. | 3.91 (1.08) | 74% | 9% | 17% |

**Feasibility Question Three**

The study sought to answer the following question: What is the acceptability of the intervention to adolescents?

The acceptability of the intervention was measured in several ways, as follows. (1) Adherence; rates of adherence to MoodGYM were measured. This was done both through self-report of participants and examination of data from the program itself. (2) Social Validity; the social validity of the intervention was measured both pre-intervention and post-intervention using Likert scale surveys. (3) Intervention Acceptability; the acceptability of MoodGYM was measured through rating scales, first on the Follow-up Survey after Module 1, and then again on the Final Survey after all modules were completed. (4) Nonparticipation Survey; those participants who did not complete the MoodGYM modules provided information on why they stopped using MoodGYM on the Final Survey. There was also a Nonparticipation Survey on the study website for those who chose not to participate in the study but wanted to give feedback. (5) Depression Treatment Acceptability; treatment acceptability of various methods to treat depression, including MoodGYM, was measured. (6) Qualitative data; participants provided responses to open-ended survey questions. Taken together, these data provided a multi-faceted view of the intervention acceptability.

**(1) Adherence Data**

For part 1 of the study, participants completed Module 1 then immediately took the Part 1 Follow-Up Survey. Adherence to Module 1 was measured by a series of questions on the Part 1 Follow-Up Survey. For part 2 of the study, participants were directed to complete a module a week of MoodGYM on their own. After completing each module, they were to complete the Weekly Follow-Up Survey. This contained a series of questions on adherence, including if they finished the module and how long it took them.

Thirty-one (31) participants completed Module 1 and the Part 1 Follow-Up Survey. Adherence data for the completion of subsequent modules was measured through the results of

the Weekly Follow-Up Survey. The information in the MoodGYM online "workbook" was also reviewed by the researcher, enabling the researcher to verify module usage. The MoodGYM workbook keeps a log of exercises, quizzes, and modules completed by participants. However, the results of the Weekly Follow-Up Survey did not always match the data in the MoodGYM workbook. By examining MoodGYM data, it was discovered that six participants had completed part of some MoodGYM modules without logging it in the Weekly Follow-Up Survey. The reasons for this were unclear; perhaps participants wanted to use MoodGYM without the constraints of the study. While the MoodGYM workbook tracks quizzes and exercises, participants can skip through pages in the module without reading them. Thus, a participant could skip through all pages of a module and it still appears "finished" according to the MoodGYM workbook. Therefore, only modules which were completed and logged in the Weekly Follow-Up Survey were considered finished in data analysis.

Based on the inclusion criterion that modules were actually completed, the mean number of the four MoodGYM modules completed by participants was 2.35 ($SD = 1.36$). This figure can be further broken down by examining the completion of individual modules. Completion of the modules is sequential; a person can only complete Module 3 after completing Module 2 and can only complete Module 5 after completing Module 3. (Module 4 was skipped). Thirty-three (33) participants completed the Pre-Survey, and 31 of those completed Module 1 and the Part 1 Follow-Up Survey. There were 18 participants who went on to complete Module 2 after completing Module 1. There were 15 participants who then completed Module 3. Finally, 10 participants completed Module 5. Therefore, of the 33 participants who completed the Pre-Survey, ten (30%) completed all the modules offered by this study (Modules 1, 2, 3, and 5). In

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addition, 25% of those who completed the Pre-Intervention Survey did not complete the Final Survey.

The number of exercises completed was measured by directly examining data from the MoodGYM workbook. The minimum number of exercises completed by participants was four and the maximum was 22. The mean number of exercises completed was 10.58 ($SD = 6.63$). The number of characters entered into open-ended exercises was also measured in order to assess the amount of effort participants put into completing the written exercises. The characters from all exercises were added together to create a total score. The range was from 0 to 6,173 characters. The mean number of characters in open-ended MoodGYM exercises was 1,320.42 ($SD =$ 1,688.94).

The total amount of time spent on MoodGYM was measured through self-report. Participants timed themselves completing Module 1 and reported the time on the Part 1 Follow-Up Survey. For subsequent modules, participants timed themselves completing the modules and reported their usage time on the Weekly Follow-Up Survey. Two participants completed Modules 2, 3, and 5 in the same day and then estimated how long it took to complete all three modules. Their estimates were 2 hours and 6 hours, and these were excluded from analysis. For the 29 remaining participants, the mean total time spent on all modules was 91.21 minutes ($SD =$ 76.9, Range = 8 to 290.). The mean time spent per module was calculated by aggregating the data from the Part 1 Follow-Up Survey and the Weekly Follow-Up Surveys. The mean time per module was 41.33 minutes ($SD = 25.64$, Range = 8 to 126). Time data for each module was also analyzed separately as reported in Table 7. The means were not equal across modules, with the most time being spent on Module 3, followed by Module 2, Module 1, and then Module 5. These discrepancies are likely directly related to the number of exercises in each module: Module 3 has

10 exercises, including a long quiz related to activity scheduling. Module 2 has 7 exercises,

Module 1 has 4 exercises, and Module 5 only has 1 exercise.

Table 7

*Self-Reported Time in Minutes Spent Using MoodGYM Modules*

| Module | *n* | *M* | *SD* | *Range* |
|---|---|---|---|---|
| Module 1 | 29 | 33.28 | 19.56 | 8-105 |
| Module 2 | 15 | 45.07 | 14.75 | 18-68 |
| Module 3 | 13 | 60.18 | 33.13 | 19-126 |
| Module 5 | 8 | 23.71 | 13.38 | 9-45 |

*Data sub-set*. Usage statistics were compiled separately for those participants who went

beyond Module 1. There were 10 participants who completed all of MoodGYM and seven

participants who completed part of it beyond Module 1. For these 17 participants, the mean of

the total completed modules was 3.47 (*SD* = 0.72). The mean number of completed exercises

was 15.12 (*SD* = 4.94). The mean number of characters entered into open-ended exercises was

2,127.53 (*SD* = 1,912.01).

Ten participants (30%) completed modules 1, 2, 3, and 5, and the average number of days

it took them to finish the four modules was calculated. Participants were directed to complete a

module a week, which means that it should have taken 21 days from the day Module 1 was

completed until the day Module 5 was completed. However, participants were allowed to

complete the modules in a shorter period of time as long as they recorded their usage on the

Weekly Follow-Up Survey. This was to maximize rates of completion of the program by

allowing participants to set their own timeline for completing the modules within the three

weeks. Three participants completed the four modules in one day. The mean number of days to

finish MoodGYM was 13.20 ($SD = 7.67$). This is less than the 21 days participants were allowed to finish the program in this study.

**Time Fidelity Data.** The surveys contained questions designed to assess how accurate participants were in reporting the time they spent using MoodGYM. For the Part 1 Follow-Up Survey, 29 participants reported using a timer while completing Module 1, while two did not. Those who did not use a timer estimated how long they had worked on MoodGYM. One participant estimated 45 to 60 minutes, which was entered as 53 minutes. One participant estimated one hour and 45 minutes. This was not entered due to it being 2.54 standard deviation units above the mean of 41.33 minutes. All 31 participants were asked how confident they were in the accuracy of the time they reported. The options were: not confident at all, somewhat confident, and very confident. Six participants (19%) responded they were somewhat confident, while 25 participants (81%) responded that they were very confident.

Participants were asked to time themselves after the completion of every subsequent module and enter the results into the Weekly Follow-up Survey. There were 38 responses to the survey. There were 36 participants who used a timer, while two did not. The two who did not use a timer reported estimates of 1.5 hours and 2 hours. These were excluded from analyses because they were respectively 1.90 and 3.08 standard deviation units above the mean. Participants were again asked how confident they were in the accuracy of the time they reported, with the options being: not confident at all, somewhat confident, and very confident. Nine participants (26%) indicated they were somewhat confident, while 27 participants (74%) reported they were very confident. Of note, no participants reported they had used MoodGYM without completing the Weekly Follow-Up Survey afterwards.

**Survey Fidelity Data.** To measure fidelity of survey responses overall, respondents were asked, "How honestly did you answer these survey questions?" They were asked this question both at the end of the Part 1 Follow-Up Survey and the Final Survey. The choices were: not very honestly at all, somewhat honestly, and very honestly. All participants responded that that they had answered the survey questions very honestly.

**MoodGYM component usage.** After the completion of each module, participants were asked to rate how they used various components of MoodGYM and the overall effort they put forth on the module. These statements were designed to assess if participants had used MoodGYM  materials as intended, and this provides richer information than just relying on the number of modules and exercises completed. Participants rated a series of statements on the Part 1 Follow-Up Survey, which was after the completion of Module 1. They rated those same statements on the Weekly Follow-Up Survey after they completed subsequent modules. The results from the Part 1 Follow-Up Survey are shown in Table 8.

Table 8

*Part 1 Follow-Up: MoodGYM Usage Ratings (N=31)*
Items rated on a scale from 1 = strongly disagree to 5 = strongly agree.

| Statement | Mean (Standard Deviation) | % Agreed | % Neutral | % Disagreed |
|---|---|---|---|---|
| I answered the quizzes truthfully. | 4.81 (0.40) | 100% | | |
| I read the feedback from the quizzes. | 4.71 (0.53) | 97% | 3% | |
| I read all the material teaching me concepts. | 4.23 (0.88) | 84% | 10% | 6% |
| I read about all the characters | 4.48 (0.72) | 86% | 11% | 3% |
| I clicked "next" on the pages without reading the material | 1.71 (0.90) | 5% | 3% | 92% |

Table 8 continued

| Statement | Mean (Standard Deviation) | % Agreed | % Neutral | % Disagreed |
|---|---|---|---|---|
| I read about how the characters reacted to events | 4.48 (0.51) | 92% | 8% | |
| I completed the multiple choice exercises | 4.52 (0.57) | 94% | 6% | |
| I completed the written exercises (meaning I typed in words in response to questions) | 4.42 (0.89) | 78% | 3% | 19% |
| I tried my best on the exercises | 4.55 (0.57) | 89% | 11% | |
| I clicked "next" on the exercises without completing them | 1.42 (0.72) | 14% | 5% | 81% |
| Overall, I tried my hardest on this module of MoodGYM | 4.52 (0.51) | 83% | 11% | 6% |

For the Weekly Follow-Up Survey, results were aggregated for the 36 surveys which were completed after participants finished a module. This provides a summary of how participants used MoodGYM for all modules following Module 1. The results from the Weekly Follow-Up Survey are shown in Table 9. Means and standard deviations are provided, as well as the percentage of respondents who agreed, were neutral, or disagreed with a statement. "Agreed" included agree and strongly agree responses, while "disagreed" included disagree and strongly disagree responses. The questions are phrased positively (i.e. "I read all about the characters") with the exception of two negatively worded questions (i.e. "I clicked 'next' on the pages without reading the material."). Note the high percentage under disagreed in response to the two negatively worded questions. Inclusion of negatively worded questions validates that the participant is considering each item as written rather than randomly answering.

Table 9

*Weekly Follow-Up Survey: MoodGYM Usage Ratings (N = 36)*
Items rated on a scale from 1 = strongly disagree to 5 = strongly agree.

| Statement | Mean (Standard Deviation) | % Agreed | % Neutral | % Disagreed |
|---|---|---|---|---|
| I answered the quizzes truthfully. | 4.73 (0.45) | 100% | | |
| I read the feedback from the quizzes. | 4.65 (0.54) | 97% | 3% | |
| I read all the material teaching me concepts. | 4.67 (0.48) | 100% | | |
| I read about all the characters | 4.38 (0.83) | 86% | 11% | 3% |
| I clicked "next" on the pages without reading the material | 1.51 (0.90) | 5% | 3% | 92% |
| I read about how the characters reacted to events | 4.49 (0.69) | 92% | 8% | |
| I completed the multiple choice exercises | 4.64 (0.59) | 94% | 6% | |
| I completed the written exercises (meaning I typed in words in response to questions) | 4.11 (1.22) | 78% | 3% | 19% |
| I tried my best on the exercises | 4.35 (0.68) | 89% | 11% | |
| I clicked "next" on the exercises without completing them | 1.81 (1.13) | 14% | 5% | 81% |
| Overall, I tried my hardest on this module of MoodGYM | 4.19 (0.84) | 83% | 11% | 6% |

**(2) Social Validity of the Intervention**

Participants rated social validity statements on the 13-item Pre-Intervention Survey and

again on the 14-item Final Survey after completing MoodGYM.  The statements were the same,

for both surveys with the addition of 1 item ("would you recommend this to a friend?")  Wording

of statements were in pre- and post- language (will vs. did). The statements were rated on a 5-

point Likert scale: 1 = strongly disagree and 5 = strongly agree.

   **Pre-Intervention Survey.** Results for the Pre-Intervention Survey are show in Table 10.

Table 10

*Pre-intervention Survey: Social Validity (N=32-33)*
Items rated on a scale from 1 = strongly disagree to 5 = strongly agree.

| Statement<br> "The online program will…" | Mean (Standard<br>Deviation) |
| --- | --- |
| Be easy for me to stick with | 3.85(0.71) |
| Be safe and secure | 4.03(0.64) |
| Teach me important skills | 3.85(0.71) |
| Help me change in important ways | 3.70(0.77) |
| Help me feel better about myself | 3.61(0.70) |
| Improve my communication skills | 3.33(0.69) |
| Improve my relationships | 3.42(0.56) |
| Help me handle stress better | 3.84(0.68) |
| Will fit into my regular schedule | 3.91(0.80) |
| Will not take too much time | 3.76(0.79) |
| Will help me deal with my<br>emotions in a positive way | 3.70(0.73) |
| Will help me understand myself<br>better | 3.58(0.75) |
| Will help me see my life differently | 3.45(0.83) |

   **Post-Intervention Survey**. Results for the post intervention Final Survey are shown in

Table 11.

Table 11

*Post-Intervention Survey: Social Validity (N=24-25)*
Items rated on a scale from 1 = strongly disagree to 5 = strongly agree.

| Statement<br>"MoodGYM…" | Mean (Standard Deviation) |
| --- | --- |
| Was easy for me to stick with | 3.00 (1.08) |
| Was safe and secure | 4.40 (0.58) |
| Taught me important skills | 3.71 (0.91) |
| Helped me change in important ways | 3.40 (0.91) |
| Helped me feel better about myself | 3.32 (0.99) |
| Improved my communication skills | 2.92 (1.00) |
| Improved my relationships | 2.83 (0.82) |
| Helped me handle stress better | 3.20 (0.96) |
| Fit into my regular schedule | 3.33 (1.13) |
| Did not take too much time | 3.12 (1.09) |
| Helped me deal with my emotions in a positive way | 3.60 (0.96) |
| Helped me understand myself better | 3.60 (1.00) |
| Helped me see things in my life differently | 3.56 (1.00) |
| Is something I would recommend to friends | 3.80 (0.91) |

To explore whether there was any significant difference in overall social validity pre- and post-intervention, the researcher calculated composite scores, which were an aggregate of responses to the social validity questions. Only the scores from participants who had completed

both the Pre-Intervention Survey and the Final Survey were included ($n = 25$). The pre-intervention social validity composite mean was 3.70 ($SD = .44$). The post-intervention social validity composite mean was 3.41 ($SD = .72$). A paired samples $t$-test was performed to look for changes to overall social validity after the intervention, and the test was nonsignificant, $t(24)$ $=1.77$, p $= .09$, $d = .37$. An item-level comparison was conducted with more paired samples $t$-tests, and it was found there were significant differences for six items. Significantly more participants agreed with the idea that MoodGYM was safe and secure after the intervention, $t(24)$ $= -2.45$, p $< .05$, $d = .78$. For the remaining five items, the social validity of the intervention decreased after MoodGYM was completed. After the intervention, ratings were significantly reduced for MoodGYM improving relationships, $t(23) =2.70$, p $< .05$, $d = .40$. Participants were also less likely to agree that MoodGYM helped them handle stress better, $t(23) = 3.11$, p $< .05$, $d$ $= .60$. Ratings for MoodGYM being easy to stick with were also lower, $t(24) = 4.45$, p $< .001$, $d$ $= 0.78$. In addition, participants were less likely to agree that MoodGYM fit into their regular schedule $t(23) = 2.23$, p $< .05$, $d = .47$. Finally, ratings were reduced for MoodGYM not taking too much time $t(24) = 2.78$, p $< .05$, $d = .56$.

### (3) Acceptability of MoodGYM Program

Participants were asked to rate a series of statements regarding their experiences using MoodGYM. The statements were both positive (i.e. "I liked the content of MoodGYM") and negative (i.e. "There was too much reading.") As indicated in Table 12, on the Part 1 Follow-up Survey, after the completion of Module 1, the majority of participants agreed with most positive statements about MoodGYM. There were also negative statements about MoodGYM included in these questions, and the majority of participants disagreed with them.

Table 12

*Part 1 Follow-Up: MoodGYM Usage Ratings (N=31)*
Items rated on a scale from 1 = strongly disagree to 5 = strongly agree.

| Statement | Mean (Standard Deviation) | % Agreed | % Neutral | % Disagreed |
|---|---|---|---|---|
| I thought MoodGYM was helpful. | 3.71 (0.78) | 65% | 29% | 6% |
| Using MoodGYM made me feel upset. | 2.52 (1.12) | 26% | 13% | 61% |
| I liked the content of MoodGYM | 3.87 (1.06) | 71% | 13% | 16% |
| I enjoyed working on MoodGYM | 3.58 (1.09) | 55% | 29% | 16% |
| I thought MoodGYM was fun | 3.13 (0.96) | 35% | 39% | 26% |
| The reading was too hard | 1.90 (0.91) | 10% | 6% | 84% |
| MoodGYM made me feel better | 3.13 (0.76) | 32% | 52% | 16% |
| MoodGYM made me feel more hopeful | 3.42 (0.92) | 61% | 19% | 20% |
| There was too much reading | 2.35 (1.23) | 19% | 10% | 71% |
| There were too many quizzes | 2.39 (1.36) | 19% | 10% | 71% |
| The module was too long | 2.26 (1.00) | 13% | 6% | 81% |
| There was too much slang I didn't understand (i.e. words like Uni, Foxtel) | 2.77 (1.28) | 35% | 13% | 52% |
| I would complete MoodGYM on my own outside of this study | 3.58 (0.85) | 71% | 16% | 13% |
| I think MoodGYM would teach high school students valuable skills | 4.00 (0.82) | 74% | 23% | 3% |
| I feel I could explain the components of CBT to someone else | 3.52 (1.26) | 55% | 16% | 29% |
| I will use the information from MoodGYM in my everyday life | 3.65 (0.84) | 65% | 29% | 6% |

Participants also responded to these positive and negative statements regarding

MoodGYM in the Final Survey, with the results shown in Table 13.

Table 13

*Final Survey: MoodGYM Usage Ratings (N=17)*
Items rated on a scale from 1 = strongly disagree to 5 = strongly agree.

| Statement | Mean (Standard Deviation) | % Agreed | % Neutral | % Disagreed |
|---|---|---|---|---|
| I thought MoodGYM was helpful | 4.00 (0.87) | 76% | 18% | 6% |
| Using MoodGYM made me feel upset | 2.40 (0.94) | 18% | 17% | 65% |
| I liked the content of MoodGYM | 3.77 (1.03) | 76% | 12% | 12% |
| The reading was too hard | 2.00 (0.94) | 12% | 6% | 82% |
| There was too much reading | 2.47 (1.23) | 24% | | 76% |
| There were too many quizzes | 2.82 (1.19) | 35% | 18% | 47% |
| The modules were too long | 2.47 (1.18) | 12% | 29% | 59% |
| There was too much slang I didn't understand (i.e. words like Uni, Foxtel) | 2.88 (1.45) | 41% | 6% | 53% |
| I would complete MoodGYM on my own outside of this study | 3.71 (1.26) | 71% | 6% | 23% |
| I think MoodGYM would teach high school students valuable skills | 4.06 (0.56) | 88% | 12% | |
| I feel I could explain the components of CBT to someone else | 3.76 (1.09) | 76% | | 24% |
| I will use the information from MoodGYM in my everyday life | 3.59 (1.00) | 59% | 23% | 18% |

Participants were asked to rate the components of MoodGYM both on the Part 1 Follow-Up Survey and the Final Survey. The options were very poor = 1, poor = 2, neutral = 3, good = 4, and very good = 5.

**Part I Follow Up Survey.** The results for the Part 1 Follow-Up Survey are shown in Table 14. A component was counted as "good" if it was rated good or very good, and a component was counted as "poor" if it was rated poor or very poor.

Table 14

*Part 1 Follow-Up Survey: Ratings of MoodGYM Components (N=31)*
Items rated on a scale from 1 = very poor to 5 = very good.

| MoodGYM Component | Mean (Standard Deviation) | % Poor | % Neutral | % Good |
|---|---|---|---|---|
| Quizzes and feedback from quiz results | 4.10 (0.65) | | 16% | 84% |
| Reading | 3.68 (0.79) | 7% | 32% | 61% |
| Diagrams | 3.90 (1.01) | 6% | 26% | 68% |
| Multiple Choice Exercises | 3.71 (0.90) | 13% | 19% | 68% |
| Written Exercises (you have to type in answers) | 3.81 (0.95) | 10% | 16% | 74% |
| Characters | 3.61 (1.17) | 19% | 26% | 55% |
| How would you rate MoodGYM overall? | 4.00 (0.63) | | 19% | 81% |

**Final Survey.** The results from the Final Survey are shown in Table 15. Results were similar with the Part 1 Follow-Up Survey on the Final Survey, except the majority of participants rated the characters as poor or neutral rather than good. The vast majority rated MoodGYM overall as good or very good.

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Table 15

*Final Survey: Ratings of MoodGYM Components (N=17)*
Items rated on a scale from 1 = very poor to 5 = very good.

| MoodGYM Component | Mean (Standard Deviation) | % Poor | % Neutral | % Good |
|---|---|---|---|---|
| Quizzes and feedback from quiz results | 4.00 (1.06) | 6% | 18% | 76% |
| Reading | 3.71 (1.16) | 18% | 12% | 70% |
| Diagrams | 4.12 (0.78) | | 24% | 76% |
| Exercises | 3.63 (0.81) | 12% | 19% | 69% |
| Characters | 3.47 (1.37) | 29% | 24% | 47% |
| How would you rate MoodGYM overall? | 4.24 (0.75) | 6% | | 94% |

On both the Part 1 Follow-Up Survey and the Final Survey, participants were asked

questions about MoodGYM and its perceived helpfulness for their depression and anxiety. After

completion of Module 1, participants were asked, "If you continued MoodGYM, how much

would it help with your depression?" The options were 1 = not at all, 2 = a little, and 3 = a lot.

The overwhelming majority (83.3%) said MoodGYM would help them a little (*M* = 2.03, *SD*

=.41). Participants were also asked, "If you continued MoodGYM, how much would it help with

your anxiety?" Again, the overwhelming majority (74.2%) answered a little (*M* = 2.00, *SD* =

.52).

On the Final Survey, which took place after completion of subsequent modules,

participants again answered questions on depression and anxiety. There were 17 respondents:

this included both the 10 participants who completed all of MoodGYM and the 7 participants

who only completed part of Modules 2, 3 and 5. Participants were asked, "How much did

MoodGYM help you with your depression?" The majority (64.7%) responded a little ($M = 1.88$, $SD = .60$). Participants were also asked, "How much did MoodGYM help with your anxiety?" The results were more mixed here, with 47.1% reporting a little, 23.5% reporting a lot, and 29.4% reporting not at all. The mean was 1.94 ($SD = .75$). Of note, the phrasing of the questions assumed the participants were experiencing both anxiety and depression. Their responses may have indicated they did not have anxiety (but not depression) or depression (but not anxiety).

Although not included in the social validity composite, participants were asked general questions about the acceptability of the intervention in the Pre-Survey. Participants were given a series of statements and asked to agree or disagree, with the options ranging from 1 = strongly disagree to 5 = strongly agree. The overwhelmingly majority of participants (93.9%) agreed or strongly agreed that they would feel comfortable completing the intervention online ($M = 4.27$, $SD = .57$). Most of the participants (87.9%) agreed or strongly agreed that they would feel most comfortable completing the intervention at home ($M = 4.33$, $SD = .78$). Most participants disagreed or strongly disagreed (75.7%) that they would feel most comfortable completing the intervention at school ($M = 2.12$, $SD = .86$). All participants agreed or strongly agreed that they were glad they could complete the intervention any time they wanted ($M = 4.52$, $SD = .51$). Participants were given the statement, "I will feel more comfortable completing the intervention at home than talking to a counselor, psychologist, social worker, or doctor in person about my problems." Results were mixed here, although most participants (51.5%) agreed or strongly agreed with the statement ($M = 3.55$, $SD = 1.09$).

On the Final Survey, participants were given a series of statements to assess the acceptability of the study overall. Participants had to indicate the degree to which they agreed with the statements, with the choices ranging from 1 = strongly disagree to 5 = strongly agree.

Participants overwhelmingly agreed or strongly agreed (96%) that they felt comfortable completing the intervention online ($M = 4.36$, $SD = .70$). This is the same question which was asked in the Pre-Intervention Survey, and it was asked again to gauge if comfort with online interventions changed after exposure to more of MoodGYM. The majority of participants also agreed or strongly agreed (96%) that the location where they completed the intervention worked well ($M = 4.40$, $SD = .71$). In order to assess their satisfaction with the intervention, participants were asked to rate the following statement: "I would tell other kids who had similar problems about the intervention." The majority of participants (76%) agreed with this ($M = 4.00$, $SD = .71$). A hallmark indicator of acceptability and satisfaction is the willingness to recommend the intervention. In order to assess their satisfaction with the study overall, participants were asked to rate the following statement: "I would still chose to be in this study if I could go back in time." The majority (80%) agreed with this statement ($M = 4.20$, $SD = .96$).

**(4) Reasons for Not Participating**

During the Final Survey, participants who did not finish MoodGYM were presented with possible reasons they may have stopped using it. Participants could select more than one answer. There were 15 participants who answered the questions: 8 participants had only finished Module 1 of MoodGYM, and 7 participants had completed more than Module 1 but had not finished Modules 2, 3, and 5. The results are reported in Table 16. Of note, participants endorsed several reasons for not participating which may relate to depressive symptoms, including losing interest in MoodGYM and not being able to concentrate to complete it. Several of the options referred to participants experiencing distress as they completed the intervention. The participants were provided with a link to the study website, which had a resource page that contained information

Table 16

*Final Survey: Reasons for Not Participating (N = 15)*

| Statement | *n* | % of participants |
|---|---|---|
| I already knew the material from previous counseling experience. | 7 | 47% |
| It was difficult for me to complete a module every week. | 7 | 47% |
| I didn't think MoodGYM was helpful. | 5 | 33% |
| The modules took too long to complete. | 4 | 27% |
| The material became repetitive. | 3 | 20% |
| I got distracted by something else. | 3 | 20% |
| I didn't have time in my schedule to complete the intervention. | 3 | 20% |
| I lost interest or didn't feel like it. | 3 | 20% |
| I couldn't concentrate to complete it. | 2 | 13% |
| I got other treatment for depression. | 2 | 13% |
| I felt better so I stopped using the program. | 2 | 13% |
| I didn't like the content of MoodGYM. | 1 | 7% |
| Using MoodGYM made me feel upset. | 1 | 7% |
| I had technical problems. | 1 | 7% |
| Taking the surveys made me feel upset. | 1 | 7% |
| The study interfered with my other activities outside school. | 1 | 7% |
| The study interfered with my job. | 1 | 7% |
| I got too sad. | 1 | 7% |
| I got too anxious. | 1 | 7% |

on several 24/7 mental health hotlines. There were also links to help find in-person counseling. A link to the study website and these resources were included in every email communication with participants. One participant endorsed that MoodGYM made them upset, while one other participant indicated that the surveys made them upset. Another participant indicated they got too sad to finish MoodGYM, while another indicated they became too anxious. The wording did not imply that MoodGYM itself made the participants anxious or sad, but it is possible. It is also possible that participants felt too anxious or sad already and this kept them from completing MoodGYM.

Participants were also asked to provide their own reasons for stopping using MoodGYM, and two did so. One stated that she "went on vacation and could not access the computer." Another explained that he doesn't think he's "able to be helped." Participants were also asked if they completed a module a week of MoodGYM, and if they did not complete it, they were asked to explain why. One stated that she was "too busy with work" and another explained that he did not complete Module 5 "since I kept procrastinating and ended up missing the deadline."

On the study website, there was a "Nonparticipation Survey" which could be completed by those who had visited the website but did not want to participate in the survey. Eighteen potential participants who decided not to participate chose to complete the survey. Non-participants ($N =18$) were asked to select statement(s) which may have influenced their decision, giving them the option to pick more than one statement. The results of the survey are reported in Table 17. Of note, participants expressed concerns over privacy and signing a consent form. Several indicated a preference for completing MoodGYM on their phone or tablet. Inability to complete intervention may have been an issue, as several reported that they would have trouble finding a quiet place to complete the intervention or did not have internet access.

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Table 17

*Nonparticipation Survey: Reasons for Not Participating (N = 18)*

| Statement | *n* | % of participants |
|---|---|---|
| I would rather complete the intervention on my phone. | 6 | 33.3% |
| I don't think the intervention will help me. | 6 | 33.3% |
| I don't think I am depressed. | 5 | 27.8% |
| I don't think I'm anxious. | 3 | 16.7% |
| I have concerns over the privacy of my data. | 3 | 16.7% |
| I don't have enough information on the study to make a decision. | 3 | 16.7% |
| I would have trouble finding a quiet place to complete the intervention. | 2 | 11.1% |
| I don't have regular access to the internet. | 2 | 11.1% |
| I would rather complete the intervention on my tablet. | 2 | 11.1% |
| The study will take up too much of my time. | 1 | 5.6% |
| I want to seek other treatment options. | 1 | 5.6% |
| I want to talk to a counselor in person. | 1 | 5.6% |
| I didn't like the study website. | 0 | 0% |
| I want to participate in therapy with other adolescents. | 0 | 0% |
| I want to use a different online treatment. | 0 | 0% |

Participants were allowed to provide their own reasons for not participating in the study, and five did so. Two stated that they were not from the United States. One explained that he was "nervous about being open with problems." Another indicated that "parents don't know or would be uncomfortable if they found out." Finally, one responded: "I'm not entirely sure if I could be diagnosed as depression/anxiety."

Respondents to the Nonparticipation Survey were asked to rate a series of statements in order to assess their perception of the acceptability of online surveys, intervention, and studies. The results are shown in Table 18.

Table 18

*Nonparticipation Survey from Study Website (N=19)*
Items rated on a scale from 1 = very poor to 5 = very good.

| Statement | Mean (Standard Deviation) | % Agreed | % Neutral | % Disagreed |
|---|---|---|---|---|
| Online interventions are safe and secure. | 3.11 (.88) | 31% | 53% | 16% |
| Online surveys are safe and secure. | 3.21 (.79) | 32% | 42% | 26% |
| I feel comfortable signing a consent form online. | 2.84 (.96) | 32% | 26% | 42% |
| I feel comfortable with completing an online survey. | 3.74 (1.05) | 71% | 5% | 21% |
| I feel comfortable with completing an online intervention. | 3.21 (.85) | 37% | 42% | 21% |
| If feel study was anonymous, I would have participated. | 3.74 (1.15) | 58% | 32% | 10% |
| I think it's a good idea for school psychologists and counselors to give flyers to students for this study. | 3.58 (1.02) | 68% | 16% | 16% |

**(5) Comparing Treatments for Depression**

On the Part 1 Follow-Up Survey, participants ($n = 31$) had to answer a question about treatment preferences in order to gauge the acceptability of MoodGYM as compared to other treatment options. Participants were asked to rank order various methods to treat their depression, anxiety, and stress. There were 10 options, and participants had to rank each item 1 to 10 in their order of treatment preference. The results are presented in Table 19. The number of participants who ranked each treatment option as their top choice is listed. Of note, after being exposed to Module 1 of MoodGYM, it was the preferred treatment modality for only one person. Adolescents expressed a preference to visit professionals in-person, either by talking with a

Table 19

*Part 1 Follow-up Survey: First Choice for Depression Treatment (N=31)*

| Treatment | $n$ | % of participants |
|---|---|---|
| Talk to a counselor in person | 11 | 35% |
| Go to a doctor or psychiatrist | 6 | 19% |
| Chat with other adolescents online | 4 | 13% |
| Talk to a friend | 4 | 13% |
| Read a book | 3 | 10% |
| Use MoodGYM | 1 | 3% |
| Chat online with a counselor | 1 | 3% |
| Text with a counselor | 1 | 3% |
| Talk to my parents or a relative | 0 | 0% |
| Meet in a group in-person with other adolescents | 0 | 0% |

counselor or going to a psychiatrist or doctor. However, group treatment with other adolescents, even though it would have been in-person, was not the top treatment of choice for any adolescent.

During the Final Survey, participants ($n = 25$) were asked if they received other treatment for depression during the study. There were 10 participants (40%) who reported receiving other treatment. Participants were asked to describe what type of treatment they received and five participants responded. All indicated they had received therapy or counseling, and three had also received medication. Participants were asked to rate the following statement: "MoodGYM was a helpful addition to this treatment." The options were rated on a 5 point scale, with 1 = strongly disagree and 5 = strongly agree. Sixty (60) percent of those respondents who received other help agreed or strongly agreed that MoodGYM was a helpful addition to treatment ($M = 3.60$, $SD = .84$). Participants were also asked to rank the following statement: "I would suggest that other kids with similar problems complete MoodGYM at the same time they complete other treatment." There were eight responses (80%) to this question, and all respondents either agreed or strongly agreed with the statement ($M = 4.25$, $SD = .46$). Participants were asked if they discussed the material in MoodGYM with a counselor. Two indicated they had, and they provided more information in response to an open-ended question. One stated that he "mainly discussed the concepts I learned within MoodGYM with a counselor and they expanded upon them." Another explained that she "took notes about what I did in MoodGYM and then my counselor and I went over them together."

**(6) Qualitative Analysis of Open-Ended Survey Questions**

Participants responded to seven open-ended survey questions, two of which were on the Pre-Intervention Survey and five were on the Final Survey. The questions and the number of participants who provided responses to each question are shown in Table 20.

Table 20

*Open-Ended Survey Questions and Number of Responses*

| Question | # of respondents |
|---|---|
| "How else do you think students should learn about the study?" | 14 |
| "Please list suggestions for improving the process of signing up for this study." | 10 |
| "How do you feel about being in the study?" | 13 |
| "How would you improve the study?" | 14 |
| "What did you like best about the study?" | 16 |
| What did you like least about the study?" | 15 |
| "What information (if any) could have been given to you at the start of the study to help make it easier?" | 7 |

Responses to questions were first coded question-by-question. Similar codes were aggregated and themes were created for each question. The data were then analyzed in regards to the overarching study feasibility question: what is the feasibility of recruitment and intervention? Five major themes across questions emerged based on the comments of participants. Three themes involved study structure, criticisms of MoodGYM, and praise of MoodGYM. The other two themes focused on the participants and factors influencing engagement (or lack of engagement) with the study. These can be grouped into external and internal engagement factors. Taken together, these themes provide more information on the feasibility of the project.

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**Theme 1 - Study Structure.** For this theme, participants remarked on either positive or negative aspects of the study structure. In terms of positives in the study, four participants commented on communication, such as "talking to the polite researcher." Another commented that they liked that the atmosphere was not too "stuffy or uptight." One study participant remarked that it was good the study was online and she could go at "her own pace." When asked to offer suggestions to improve the process of signing up for the study, there were 10 responses, with four remarking it was "fine as is" or having no suggestions for improvement. In total, there were several suggestions regarding minor changes to the study structure, such as having more directions, providing more information in the beginning, more reminders throughout the study, and adding additional text boxes to make comments. Two participants remarked that having a more indirect way to join the study, such as text message, may be beneficial and a method of alleviating social anxiety. Several other comments concerned more major aspects of study design. A study participant remarked that "some sort of certification that the survey was legit would have been nice" while another suggested providing links to the official study webpage so participants can verify the study was not a "scam." Three participants commented on the amount of material and timeline of the study, with one indicating that the material could have been broken up into "smaller chunks." Another recommended more time to complete modules, while another suggested that having breaks while completing a module would be preferred over having to do it all at once.

**Theme 2 - Criticisms of MoodGYM.** When asked what they liked least about the study and how they would improve the study, many of the participants provided criticisms of MoodGYM. Five participants remarked negatively on the MoodGYM characters, with one describing them as "cheesy" and another describing them as "stereotypical" and "one-

dimensional." Four participants criticized the surveys and quizzes in MoodGYM, saying they were "long," "boring," "redundant," and "repetitive." However, one participant commented that there could have been more quizzes. Two participants remarked that they did not like the long section where they had to memorize several thinking patterns and apply them. Two participants commented that MoodGYM could be more interactive; the creators could have taken advantage of the fact it is online and provided material that sets it apart from face-to-face counseling. Another participant described the length of MoodGYM as something they didn't like about the study, and other described it as "repetitive." One participant noted that it was "sometimes honestly hard to recall the events of the week that I had to analyze." One participant mentioned that there could be less reading and more exercises, explaining, "One of the first things that changed when I started getting depressed was my passion for reading. It's still hard to really focus on anything long that isn't in the form of an interesting story. A few more exercises could help people understand the information." One participant explained that she would have liked it if MoodGYM had been less focused on results and more focused on tools to try. Finally, one participant provided a lengthy, in-depth criticism of MoodGYM:

> The setup of MoodGYM was subpar. There was no way to opt out of taking the
>
> depression and anxiety screening, no good way to skip modules, there was slang that
>
> makes no sense to anyone outside of England, improper grammar and punctuation,
>
> awkward writing styles at some points... The whole thing came off as unpolished. The
>
> length of the modules makes the whole program pretty inaccessible to not only people
>
> with depression and anxiety, but also for people who have learning difficulties or other
>
> disorders like ADHD, dyslexia, etc... Generally these make it difficult to read things,
>
> especially long things, and there is a high rate of co-morbidity with these problems with

depression and anxiety... What I'm trying to say is the overall delivery of MoodGYM

wasn't the best.

In summary, participants expressed many criticisms of MoodGYM, including its characters,

quizzes, length, repetitive material, and length.

**Theme 3 - Praises of MoodGYM.** When asked what they thought about the study and

what they liked best about the study, participants provided some positive feedback concerning

MoodGYM. Four participants commented that MoodGYM helped them analyze their thought

patterns and change them. One participant explained: "The best part was the CBT skills taught. I

retained some of them and use them to try and cheer up my friends who are also depressed, and

they're effective. I feel like it doesn't matter if you use MoodGYM or any other system, as long

as you learn the skills they will be helpful." Participants also commented that MoodGYM helped

them deal with "warped," "bad," and "intrusive" thoughts. One respondent remarked that she

liked "the way it made me able to pick apart my thoughts and see how I could make myself think

differently." One participant commented that she learned about CBT but wondered about

MoodGYM's overall effectiveness: "I did learn about methods of CBT that I think will help me,

but I don't know how much in this timeline that it really helped with the issues I'm facing." A

few participants praised MoodGYM's quizzes and characters, with one participant commenting

that she liked best "the use of quizzes and characters for self-evaluation." Other participants

praised the modules and expressed that they were glad they completed the overall program.

**Theme 4 - External Engagement.** When asked how they think students should learn of

the study, participants recommended recruitment methods, which highlighted external ways

participants could become initially involved with the study. Five participants discussed personal

methods of recruitment, including peers, friends, family, and teachers. Three participants

described public, physical ways of recruitment, including posting flyers in public libraries and bulletin boards and marketing in residential treatment centers. Five participants recommended using public, online methods to engage participants in the study, including email and social media methods such as Tumblr, reddit, or Instagram.

Some participants discussed their external motivations for wanting to complete the study. Three participants discussed helping others with their data. As one explained, "I feel like it's a good opportunity to maybe help someone else who like me, suffers from depression and anxiety." One participant similarly expressed a desire to "provide data to assist researchers." Three participants mentioned the gift card compensation as a positive about the study.

**Theme 5 - Internal Factors.** This theme focused on internal factors which were involved in how participants engaged in the study. There were 13 responses when participants were asked how they felt about being in the study, and 9 of those reflected that participants felt "good" or "liked" being in the study, or that it was an interesting and worthwhile experience. Three participants discussed how they appreciated how the study dealt with depression, with one explaining that he liked that "it was very realistic and didn't gloss over anything." Another stated that "I liked that it acknowledged that depression is a serious and very real thing." One participant commented that the study made him realize that he "wasn't alone in how he felt."

Some participants expressed that being in the study led to negative feelings, some of which may be characteristic of depression or anxiety. One participant expressed that the study "made me feel incompetent because the tools it suggested for me didn't really help me. Maybe I wasn't trying hard enough." This reflects some possible self-blame and feelings of worthlessness. Another respondent expressed feelings of isolation and hopelessness: "I feel like my results don't really help anyone because everything that seems to help other people never helps me." Finally,

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one participant expressed worry when asked how she felt about being in the study: "I feel a bit

nervous, because I worry that I did something wrong and because of me the whole study will be

ruined." This worry may be reflective of anxiety or depression on part of the participant.

**Acceptability Summary**

The acceptability of MoodGYM was measured in six different ways, including adherence

rates, social validity, intervention acceptability, nonparticipation surveys, depression treatment

acceptability, and qualitative data. In regards to adherence, participants completed an average of

2.35 modules of MoodGYM, out of the total four included in this study. Thirty percent (30%) of

the total study participants completed all four modules. There was a drop-out rate of 25%

between the Pre-Intervention Survey and the Final Survey. This data indicates that most

participants did not find MoodGYM acceptable enough to finish. In terms of social validity, the

intervention was generally acceptable on both pre- and post-intervention surveys, although

participants were neutral on MoodGYM improving their communication skills and relationships.

For intervention acceptability, participants generally found MoodGYM overall as well as

components to be acceptable. Most participants indicated they would complete MoodGYM

outside this study as well as recommend it to a friend. Participants provided a variety of reasons

for not completing the program, some of which involved knowing material from previous

counseling experience and it being too difficult to complete a module of MoodGYM a week.

Some responses indicated that depressive symptoms might have negatively affected the ability of

participants to finish the intervention. In regards to depression treatment acceptability,

participants reported they preferred in-person treatment options, and only one person expressed

that MoodGYM would be their top treatment choice. Finally, in terms of the qualitative data, five

themes were identified: comments on study structure, criticisms of MoodGYM, praises of MoodGYM, and external and internal factors affecting study engagement.

**Research Question One**

The study sought to answer the following question: How is the social validity of the intervention related to adherence rates?

For this question, social validity was represented by the composite measures discussed previously. There were both a pre-intervention social validity composite and a post-intervention social validity composite. These composite scores were an aggregate of the social validity questions given in the Pre-Intervention Survey and the Final Survey. Adherence rates were measured in several ways: the number of exercises completed, the number of characters entered into written exercises, the total number of modules completed, and the total amount of time spent on all modules, as measured by self-report.

The relationship between social validity and adherence measures was explored using the Pearson product-moment correlation coefficient. First, the pre-intervention social validity was correlated with each adherence measure. The pre-intervention social validity data came from the Pre-Intervention Survey ($n = 31$). There were no statistically significant results; however, there was some evidence of small relationships between the variables, as indicated by guidelines put forth by Cohen (1988). Cohen proposed that a small relationship was an $r$ value between .10 and .29, a medium one was between .30 and .49, and a large one between .50 to 1.0. The results of the correlations are presented in Table 21.

Table 21

*Correlations Between Pre-Intervention Social Validity and Adherence Measures*

| Adherence Measure | r | n | p |
|---|---|---|---|
| Completed Exercises | .19 | 31 | .30 |
| Characters in Exercises | .18 | 31 | .33 |
| Completed Modules | .24 | 31 | .20 |
| Total Time on All Modules | .10 | 29 | .61 |

The relationship between post-intervention social validity and adherence measures was also explored using Pearson product-moment correlation coefficients. The post-intervention social validity data came from the Final Survey ($n = 25$). The relationships found were all medium based on Cohen's criteria, although only one was statistically significant; this was for the completed number of exercises. The results of the correlations are reported in Table 22.

Table 22

*Correlations Between Post-Intervention Social Validity and Adherence Measures*

| Adherence Measure | r | n | p |
|---|---|---|---|
| Completed Exercises | .40 | 25 | .05* |
| Characters in Exercises | .38 | 25 | .06 |
| Completed Modules | .33 | 25 | .11 |
| Total Time on All Modules | .34 | 23 | .12 |

*p < .05

**Research Question Two**

The study sought to answer the following question: How is the social validity of the intervention related to changes in depression symptoms over time?

Participants in this study completed the RCADS on both on the Pre-Intervention Survey and again on the Final Survey three weeks later. Only the scores from the Depression subscale were used in the analysis for this question. Only the scores from those participants ($n = 10$) who completed the entire intervention (Modules 1, 2, 3, and 5) were included. The post-intervention social validity ratings for this group are based on the experience using all of MoodGYM. The other participants did not complete the full intervention and their scores were therefore not included in this analysis. The mean $t$-score for this participant sample ($n = 10$) on the Depression scale for the Pre-Intervention Survey was 70.30 ($SD = 10.32$). This is above the clinical threshold for the RCADS. The mean $t$-score for this participant sample ($n = 10$) on the Depression scale on the Final Survey was 67.00 ($SD = 10.04$). This is in the borderline clinical threshold range.

In order to calculate the change in depressive symptoms over time, the raw scores from the Final Survey were subtracted from the scores from the Pre-Intervention Survey. Again, only participants who completed the entire intervention ($n = 10$) were included. The mean RCADS raw depression score for this sample from the Pre-Intervention Survey was 18.50 ($SD = 5.34$). The mean RCADS raw depression score from the Final Survey was 16.80 ($SD = 4.94$). On average, participants' raw scores decreased 1.7 points from the Pre-Intervention Survey to the Final Survey.

The relationship between social validity and change in depressive symptoms over time was explored with a Pearson product-moment correlation coefficient. The pre-intervention social validity composite score and the post-intervention social validity composite score were used to represent social validity. Neither correlation was found to be statistically significant, but there was some evidence of a small relationship (pre-intervention social validity) and a medium relationship (post-intervention social validity). These are of note due to the low sample size.

There was a small, negative correlation between pre-intervention social validity and the change in depressive symptoms over time, $r = -.18$, $n = 10$, $p = .63$. There was a medium, negative correlation between post-intervention social validity and the change in depressive symptoms over time, $r = -.39$, $n = 10$, $p = .26$. These results indicate that as pre-intervention and post-intervention social validity increased, the change over time in depressive symptoms decreased. This relationship is in the opposite direction than what was predicted: if depressive symptoms were decreasing over time, a positive relationship would be expected. This interpretation is stated with caution due to the small sample size.

## Supplementary Analysis: Rural Participants

Although participants were included from nonrural locations, the intended focus of the study was on participants from rural areas. Supplementary analysis was therefore conducted on those participants from a rural area to provide more information on this sample. The five participants who were from outside the United States were excluded from all analysis.

There were 12 participants that were considered from a rural area as described by the U.S. Census (2010), as noted previously. Ten of these participants completed the final survey. There were nine participants who completed Module 2, seven participants who completed Module 3, and four participants who completed Module 5. Adherence rates were calculated separately for those who lived in a rural area and those who lived in nonrural states. The results are presented in Table 23.

Independent samples $t$-tests were performed to compare the measures of adherence for rural and nonrural participants. There was one significant difference found in the number of characters typed into written exercises, $t(25) = .80$, p $< .05$, $d = .30$. Although it was not a statistically significant difference, it is of note that rural participants completed 2.58 modules on

Table 23

*Adherence Measures in Rural (n = 12) and Nonrural participants (N = 15)*

| Adherence Measure | Rural<br>Mean (Standard Deviation) | Nonrural<br>Mean (Standard Deviation) |
| --- | --- | --- |
| # of Completed Exercises | 10.58 (6.95) | 10.00 (6.77) |
| # of Characters in Exercises | 1,606.50 (2,260.05) | 1,056.12 (1,251.62) |
| # of Completed Modules | 2.58 (1.31) | 2.07 (1.39) |
| Total Time on All Modules | 92.73 (97.39) | 85.86 (58.64) |

average while nonrural participants completed 2.07 modules, $t(25) = .99$, p $=.48$, $d = .38$. As there were only four modules to complete, this may represent a notable practical difference. As an alternative, the magnitude of the difference was examined by calculating Cohen's d. This represents the magnitude of difference between groups in standard deviation units. Cohen's d was 0.38, which is considered a small effect according to standards described by Cohen (1988).

CHAPTER 5

DISCUSSION

The current study explored the usage of an online intervention, MoodGYM, by adolescents at home to treat depressive symptoms. The study included 18 and 19 year old participants, an adolescent group who experiences high rates of depression as they undergo many unique developmental challenges. After a comprehensive examination of depression from childhood through adulthood, Rohde et al. (2013) suggested that emerging adults should be a primary focus of research due to high prevalence depression rates in this population. The current study focused on that important group. Adolescents and young adults are also avid users of technology and this study employed online social networking recruitment to reach teens with depressive symptoms who were seeking help. The current study piloted MoodGYM, a CBT intervention accessed online, and it was found to be generally acceptable, making future research in this area promising. The current study also paid specific attention to rural adolescents who may not have had access to treatment in other ways in their communities.

**Feasibility of Recruitment Through Schools**

The first aim of the study was to recruit students through schools using professionals such as school psychologists and counselors. This study design has not been attempted in previous studies of cCBT with adolescents. This was not feasible as designed. Professionals did not respond to email campaigns, online social networking postings, or in-person presentations. The only school psychologists who agreed to recruit were previously known to the researcher, and their efforts to recruit in two high schools were unsuccessful. Although these avenues of recruitment were unviable, alternative ways of recruiting in the schools should be explored as a next step. Adolescents in high school are especially in need of intervention as depression

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typically first emerges during these years, and school-based interventions have huge potential to reach students.

The outreach efforts used in this study were designed to reach as many mental health professionals as possible, but ultimately mass marketing was perhaps not personal enough. Professionals are faced with a deluge of information and spam daily; it is difficult to know when clicking on an email or seeing a post if the information is something worthwhile and legitimate. The only two professionals willing to recruit for the study were already known to the researcher, and that extra assurance of legitimacy may have been what was needed to persuade school professionals to recruit students. It is important to note, however, that the current study used in-person methods such as presentations at professional development sessions and state association conventions. Although there was interest in the study, there was no follow-through by professionals. This suggests that just exposing professionals to a study, whether in-person or online, is not very engaging.

School psychologists and other professionals are faced with a high caseload of students and may have been simply too busy to help recruit for the study. In addition, there may have been a lack of buy-in because having students complete the intervention at home may not have been viewed as a school-based intervention which was relevant to their work as school psychologists.

Ultimately, despite extensive recruitment efforts, only two professionals were willing to recruit high school age adolescents for the study. These school psychologists put forth a strong effort to recruit students, and used such as methods as presenting to a large health class, posting flyers, and telling individual students and parents about the study. Survey results indicated that the recruitment process was acceptable overall to these school psychologists; efforts to treat

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depression were construed as important work with students. Once psychologists were engaged in the study, they found it worthwhile. This suggests if more work can be done to engage professionals on the front end, they may view this research as important to their work and be willing to recruit students.

Students in two high schools were therefore exposed to the research study, yet no students chose to participate. Feedback from school psychologists indicated that student concerns over privacy and parent consent may have been obstacles to participation in the study. This indicates that there may have been a lack of buy-in by students to complete the intervention. A lack of familiarity or distrust of online interventions could have been a factor in the lack of student follow-through. Furthermore, high school students would have required parent permission to participate in the study. One school psychologist who attempted to recruit for the study identified this as a barrier to participation, with students expressing reluctance to be in the study if they needed to ask their parents. Overall, this indicates that the original consent and recruitment procedure was unacceptable to a small sample of adolescents. This differs from what was predicted at the onset of this study

**Feasibility of Online Recruitment**

After school recruitment was unsuccessful, the study shifted to recruiting adolescents through online social networking. Links to the study website were published on Facebook, Twitter, reddit, and Tumblr blogs. No other published studies with cCBT have used this design. Posting links on Tumblr blogs was the only successful recruitment method for this current study. Many Tumblr sites have a mental health focus and blogs are often of a highly personal nature, so this may explain the success on this platform. In the current study, participants were surveyed about the recruitment, consent, and screening process and it was found to be acceptable overall.

Thus, while the original study design of school recruitment was unsuccessful, the revamped social networking outreach was successful and acceptable. However, hundreds of links had to be posted in order to recruit 33 participants. The outreach was targeted to mental health blogs, so presumably hundreds of adolescents with depressive symptoms saw the postings, and only a fraction of those opted to participate in the study. The results of the Nonparticipation Survey on the study website may shed light on the concerns of those who chose not to participate: namely signing an online consent form and participation not being anonymous. For future studies, this suggests that online recruitment may be a valid way of obtaining participants, but the outreach efforts need to be considerable and researchers may want to further address privacy concerns to make signing up for the study more acceptable.

**Feasibility of the Intervention**

Despite MoodGYM being acceptable to most participants in this study, only about a third of participants finished the program. Survey responses provided more information on why participants may have not finished the intervention. Some participants reported that they were already familiar with the material from previous counseling experience or the material was too repetitive. Some participants indicated reasons for not finishing which may be suggestive of depressive symptoms, such as losing interest in MoodGYM, not being able to concentrate to complete it, feeling upset by MoodGYM, or feeling too sad or too anxious. Some of the open-ended comments may have also indicated depressive symptoms such as hopelessness and isolation (i.e. participants felt they weren't able to be helped). Depressive symptoms may inhibit completion of online interventions such as MoodGYM, and this may explain in part why adherence rates have been so low in the research base.

In open-ended survey comments, criticisms of MoodGYM were common. These reasons may provide insight as to why so few participants finished MoodGYM. Frequent critiques of MoodGYM included concerns with the characters being stereotypical. Several participants also expressed that MoodGYM had too many long and repetitive quizzes. Participants also remarked on it having too much reading. One of the most telling criticisms of MoodGYM was the suggestion that it should be more interactive, perhaps with interesting video clips. MoodGYM could be updated to take advantage of its online medium, by perhaps including video vignettes and interactive games. If MoodGYM is to be refined, researchers may want to conduct further qualitative research on various aspects of the program. If participants gave feedback on each module, that could be invaluable in further developing the program to be more appealing to teens. This in turn may increase the adherence rates to levels higher than found in this study.

Despite overall low adherence rates, one third of participants did finish the intervention. In the qualitative data, some participants provided praise of MoodGYM which may help illuminate why some adolescents found it valuable. The most common praise was in regards to CBT skills and MoodGYM improving thinking patterns. If MoodGYM is updated, it should retain at its core the research-based elements from CBT. The creators should find ways to embed these concepts within an attractive and engaging design.

The open-ended survey questions provided more information on participants' engagement with the study and intervention. These were grouped into external and internal factors. Examining these factors provides more information on the feasibility of the current study and any possible future studies. Participants recommended both personal and public ways of being recruited into the study, included family, friends, posting of flyers, and online social networking. Participants also discussed external motivators for wanting to be in the study,

including wanting to provide data to researchers and help others with depression. Researchers could use this data to inform future recruitment campaigns. Interestingly, 25 participants took the Final Survey, but only three noted that the gift card compensation as a positive about the study. Researchers may want to consider using compensation in future studies, but it may not be a strong motivating factor in completing the study. Thus attention should be paid to other factors, such as tapping into the genuine desire to help others expressed by some adolescents in the study.

The qualitative data provides a glimpse of some of the internal factors which influenced participants during the study. Many described feeling good or being glad they were involved in the study. Several participants described that they appreciated how the study acknowledged depression. Future recruitment campaigns might include depression awareness as a component to boost engagement. Other internal factors included feelings of self-blame, worthlessness, isolation, hopelessness, and worry. These are all characteristic of depression and anxiety, which MoodGYM aims to treat. Possibly adding a psychoeducational component and therapist support could help overcome the negative emotions some participants experienced while completing MoodGYM.

**MoodGYM Adherence Rates**

The completion rates of MoodGYM compare favorably to the rates reported in similar studies. About one third of participants who completed the Pre-Intervention Survey completed MoodGYM, and the mean number of completed modules was 2.35. If participants went beyond Module 1 of MoodGYM, they completed an average of 3.47 modules. This was out of the four modules which were a part of the study (Modules 1, 2, 3 and 5.) These usage statistics compare favorably with four previous studies in which adolescents used MoodGYM. These other studies

included all five modules of MoodGYM as compared to the four used in this study, so that has to be taken into account as comparisons are made. O'Kearney et al. (2006) reported that only 40% of the adolescent boys in their study completed three or more modules of MoodGYM. In a similar study with adolescent girls, O'Kearney et al. (2009) reported that only 30% of the sample completed three or more modules. Calear et al. (2013) provided more precise adherence data, and the authors reported that 33% of participants completed all 5 modules of MoodGYM, with a mean of 3.16 modules completed. Lillevoll et al. (2014) had the design most similar to this study, with Norwegian high school students completing MoodGYM outside of school. Their adherence rate was much lower than in the current study, with less than 10% of participants logging in and using MoodGYM.  Less than one percent of participants completed all five modules in that study. In those four studies, students were not screened for depression; in this study, participants were self-selected because of perceived depressive symptoms. Personal distress may have made the participants more motivated to complete MoodGYM. The participants who completed MoodGYM as part of the current study were recruited through online social networking and not through schools, so this may also explain the difference in adherence rates. Participants may have had more investment if they were completing the study on their own time and of their own initiative.

This study used several additional methods to measure adherence such as time spent using modules, the number of exercises completed, and the number of characters entered into exercises. The time spent using modules was self-reported, but the majority of participants reported using a timer and indicated their time was very accurate. The time participants reported also varied according to the number of exercises in each module, which is an indicator of accurate reporting. Participants were also surveyed to determine if they were using MoodGYM

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as intended (i.e. reading the material and completing the exercises.) Overall, most participants reported completing MoodGYM's reading, written exercises, and quizzes. This is indicative of the intervention's acceptability: participants generally used MoodGYM as designed.

**Comparison of Acceptability of MoodGYM to Other Studies**

The current study learned that participants generally found MoodGYM to be an acceptable intervention. The majority of participants rated MoodGYM as "good" or "very good" overall and would recommend it to a friend; a key indicator of acceptability is the willingness to recommend to others. Most participants also responded favorably on social validity measures taken both before and after the intervention. These results were as predicted and aligned with previous research. Authors have reported that satisfaction is generally high among those who complete cCBT (Vallury, Jones, & Oosterbroek, 2015). The same high acceptiblity for cCBT has been found among university students (Davies et al., 2014) and children and parents (Richardson et al., 2010). In regards to MoodGYM, the previously discussed studies with adolescents did not measure acceptability. However, researchers have gathered acceptability data with other age groups in MoodGYM studies. Ellis and Campbell (2011) found in a study with university students that the majority of participants would recommend MoodGYM to others. Likewise, Lintvedt et al. (2013) reported that most university students found MoodGYM useful and would recommend it to others. In a study with adults, Schneider et al. (2014) found that the majority of participants had generally positive comments about MoodGYM. In another study with adults, HØifØdt et al. (2013) found that MoodGYM was mostly acceptable to participants. The current study extends the research on the acceptability of cCBT. It also provides information about adolescent satisfaction with MoodGYM, which has not been examined in the research literature.

**Changes in Depressive Symptoms**

For those who completed the intervention, changes in depressive symptoms over time were measured pre- and post-intervention using the RCADS. Raw scores decreased only an average of 1.7 points over the course of the study. This indicates that MoodGYM was not particularly effective in reducing depressive symptoms in those with high levels of depression. However, the intervention timeframe may have been too short to measure any meaningful change in depressive symptoms. It is possible with more time, or with more practice of skills, that there would be more measurable change in symptoms.

**Social Validity**

This study examined the relationship of social validity to various adherence measures. It was predicted that the more socially valid participants found MoodGYM to be, the more of it they would complete. Pre-intervention social validity was not found to be related to adherence measures. Overall, higher expectations of MoodGYM, and perhaps online interventions in general, were not associated with higher completion rates of the program. Perhaps participants did not know enough about MoodGYM before the intervention to adequately assess their opinions of it. Only one significant relationship was found: post-intervention social validity was positively related to the number of characters entered into exercises. This means the more acceptable participants found the intervention to be, the more work they invested into the written exercises. In MoodGYM, the amount of effort participants can put into the written exercises is highly variable—it can range from not completing them at all to writing detailed and long responses to the open-ended prompts. Some participants may have viewed the intervention as socially valid and potentially leading to lasting improvements in their lives, such as helping them understand themselves better or deal with their emotions in a positive way. As a result, these

participants were perhaps more willing to invest more effort into the intervention by completing more of the written exercises.

In contrast to what was predicted, higher levels of social validity were not related to more decreases over time in depressive symptoms. Pre-intervention social validity represented the expectations of participants that MoodGYM would be an acceptable intervention and make a practical difference in their lives. However, having higher expectations pre-intervention was not associated with an improvement in depression symptoms over time. Post-intervention social validity represented the experiences of participants, their assessment if MoodGYM fit into their lives and helped them change in important ways. These perceptions were not associated with decreases in depressive symptoms over time. In fact, there was some indication of a small but nonsignificant relationship that suggested that higher levels of social validity were associated with more increases in symptoms of depression over time. Perhaps those who found MoodGYM the most valuable were those who were continuing to struggle with depressive symptoms. It may have been that these participants started experiencing changes in their lives such as understanding themselves better but this did not necessarily correlate to a reduction in depressive symptoms. Still, post-intervention social validity survey results indicated that most participants agreed that MoodGYM taught them important skills and helped them feel better about themselves. These are meaningful improvements even if depression levels did not decrease. It is important to note that there were only three weeks between pre- and post-measurement for depressive symptoms. It may be that this was simply not enough time to capture meaningful change, and this limitation should be taken into account when considering the findings on social validity.

**Study Contributions**

The current study extended the literature base by evaluating the usage of a cCBT intervention by adolescents at home. MoodGYM is an established intervention with some research base, yet only a handful of studies have tested this program with adolescents. This study provided more information on the usage of MoodGYM by an adolescent/young adult population. This is also the first published study using MoodGYM in the United States.

The study explored using schools for recruitment by enlisting the help of school psychologists to recommend students for the study. Few studies have taken this approach. Using schools for recruitment has the potential to reach many students who may not otherwise receive treatment. When recruitment in schools was not successful, the study expanded to include recruitment methods from online social networking sites, namely Tumblr. These efforts ultimately yielded enough participants to meet the estimated sample size. No other published studies of cCBT with adolescents have used similar online recruitment methods.

Several different measures of adherence were used to evaluate completion of MoodGYM material. Previous studies with MoodGYM have included the completion of exercises and modules only. These were reported here as well and a marker of adherence was added that infers effort; specifically, the number of characters entered into exercises. Participants also self-reported the time they spent using each module, an important measure of effort. In addition, surveys were utilized to collect data on how participants used MoodGYM, such as if they completed the reading, answered the quizzes truthfully, etc. Overall,use of these measures added to the literature by providing a comprehensive analysis of how participants used MoodGYM and how acceptable it was to them. Social validity was also measured pre- and post-intervention, and this makes the study unique in the research literature.

Finally, the study examined  results relative to rural participants' use and satisfaction with MoodGYM. This is an important group of adolescents who could especially benefit from online interventions due to factors such as a lack of available mental health services and stigma.

**Limitations**

Although the current study contributed to the literature in several important ways, there are limitations that should be noted. First, the sample size was small, limiting generalizability and external validity and reducing statistical power. Although 33 participants completed the initial Pre-Intervention Survey, because of attrition, there was less data as participants moved through the study. Only 10 participants completed all four modules. Twenty-five participants completed the Final Survey. Thus, the study could have benefited from a larger starting sample.

Second, the external validity of the study was limited by using subjects who were only 18 and 19 years old. Although the researchers have suggested this group needs special attention (Rohde et al., 2013), this narrow scope makes it difficult to generalize results. Some of the participants were high school students while some were university students, and others were neither. This mixure makes it difficult to generalize to high school or university students.

Third, participants were recruited from only one online social networking website, Tumblr. Extensive efforts were undertaken to recruit from high schools and other online platforms such as Facebook, but the only successful recruitment was from Tumblr. This also limits the generaliziblity of results by sampling from only one source.

Fourth, the RCADS was the instrument used to measure depressive symptoms in participants. The RCADS was normed on a sample with an age range up of to 17 and 18 in two studies (Chorpita et al., 2000; Chorpita et al., 2005), with only students through grade 12 included. The current study included 18 and 19 year olds, many of whom had graduated high

school. The results for the current study were scored using the norms for Grade 12, so the sample did not always align with the norm group which was used. This lowers confidence in the accuracy of data reported. However, the study was focused on feasibility rather than the effectiveness of MoodGYM in reducing depressive symptoms. While the RCADS data was used in Research Question 2, it was not centrally important to the questions of feasibility addressed by the study.

Fifth, the timeframe of the study may have been too short for participants to demonstrate meaningful change over time. Depressive symptoms are unlikely to change significantly over a period of three weeks. In addition, pre- and post-social validity questionnaires asked about changes in how participants viewed themselves, their relationships, their emotions, and their communication skills, as well as if they had learned any important skills. The brief duration of the study may not have allowed enough time for adolescents with depressive symptoms to detect meaningful changes in their lives.

Sixth, MoodGYM was designed for Austrialian adolescents, and there was some slang used which may have been unfamilar to American adolescents. One participant mentioned the cultural differences in their response to an open-ended question. Although it is not believed that there were major differences in the way the two cultures were represented, it is possible that these differences affected the acceptiblity of the intervention.

**Future Directions**

In order to successfully recruit students in schools, researchers may need to engage more with school systems, including with administration. Ultimately, principals were the ones who needed to give permission to be in the current study. Asking school psychologists to seek permission from the principals may have been a hindrance to participation. It is possible that

engaging directly with principals may bring more positive results, but the method of communication needs to be considered. Email and other online methods were not effective in engaging professionals. It may be that in-person meetings or phone conferences are needed in order to fully inform schools of research and persuade them to participate. During these conferences, researchers can discuss the wider applications of the study within a school. Principals may be more likely to want to participate if they can see how the research is embedded within a system of interventions. An intervention like MoodGYM can be used as a Tier 2 or Tier 3 intervention under an MTSS system. The study could be presented as a way of testing an intervention, which if successful, could become part of a mental health MTSS system. MoodGYM is a free resource, and completely free interventions which can be widely used are rare. This could be a strong selling point for schools to be involved in research such as the current study. Once there is buy-in from the principal, school psychologists and other professionals may be compelled to participate in recruitment. Initiating study participation from the top-down, with administrators leading the way, may increase participation from schools. This may be a more effective approach than the trying to engage individual practitioners in recruitment.

Researchers could also seek to engage organizations working within the schools, such as the Community and Schools Comprehensive Treatment (CSCT) program in Montana. Such programs are contracted to provide mental health care to students within the school setting. School psychologists and school counselors often have high caseloads, and their work may not have a mental health focus. Programs like CSCT are already working with students with identified mental health issues, which creates a sample which may be more readily accessible. In addition, these programs have established partnerships with schools, which adds legitimacy to

the research and embeds it in the school system. This may make it more likely that that principals, professionals, parents and students will participate in the research. In the current study, students would have been involved on an individual basis. Study enrollment was not part of a larger system such as MTSS or a mental health program within the school. Framing the study as an intervention which is recommended as part of a larger system may increase student and parent buy-in. If parents and students view an intervention as recommended by the school, they may be more likely to engage in it.

The current study focused on examining whether MoodGYM was an acceptable intervention to adolescents. Ultimately, only 30% of participants finished the intervention, but most participants rated MoodGYM as acceptable and would recommend it to a friend. This indicates adolescents would likely be willing to try the intervention even if they do not complete it. A larger study which examines the effectiveness of MoodGYM in treating depressive symptoms seems warranted. Even if adherence rates are similarly low, the intervention may reduce depressive symptoms in the adolescents who finish it, and it may even have some positive impact on those who only complete part of it. MoodGYM is a short, self–guided intervention which is free and widely available. If MoodGYM reduces depression in one third of adolescents who try it, the public health impact could be huge. Overall, the adherence rates in this study as well as the finding that MoodGYM was an acceptable intervention indicate that it has potential to be used as a tool to teach CBT skills to adolescents experiencing depression or depressive symptoms. Future studies could add a follow-up survey after 6 weeks to allow more time for adolescents to experience improvement in their lives, including depressive symptoms. A self-monitoring measure of behavior tracking to assess how often the CBT skills are being used, such as a phone app, would also help evaluate the effectiveness of MoodGYM.

Future studies could use psychoeducation to support adolescents as they complete the intervention. Participants could learn that completing tasks can be more difficult when depression is present, and that does not represent a personal failure. Educating adolescents about the high rates of depression could also help combat feelings of isolation. Moreover, it should be explained that although a short intervention can be beneficial, ongoing practice of CBT skills is necessary in order to develop lasting and substantial improvements. It is possible that extra support from a therapist in providing psychoeducation, encouragement, and practice of skills could increase the effectiveness of MoodGYM. Interestingly, two of the participants reported that when they told their therapist about MoodGYM skills, the therapist incorporated their online work with their treatment plan. It should be explored whether this additional support could boost adherence rates. This current study examined reasons why participants did not complete an online intervention to treat depression, and this information could be valuable in increasing adherence in future studies, possibly through providing therapist support.

If further studies on MoodGYM prove it to be effective, this could provide much needed support that cCBT is an important intervention for adolescent depression. However, more work is needed to develop additional programs which are culturally relevant to adolescents. The United States government could make mental health and suicide prevention a priority like Australia has done and develop its own freely available, top quality intervention. The Health and Human Resources agency of the United States government could create its own program geared towards our unique adolescent population and culture(s). Further research and testing would be needed to support its effectiveness. Additional studies with MoodGYM, an already developed tool, would provide more support that cCBT is a research-based therapy, and this could lead to a program designed specifically for the U.S.

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If further research supports MoodGYM or another newly developed cCBT treatment, the focus should turn to dissemination. Online interventions have huge potential to reach millions of adolescents, but they must be implemented with fidelity. In addition, it is important to focus on the speed of dissemination in order to make sure interventions reach those who need it most; with high prevalence rates of depression and low rates of treatment, many adolescents need intervention, and they need it quickly. An appropriate next step may be implementation science and research, which "explores strategies for improving speed and quality of implementation of evidence-based interventions and for increasing access to the interventions" (Forman, 2015, p. 49). It often involves situating treatments comfortably within the operations of large agencies like schools (Forman et al, 2013). It may be that a program like MoodGYM can be most effectively disseminated through the schools, and future studies should explore that. This focus on implementation has been described as "essential" to school psychology research and practice, yet the area has been neglected (Forman et al., 2013, p. 79). Future implementation research could focus on how to integrate cCBT into school systems, possibly through a system like MTSS.

Online social networking was effective in recruiting adolescents to participate in this study. In the current study, adolescents suggested using Facebook, reddit, Twitter, and Instagram to recruit participants. Future studies could perhaps use focus groups to gather more information from adolescents on possible recruitment methods (i.e. what would catch their interest, what would demonstrate the study was legitimate, etc.). The government or non-profit group could potentially use this information to develop effective awareness campaigns for depression and to promote online interventions. Like one school psychologist said in this study, it is important to meet adolescents where they're at, and they are clearly online.

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**Adolescent Pre-Intervention Survey**

*Directions: Please answer the following questions. You are not required to answer any questions.*

1) What is your ID number? ___

2) What is your age? ___

3) What is your gender?

    __Male

    __Female

    __Other: please describe _____

4) What is your ethnicity? Please check all that apply.

    __ White

    __ American Indian or Alaska Native

    __ Hispanic or Latino

    __ Asian or Pacific Islander

    __ Black or African-American

    __ I choose not to answer.

    __ Other: Please describe _____

5) Do you have internet access at home?

    __Yes

    __No

6) Have you graduated from high school?

    __Yes

    __No

*If yes, they indicate they graduated high school on Question 6, they were shown Questions 7-11:*

7) What high school did you attend? _____

8) In what city and state was your high school? _____

9) In what city and state do you currently reside in, if different from above? _____

10) Do you currently attend college?

    __Yes

    __No

        If you attend college, which one do you attend, and what year are you (freshman, etc.)? _____

11) Are you going to start college in the fall?

    __Yes

    __No

    __Not sure

    __I already attend college

        If yes, what college? _____

*If no, they indicate that they did not graduate high school on Question 6, they were shown Questions 12-14:*

12) What high school do you attend? _____

13) What city and state do you live in? _____

14) Will you be attending college?

    __Yes

    __No

    __Not sure

    If yes, what college are you going to attend? _____

15) Have you ever been diagnosed with depression?

    __Yes

    __No

16) Have you ever been in treatment for depression?

    __Yes

    __No

        If yes, please describe: _____

17) Are you currently in treatment for depression?

    __Yes

    __No

        If yes, please describe: _____

18) Have you ever completed any online programs to treat depression?

    __Yes

    __No

        If yes, please describe: _____

19) Have you ever taken online tests for depression or searched the internet for more information about depression?

    __Yes

    __No

20) How many hours a week do you estimate you spent participating in extracurricular activities like sports or clubs? ____

21) What is your high school GPA? (An estimate is fine.) ____

22) If you currently attend college, what is your college GPA? (An estimate is fine.) ____

23) Did you take AP classes?

    __Yes

    __No

24) Did you take Honors classes?

    __Yes

    __No

*Please answer the following questions. (Questions 25-27)*

    Choices are: Strongly disagree, disagree, neutral, agree, strongly agree

25) I like reading for fun.

26) I get good grades in school.

27) I am not a good reader.

28) How many hours a day do you estimate you spend on Facebook?____

29) If you use Facebook, how many Facebook friends do you think you have? (An estimate is fine.) ____

30) How many hours a day do you estimate you spend on other online social networking? (Twitter,, Snapchat, Tumblr, Pinterest, Instagram etc.) ____

31) Why are you interested in doing an online intervention?

_____

32) How did you learn about the study?

_____

33) Were you given a flyer at your school?

    __Yes

    __No

34) If you were given a flyer at your school, who gave it to you?

    __School psychologist

    __School counselor

    __Social worker

    __Other (please describe): ____

35) Did someone tell you about the study website without giving you a flyer?

　　__Yes

　　__No

　　　　If yes, who gave you the study website?

　　　　__School psychologist

　　　　__School counselor

　　　　__Social worker

　　　　__Other (please describe): ____

36) Did you hear of the study on a website (Erika's Lighthouse, etc.)?

　　__Yes

　　__No

　　　　If yes, what website? ____

37) Did you hear of the study on social media (Facebook, etc.)?

　　__Yes

　　__No

　　　　If yes, how did you hear of the study? (Facebook support group, etc.)? _____

38) What do you think are the best ways to tell students about the study? Check all that apply:

　　__School psychologists/counselors posting flyers in schools.

　　__School psychologists/counselors giving flyers to individual students.

　　__Outside counselors or therapists telling students about the study.

　　__Posting information about the study on social media.

　　__Posting information about the study on websites.

39) What are the best social media sites to use for getting out the word on the study? Check all that apply.

　　__Facebook

__Twitter

__Tumblr

__Pinterest

__Instagram

__Other (please describe):

40) How else do you think students should learn about the study? Do you have any other comments?

_____

*Please select the best response for the following statements. (Questions 41-51)*

        Choices are: Strongly disagree, disagree, neutral, agree, strongly agree

41) There are not many counselors or therapists in my area.

42) I will feel comfortable completing the intervention online for this study.

43) I would feel most comfortable doing the intervention at home.

44) I would feel most comfortable doing the intervention at school.

45) I am glad I can complete the online intervention any time I want.

46) I want to attend therapy or counseling but my parents or I can't afford it.

47) My parents don't want me attending therapy or counseling.

48) My parents don't know that I need help.

49) I will feel more comfortable completing the intervention online than talking to a counselor, psychologist, social worker or doctor in person about my problems.

50) I would prefer to complete a program on my phone or tablet rather than an internet browser (Internet Explorer, Firefox, Chrome, etc.)

51) I am interested in using Facebook to help with my depression.

*For each item, please select the option that most closely represents how you feel about the intervention now that you have learned more about it.*

        Choices are: Strongly disagree, disagree, neutral, agree, strongly agree

*The online program will…*

52) Be easy for me to stick with

53) Be safe and secure.

54) Teach me important skills.

55) Help me change in important  ways.

56) Help me feel better about myself.

57) Improve my communication skills.

58) Improve my relationships.

59) Help me handle stress better.

60) Will fit into my regular schedule.

61) Will not take too much time.

62) Will help me deal with my emotions in a positive way.

63) Will help me understand myself better.

64) Will help me see my life differently

*Please answer these questions about your experience in the study so far. (Questions 65-70)*

Choices are: Strongly disagree, disagree, neutral, agree, strongly agree

65) I think it is a good idea for school counselors or school psychologists to give out flyers for this study.

66) I was comfortable signing a consent form online.

67) The website explained a lot about the study.

68) I was comfortable completing this survey online.

69) This survey did not take too long.

70) Signing up for this study was not difficult.

71) Do you have any suggestions for improving the process of signing up for this study?

_____

72) How honestly did you answer these survey questions?

    \_\_Not honestly at all

    \_\_Somewhat Honestly

    \_\_Very Honestly

**Revised Children's and Adolescent Depression Scale (RCADS)**

*Please select the word that shows how often each of these things happen to you. There are no right or wrong answers.*

Answer choices: Never, sometimes, often, always

1) I worry about things.

2) I feel sad or empty.

3) When I have a problem, I get a funny feeling in my stomach.

4) I worry when I think I have done poorly at something.

5) I would feel afraid of being on my own at home.

6) Nothing is much fun anymore.

7) I feel scared when I have to take a test.

8) I feel worried when I think someone is angry with me.

9) I worry about being away from my parents.

10) I get bothered by bad or silly thoughts or pictures in my mind.

11) I have trouble sleeping.

12) I worry that I will do badly at my school work.

13) I worry that something awful will happen to someone in my family.

14) I suddenly feel as if I can't breathe when there is no reason for this.

15) I have problems with my appetite.

16) I have to keep checking that I have done things right (like the switch is off, or the door is locked)

17) I feel scared if I have to sleep on my own.

18) I have trouble going to school in the mornings because I feel nervous or afraid.

19) I have no energy for things.

20) I worry I might look foolish.

21) I am tired a lot.

22) I worry that bad things will happen to me.

23) I can't seem to get bad or silly thoughts out of my head.

24) When I have a problem, my heart beats really fast.

25) I cannot think clearly.

26) I suddenly start to tremble or shake when there is no reason for this.

27) I worry that something bad will happen to me.

28) When I have a problem, I feel shaky.

29) I feel worthless.

30) I worry about making mistakes.

31) I have to think of special thoughts (like numbers or words) to stop bad things from happening.

32) I worry what other people think of me.

33) I am afraid of being in crowded places (like shopping centers, the movies, buses, busy playgrounds.)

34) All of a sudden I feel really scared for no reason at all.

35) I worry about what is going to happen.

36) I suddenly become dizzy or faint when there is no reason for this.

37) I think about death.

38) I feel afraid if I have to talk in front of my class.

39) My heart suddenly starts to beat too quickly for no reason.

40) I feel like I don't want to move.

41) I worry that I will suddenly get a scared feeling when there is nothing to be afraid of.

42) I have to do some things over and over again (like washing my hands, cleaning or putting things in a certain order.)

43) I feel afraid that I will make a fool of myself in front of other people.

44) I have to do some things in just the right way to stop bad things from happening.

45) I worry when I go to bed at night.

46) I would feel scared if I had to stay away from home overnight.

47) I feel restless.

**Part 1 Follow-up Survey**

1) What is your ID code? _____

2) Where did you work on MoodGYM?

 __Home

 __School

 __Library

 __Other (please explain): _____

3) Did you complete the first module?

 __Yes

 __No

4) Did you work on any other Modules?

 __Yes

 __No

5) If yes, which one(s)?

 __Module 2

 __Module 3

 __Module 5

6) Had you used MoodGYM before this study?

 __Yes

 __No

  If yes, please explain: _____

7) Did you use a timer while you worked on MoodGYM?

 __Yes

 __No

*Questions 8 to 11 are for those who answered "Yes" to Question 8, meaning they did use a timer on MoodGYM.*

8) What was the time? _____

9) Did you work on MoodGYM that whole time?

    __Yes

    __No

10) If no, how much do you think you spent only working on MoodGYM? ____

11) How confident are you in the accuracy of the time you reported above?

    __Not confident at all

    __Somewhat confident

    __Very confident

*Questions 12-14 are for those who answered "No" to Question 7, meaning they did not use a timer on MoodGYM.*

12) How long do you think you worked on MoodGYM? ___

13) Did you work on other things while you did it?

    __Yes

    __No

14) How confident are you in the accuracy of the time you reported?

    __Not confident at all

    __Somewhat confident

    __Very confident

*Please answer the following questions based on your experience using the first module of MoodGYM.(Questions 15-25)*

    Choices are: Strongly disagree, disagree, neutral, agree, strongly agree

15) I answered the quizzes truthfully.

16) I read the feedback from the quizzes.

17) I read all the material teaching me concepts.

18) I read about all the characters.

19) I clicked "next" on the pages without reading the material.

20) I read about how the characters reacted to events.

21) I completed the multiple choice exercises.

22) I completed the written exercises (meaning I typed in words in response to questions).

23) I tried my best on the exercises.

24) I clicked "next" on the exercises without completing them.

25) Overall, I tried my hardest on the first module.

*Please answer the following questions about MoodGYM (Questions 26-41)*

Choices are: Strongly disagree, disagree, neutral, agree, strongly agree

26) I thought MoodGYM was helpful.

27) Using MoodGYM made me feel upset.

28) I liked the content of MoodGYM.

29) I enjoyed working on MoodGYM.

30) I thought MoodGYM was fun.

31) The reading was too hard.

32) MoodGYM made me feel better.

33) MoodGYM made me feel more hopeful.

34) There was too much reading.

35) There were too many quizzes.

36) The module was too long.

37) There was too much slang I didn't understand (i.e. words like Uni, Foxtel)

38) I would complete MoodGYM on my own outside of this study.

39) I think it's a good idea for counselors/psychologists/social workers to give information on MoodGYM to students.

40) I think MoodGYM would teach high school students valuable skills.

41) I feel I could explain the components of CBT to someone else.

42) I will use the information from MoodGYM in my everyday life.

*How would you rate each of the components of MoodGYM? (Questions 43-48)*

> Choices are: Very poor, poor, neutral, good, very good

43) Quizzes and feedback from quiz results

44) Reading

45) Diagrams

46) Multiple choice Exercises

47) Written Exercises (you have to type in answers)

48) Characters

49) How would you rate MoodGYM overall?

> __Very poor
>
> __Poor
>
> __Neutral
>
> __Good
>
> __Very good

50) If you continued MoodGYM, how much would it help you with your depression?

> __Not at all
>
> __A little
>
> __A lot

51) If you continued MoodGYM, how much would it help you with your anxiety?

> __Not at all

__A little

__A lot

52) If you continued MoodGYM, how much would it help you deal with stress?

__Not at all

__A little

__A lot

53) Please rank the following based on how you would prefer to get help for your depression/anxiety/stress. Rank your first preference #1, your second preference #2, etc. There are 10 options.

Read a book ____

Talk to a counselor in person____

Use MoodGYM ____

Chat online with a counselor ____

Talk to a friend ____

Text with a counselor_____

Talk to my parents or a relative____

Chat with other adolescents online _____

Meet in a group in-person with other adolescents _____

Go to a doctor or psychiatrist _____

54) Why did you participate in this study? Check all that apply.

__I am feeling stressed and want help.

__I am feeling depressed and want help.

__I am feeling anxious and want help.

__I wanted the $10 gift card.

__My counselor recommended it.

__I thought it would be fun to be in a study.

__Other (please describe):

*Please answer the following questions.(Questions 55-57)*

Choices are: Strongly disagree, disagree, neutral, agree, strongly agree

55) I would have participated in the study if there were not a gift card.

56) I completed the study mainly for the gift card.

57) I would recommend MoodGYM to other adolescents.

*As an adult 18 years or older, you can provide your own consent to be in this study. If you were 17 or younger, you would need parent consent. Imagine that you were 17 and you needed parent consent to be in this study.  Answer the following questions. (Questions 58-61)*

Choices are: Strongly disagree, disagree, neutral, agree, strongly agree

58) I would have asked my parents to be in the study.

59) My parents would have given me permission to be in the study.

60) I wouldn't be in the study if I needed parent permission.

61) I think it's better that adolescents do the study on their own without needing parent permission.

62) Are you interested in participating in the rest of the study?

__Yes

__No

__Not sure

63) What are the main reasons you want to continue with the study?

_____

64) Tell us why you don't want to continue the study.

_____

**Final Survey**

1) Please enter your four digit code number from your email. _____

2) Which Modules of MoodGYM did you complete? Select all that apply.

    __1

    __2

    __3

    __5

3) Did you complete a module a week of MoodGYM?

    __Yes

    __No

        If no, please explain: _____

4) How many weeks did it take you to complete MoodGYM, starting from the day you completed the first survey and Module 1?

    __1 week

    __2 weeks

    __3 weeks

    __4 weeks

    __More than 4 weeks.

    __I'm not sure.

    __Other (please specify):

*Please answer the following questions. (Questions 5-7)*

    Choices are: Strongly disagree, disagree, neutral, agree, strongly disagree

5) Three weeks is the right amount of time to complete MoodGYM.

6) I would have preferred less than 3 weeks to complete MoodGYM.

7) I would have preferred more than 3 weeks to complete MoodGYM.

8) What do you think is the ideal amount of time to complete MoodGYM (1 day, 2 weeks, etc.)?

_____

*Please answer the following questions about your total experience using MoodGYM. (Questions 9-22)*

 Choices are: Strongly disagree, Disagree, Neutral, Agree, Strongly agree

9) Overall, I tried my hardest to complete all of MoodGYM.

10) I thought MoodGYM was helpful.

11) Using MoodGYM made me feel upset.

12) I liked the content of MoodGYM.

13) The reading was too hard.

14) There was too much reading.

15) There were too many quizzes.

16) The modules were too long.

17) There was too much slang I didn't understand (i.e. words like Uni, Foxtel)

18) I would complete MoodGYM on my own outside of this study.

19) I think it's a good idea for counselors/psychologists/social workers to give information on MoodGYM to students.

20) I think MoodGYM would teach high school students valuable skills.

21) I feel I could explain the components of CBT to someone else.

22) I will use the information from MoodGYM in my everyday life.

*How would you rate each of the components of MoodGYM? (Questions 23-28)*

 Choices are: Very poor, poor, neutral, good, very good

23) Quizzes and feedback from quiz results

24) Reading

25) Diagrams

26) Multiple choice Exercises

27) Written Exercises (you have to type in answers)

28) Characters

29) How would you rate MoodGYM overall?

    \_\_Very poor

    \_\_Poor

    \_\_Neutral

    \_\_Good

    \_\_Very good

30) How much did MoodGYM help you with your depression?

    \_\_Not at all

    \_\_A little

    \_\_A lot

31) How much did MoodGYM help with your anxiety?

    \_\_Not at all

    \_\_A little

    \_\_A lot

*Please answer the following questions (Questions 32-44)*

    Choices are: Strongly disagree, Disagree, Neutral, Agree, Strongly agree

MoodGYM…

32) Was easy for me to stick with.

33) Was safe and secure.

34) Taught me important skills.

35) Helped me change in important ways.

36) Helped me feel better about myself.

37) Improved my communication skills.

38) Helped me handle stress better

39) Fit into my regular schedule.

40) Did not take too much time.

41) Helped me deal with my emotions in a positive way.

42) Helped me understand myself better.

43) Helped me see things in my life differently.

44) Is something I would recommend to my friends.

*Please answer the following questions.(Questions 45-55)*

Choices are: Strongly disagree, Disagree, Neutral, Agree, Strongly agree

45) I felt comfortable completing the intervention online.

46) The location where I completed the intervention worked well.

47) I would tell other kids who had similar problems about this intervention.

48) I would still choose to be in this study if I could go back in time.

49) I am glad I was given a flyer or a web link for this study.

50) I think it's a good idea for researchers to post on social media about this study.

51) I am glad I learned about this study on social media.

52) I think counselors at university health centers should tell students about this study.

53) I think students should be told about the study at college orientation.

54) I would have participated in Part 2 of this study even if there had been no gift card.

55) I completed the study mainly for the gift card.

56) Did you discuss the material in MoodGYM with a counselor?

__Yes

__No

__I'd prefer not to say.

57) Please explain how you discussed the material with a counselor.

_____

58) Did this help you understand the concepts?

    __Yes

    __No

59) Did this help you in some other way?

    __Yes

    __No

60) Did you receive other treatment for depression during the study?

    __Yes

    __No

    __I'd prefer not to say.

61) When did this treatment begin? _____

62) What type of treatment was it (medication, counseling, etc.)?
_____

63) MoodGYM was a helpful addition to this treatment.

    __Strongly disagree

    __Disagree

    __Neutral

    __Agree

    __Strongly Agree

64) I would suggest that other kids with similar problems complete MoodGYM at the same time they complete other treatment.

    __Strongly disagree

    __Disagree

    __Neutral

__Agree

__Strongly Agree

65) How honestly did you answer these survey questions?

__Not honestly at all

__Somewhat Honestly

__Very Honestly

66) How do you feel about being in the study?

_____

67) How would you improve the study?

_____

68) What did you like best about the study?

_____

69) What did you like least about the study?

_____

70) What information (if any) could have been given to you at the start of the study to help make it easier?

_____

**Weekly Follow-Up Survey**

*Directions: These questions are to be completed every time you work on a module of MoodGYM. You need to complete a separate survey for each module.*

1) What is your ID code? _____

2) Where did you work on MoodGYM?

    __Home

    __School

    __Library

    __Other (please describe):

3) Which module did you work on today?

    __Module 2

    __Module 3

    __Module 5

4) Did you finish the module?

    __Yes

    __No

5) Did you finish the module all at one time?

    __Yes

    __No

6) Did you work on any other modules?

    __Yes

    __No

7) If so, which other modules did you work on? Check all that apply.

    __Module 2

__Module 3

__Module 5

8) Did you use a timer while you worked on MoodGYM?

__Yes

__No

*Questions 9 to 11 are for those who answered "Yes" to Question 8, meaning they did use a timer on MoodGYM.*

9) What was the time? _____

10) Did you work on MoodGYM that whole time?

__Yes

__No

If no, how much do you think you spent only working on MoodGYM? ____

11) How confident are you in the accuracy of the time you reported above?

__Not confident at all

__Somewhat confident

__Very confident

*Questions 12-14are for those who answered "No" to Question 8, meaning they did not use a timer on MoodGYM.*

12) How long do you think you worked on MoodGYM? ___

13) Did you work on other things while you did it?

__Yes

__No

14) How confident are you in the accuracy of the time you reported above?

__Not confident at all

__Somewhat confident

__Very confident

15) Have you been using MoodGYM without timing yourself and completing this form?

    \_\_Yes

    \_\_No

        If yes, please explain (how many times, how long, etc.)\_\_\_\_

*Answer the following questions about how you used MoodGYM.*

    Choices are: Strongly disagree, disagree, neutral, agree, strongly disagree

16) I answered the quizzes truthfully.

17) I read the feedback from the quizzes.

18) I read all the material teaching me concepts.

19) I read about all the characters.

20) I clicked "next" on the pages without reading the material.

21) I read about how the characters reacted to events.

22) I completed the multiple choice exercises.

23) I completed the written exercises (meaning I typed in words in response to questions).

24) I tried my best on the exercises.

25) I clicked "next" on the exercises without completing them.

26) Overall, I tried my hardest on this module.

## APPENDIX F

## Nonparticipation Survey

1. Please tell us more about why you don't want to be in the study. Select all of the reasons that might apply below. You can also provide your own reasons.

__I would have trouble finding a quiet place to complete the intervention.

__I don't want to sign a consent form or give my name to be in the study.

__I have concerns over the privacy of my data.

__I don't have regular access to the internet.

__The study will take up too much of my time.

__I don't think the intervention will help me.

__I want to seek other treatment options.

__I don't think I am depressed.

__I don't think I'm anxious.

__I don't have enough information on the study to make a decision.

__I didn't like the study website.

__I want to talk to a counselor in person.

__I want to participate in therapy with other adolescents.

__I want to use a different online treatment.

__I would rather complete the intervention on my phone.

__I would rather complete the intervention on my tablet.

2. What reasons did we miss?

_____

*Please answer the following questions. (Questions 3-9)*

Choices are: Strongly disagree, disagree, neutral, agree, strongly disagree

3) Online interventions are safe and secure.

4) Online surveys are safe and secure.

5) I feel comfortable signing a consent form online.

6) I feel comfortable with completing an online survey.

7) I feel comfortable with completing an online intervention.

8) If this study was anonymous, I would have participated.

9) I think it's a good idea for school psychologists and counselors to give flyers to students for this study.

# APPENDIX G

## Survey for Early Completion of MoodGYM

1) Why did you stop using MoodGYM? Please select as many reasons that apply or provide your own reasons.

__I didn't like the content of MoodGYM.

__I didn't think MoodGYM was helpful.

__The modules took too long to complete.

__It was difficult for me to complete a module every week.

__Using MoodGYM made me feel upset.

__The material became repetitive.

__The material was not relevant to my life.

__I already knew the material from previous counseling experience.

__I had technical problems.

__Taking the surveys made me feel upset.

__I felt better so I stopped using the program.

__The study interfered with my school work.

__The study interfered with my other activities outside school.

__I didn't have time in my schedule to complete the intervention.

__I didn't have any place where I felt comfortable doing the intervention.

__I got other treatment for depression.

__The process of completing the intervention was too complicated.

__I thought MoodGYM was too hard to finish.

__The study interfered with my job.

__I got too sad.

__I got too anxious.

__I lost interest or didn't feel like it.

__I couldn't concentrate to complete it.

__I got distracted by something else.

2) Please provide other reasons we didn't list

_____

# APPENDIX H

## School Psychologist Survey

1) What is your name?_____

2) What is your email address? _____

3) What is your school name? _____

4) What city and state is your school located in?_____

5) What motivated you to participate in the study? _____

6) Why did you think an online treatment for depression, anxiety, or stress would be useful for students at your school?

_____

*Please answer the following questions.(Questions 7-17)*

       Choices are: Strongly disagree, disagree, neutral, agree, strongly disagree

7) I think it's a good idea for school psychologists/counselors to give flyers for this study.

8) Students were interested in participating in the study.

9) I felt comfortable giving a flyer to a student.

10) I felt comfortable giving the study website to a student.

11) The recruitment process was acceptable to students.

12) The intervention would be acceptable to students.

13) I felt comfortable asking my principal for permission for the school to participate in the study.

14) I felt comfortable displaying flyers about the study around the school.

15) I would feel comfortable answering questions about the study from students.

16) I would feel comfortable answering questions about the study from parents.

17) I would be willing to participate again in recruitment for a similar project.

18) How many individual flyers do you think you gave to students? _____

19) How flyers do you think you displayed around your school, if any? ____

20) If you put up flyers, did students take the tabs off the flyers? _____

21) Did you tell students in some other way about the study? If so, please explain.

_____

*Please answer the following questions about online interventions for depression and anxiety.(Questions22-27)*

　　　　Choices are: Strongly disagree, disagree, neutral, agree, strongly disagree

22) Online interventions are safe and secure.

23) Online interventions are helpful.

24) Online interventions are acceptable to parents.

25) Online interventions are acceptable to students.

26) I would feel comfortable recommending an online intervention to a student.

27) I would feel comfortable recommending an online intervention to a parent.

28) What do you think are the best methods to reach teens to recruit them for this type of study? You can select more than one method.

　　　__School psychologists and counselors giving study information to students

　　　__Posting flyers in schools

　　　__Outside therapists/counselors

　　　__Internet Ads

　　　__Facebook

　　　__Other (please explain): _____

29) In your opinion, what do you think the barriers are for trying to recruit students in schools for a study like this?

_____

30) For students who are under age 18, do you think having to obtain parental consent could be a barrier for participation?

31) Are there reasons you think students might have been reluctant to participate in this study?

_____

32) How do you think parents at your school would feel about their child being in this study?

_____

33) Please list any suggestions you have for improving the recruitment process.

_____

34) Please give any comments or suggestions you have for the researchers. Your feedback is important in developing effective interventions for students.

_____