DISSERTATION

# LGBTQ+ ADOLESCENT AND YOUNG ADULT MENTAL AND PHYSICAL WELLBEING: EXAMINING THE EFFECTS OF NON-ADAPTED VERSUS ADAPTED MINDFULNESS-BASED INTERVENTIONS

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ABSTRACT

LGBTQ+ADOLESCENT AND YOUNG ADULT MENTAL AND PHYSICAL WELLBEING: EXAMINING THE EFFECTS OF NON-ADAPTED VERSUS ADAPTED MINDFULNESS-BASED INTERVENTIONS

Lesbian, gay, bisexual, transgender, queer and other gender and sexual minority identified (LGBTQ+) adolescents and young adults face mental and physical health disparities compared to their heterosexual and cisgender counterparts. These disparities in health are often due to minority stressors, like experiencing discrimination and oppression. Adolescence and emerging adulthood are vulnerable developmental periods for LGBTQ+ youth and young adults due to the prevalence of minority stressors while also navigating developmental tasks. Mindfulness based interventions (MBI) may be a potential method to intervene upon health disparities in this population, as the mindfulness stress-buffering hypothesis posts MBI may be the most beneficial in populations that experience high levels of stress. Chapter one explores the acceptability, feasibility, and effects of an online MBI, L2B, on sexual minority participants compared to heterosexual participants. Sixty-two college-aged participants completed baseline and post-test questions assessing mental health, mindfulness, self-compassion, emotion regulation, and substance usage ($M_{age}$=21.28, *SD*=4.17, 82.3% Caucasian, 85.5% Non-Hispanic/Latinx, 71% female, 37% LGBQ+). Results from chapter one indicated L2B was acceptable, but feasibility, as indicated by attendance and drop- out rates, could be improved. Furthermore, sexual minority participants saw statistically meaningful improvements in all outcomes except for substance usage and consequences of alcohol use. sexual minority

participants may benefit more greatly from MBI related to mental health, internalized shame, consequences of Marjana use, accessing regulation strategies, and with goal-oriented behavior from just as much, or greater than heterosexual participants when related to mental health. However, further research is needed to explore the effects of MBI on substance use among sexual minority participants. Study two explores the initial acceptability and feasibility, along with the effects of an online MBI, L2B-Q, that was adapted specifically to meet the needs of LGBTQ+ adolescents. Twenty adolescents completed baseline and post-test assessments on mental health symptoms, mindfulness, stress-related health behaviors, and identity constructs. Participants also participated in a focus group to provide qualitative feedback on L2B-Q. Results from study two indicate L2B-Q was feasible and accepted, however further adaptations (e.g., changes in timing, and activity modifications) would be beneficial to the program. Furthermore, results indicate than an adapted MBI is highly effective in reducing mental health and stress, while increasing mindfulness and identity related variables. In the final chapter, I compare the effects found in chapter one and chapter two and discuss the ways in which each program differed from one another, and which program may be more effective among LGBTQ+ participants.

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# Chapter 1: Examining the Effects of an Online Mindfulness-Based Intervention on LGBQ+ College Students' Mental Health, Wellbeing, and Substance Use

According to the United States (US) Census Bureau (2021) about 11.7% of the US adult population identify as non-straight. That equates to over 30 million adults identifying as a sexual minority. In a survey of over 180,000 graduate and undergraduate students in the United States, almost 17% of students identify as a sexual minority (Cantor et al., 2020), and it is suspected that this number will continue to rise, with estimates that one in five Generation Z individuals identify as a sexual minority (Gallup, 2022). With more and more individuals identifying as gay, bisexual, queer, asexual, queer, questioning, or as another sexual minority not listed here (LGBQ+), it is imperative to better understand the unique experiences and stressors faced by this community that may contribute to or hinder their ability to thrive.

In The Gay and Lesbian Alliance Against Defamation's (GLAAD; 2022) report on American attitudes toward LGBTQ Americans, 70% of LGBQ+ individuals reported experiencing discrimination and oppression, which may in turn lead to increased stress, higher incidence of mental health symptomology, and the use of alcohol and drugs at higher rates than their peers (Lewis et al., 2009; McCabe et al., 2010; Meyer, 1995; Shearer et al., 2016; Shields et al., 2012; Zaza et al., 2016). Therefore, it is imperative that novel methods of coping are studied within this population. The current study aims to examine the initial feasibility and acceptability, as well as the effects of a mindfulness-based intervention on the mental health, perceived stress, and substance use rates and consequences among LGBQ+ college-aged students compared to their heterosexual peers. To date, mindfulness-based interventions have not been adequately tested with this particularly vulnerable population, filling a gap in the literature.

## Emerging Adulthood

Emerging adulthood (ages 18-29; often referred to as young adulthood), often occurs during years spent in college (Greenlee et al., 2017)- about 67% of college students are 24 years old or younger (Hanson, 2023). Emerging adulthood is a critical developmental period for all individuals but remains a particularly sensitive period of development for LGBQ+ individuals (Salvatore & Daftary-Kapur, 2020; Torkelson, 2012; Wagaman, 2016). The majority of LGBQ+ young people aged 18-21 report experiencing discrimination, harassment, and rejection at school (Kosciw, et al., 2022). At home, about two thirds of LGBQ+ young adults report a lack of acceptance of their identity among their family (Rosario & Scrimshaw, 2013). Furthermore, LGBQ+ young adults disproportionately experience worsened mental health outcomes compared to their heterosexual peers (Mizock, 2017). These disparities in mental health among LGBQ+ young adults are linked to experiences of compounding stress as a result of accumulated stress stemming from their minority identity (Meyer, 1995).

LGBQ+ young adults experience stress, mental health outcomes, and utilize substances more often than their heterosexual peers (Lewis et al., 2009; Meyer, 1995; Shearer et al., 2016; Shields et al., 2012; Zaza et al., 2016). For many LGBQ+ college-aged students, their sexual orientation and membership into the LGBQ+ community holds great importance and meaning (Ceatha et al., 2019; DeChants et al., 2022). Yet, the journey to discover who they are may be complex. For some college-aged students, this experience may be linear and straightforward as they are met with supportive peers, family members, and have access to a broader LGBQ+ community. For others, the experiences of discovering their sexual identity may be more confusing and stressful if they are met with rejection, discrimination, internalized shame, or lack a supportive community to seek refuge. The literature examining the role of community and

social support in the improvement of health disparities among the LGBQ+ community is robust (Ceatha et al., 2019; DeChants et al., 2022; Johns et al., 2013; Kaniuka et al., 2019; Kertzner et al., 2009; Lim et al., 2023). However, there is a gap in the literature in the role that mindfulness intervention may play in minimizing the effects of minority stress seen in LGBQ+ young adults. The following study aims to fill this gap.

**Emerging Adulthood & Stress**

Regardless of sexual orientation, emerging adulthood is a developmental period associated with specific developmental tasks that set the stage for adulthood (Arnett, 2000). Those specific developmental tasks include utilizing abstract thinking, growing into a biologically and sexually maturing body after puberty (Hazen et al., 2008; Pfeifer & Allen, 2021; Tiepel, n.d.), navigating peer and romantic relationships (Adams & Berzonsky, 2008; Konstam, 2015) and forming a sense of self unique and separate from family and/or parental identity (Erickson, 1980; Graber & Archibald, 2001; Tiepel, n.d.). This time may also be associated with moving out of the family home for the first time, having increasing demands due to entering the workforce or starting college, and experiencing financial independence for the first time (Konstam, 2015). It is theorized that the amount of change that occurs during this time period can bring an onset of increased stress (Matud et al., 2020) and increased mental health symptomology (Arnett et al., 2014; Auerbach et al., 2018; Meadows et al., 2006).

For some young adults, they may experience hyper-sensitivity to peer feedback or experiences of bullying (Choukas-Bradley & Prinstein, 2014), resulting in increased distress. For others, changing peer, family, educational, and workplace dynamics and contexts may be a source of distress (Reed-Fitzke et al., 2019**).** Other examples of specific situations that may lend themselves to increasing stress in emerging adulthood include balancing the demands of school

with a changing social life, starting a career, and newfound financial independence. This increased stress has consequences- often seen newfound diagnoses of anxiety and depression (Kranzler et al., 2019; LeBlanc et al., 2020; Matud et al., 2020) and increased risk for suicide (Goldston et al., 2016; Heron, 2019). For LGBQ+ young adults, navigating these developmental tasks and their accompanied stress, in addition to navigating specific stressors related directly to their sexuality (i.e., identity disclosure in peer and romantic relationships, experiencing discrimination, and forming a sense of self and acceptance as an LGBQ+ individual), can lead to an increased risk for negative outcomes (Lewis et al., 2009; Meyer, 1995; Meyer, 2003; Strutz et al., 2015).

Not only are LGBQ+ young adults exploring their sexual identity and who they are attracted to, they are also discovering who they are within environments that may not be accepting or welcoming of their identity (Salvatore & Daftary-Kapur, 2020). LGBQ+ young adults must navigate specific identity related tasks, (i.e., identity development and disclosure, romantic relationship, and friendship formation), at school, at work, and in their communities, which may result in an increase in stress as they figure out in which environments, they can safely express their identity (Evans and Broido, 1999). Developing a sense of self may be met with internalized uncertainty or shame (Moradi et al., 2010), confusion over identity labels (Rosario et al., 2011), and a lack of acceptance from peers and family (LaSala, 2000); all of which may increase potential stress (Dentato et al., 2013). When examining the reasons why LGBQ+ young adults experience greater amounts of stress and disparities in health outcomes compared to their heterosexual peers, reviewing the minority stress model is paramount.

**Minority Stress Model**

To best understand broadly the stressful experiences inherent for many LGBQ+ young adults, we can look to the minority stress model (Meyer, 1995). The minority stress model posits that sexual minorities experience additional stressors than their heterosexual peers. These are stressors related specifically to their minoritized identity, aptly called minority stressors (Meyer, 1995). Minority stressors are rooted in social prejudices and stigmas that minoritized individuals may face when interacting with different social contexts (Frost & Meyer, 2023). Minority stressors may be distal, meaning they originate from institutional systems or from other people, or proximal, meaning they originate from an individuals' socialization process (Frost & Meyer, 2023; Meyer 1995, 2003). Examples of distal stressors may include experiencing discrimination and rejection in the workplace or living in a state with discriminatory laws. Proximal stressors may include internalized stigma, or concealment of identity (Frost & Meyer, 2023).

Additional minority stressors that may be specific to LGBQ+ young adults may include navigating the coming out process with their peers and their families, dating someone of the same sex or gender for the first time, experiences of rejection or discrimination at college or in the workplace, and victimization and bullying. In a 2022 poll of over 34,000 LGBQ+ individuals aged 13-26, 73% reported experiencing bullying and discrimination based on their identity, and 38% experienced physical harm or threats of physical harm related to their sexuality (Trevor Project, 2022). In addition, the minority stress model also articulates that the weight of experiencing distal and proximal minority stressors, on top of everyday stresses, may lead to an increased risk of worsened mental health outcomes and worsened coping strategies among sexual minorities compared to heterosexual counterparts (Meyer 1995, 2003). These mental health disparities have been seen among LGBQ+ young adults.

**LGBQ+ Mental Health Disparities**

Experiences of minority stress associated with one's minority identity and corresponding experiences can lead to worsened mental health outcomes among LGBQ+ individuals (Hatzenbuehler, 2009; Meyer, 1995; Meyer, 2003). Specifically, LGBQ+ young people are almost twice as likely to report symptoms of anxiety and depression compared to their straight peers (Woodford et al., 2014). In a survey of over 34,000 LGBQ+ young people aged 13-26, 65% of females and 47% of males reported symptoms of anxiety and 38% of males and 46% of females indicated symptoms of depression (Trevor Project, 2023). That same study found that 25% of sexual minority boys and 31% of sexual minority girls considered suicide in the past year, with 6% of boys and 8% of girls making a suicide attempt (Trevor Project, 2023). Additionally, a recent meta-analysis of studies investigating minority stress experiences and mental health outcomes found that suicidal ideation and attempts are clearly linked with minority stress experiences in LGBQ+ young adults (de Lange et al., 2022). Lack of family support and acceptance, discriminatory experiences at school, physical harm, and a lack of mental and physical health care options were all stressors that increased LGBQ+ young adults' mental health disparities (de Lange et al., 2022; Silverschanz et al., 2008; Trevor Project, 2023, Woodford et al., 2014; Woodford et al., 2015).

In addition to disparities in anxiety, depression, and suicide rates, LGBQ+ young adults are also more likely to have been exposed to trauma or traumatic events. LGBQ+ adults are almost four times more likely to be diagnosed with post-traumatic stress disorder (PTSD) or meet the diagnostic criteria for PTSD compared to heterosexual adults (Roberts et al., 2012). Research on trauma among LGBQ+ young people indicated that they are more likely to experience abuse (Roberts et al., 2012). Moreover, about 82% of LGBQ+ youth 13-21 years old report experiencing a physical assault, 31% report physical harassment, and almost 54% reported

sexual harassment on school property, (Kosciw, et al., 2022). The prevalence in which LGBQ+ individuals experience traumatic events, another form of minority related stress, likely exacerbates the disparities in mental health symptoms seen within this population.

Another area in which LGBQ+ young adults experience disparities is in their ability to regulate emotions effectively. LGBQ+ individuals who experience high levels of stress may report a lack of, or difficulties with, emotion regulation. More specifically, experiences of discrimination directly related to one's sexual identity are positively correlated with emotion regulation difficulties among LGBQ+ individuals (Keating & Muller, 2019). Furthermore, young gay and bisexual men who experience family difficulties report greater difficulties with emotion regulation (Wood et al., 2019). Emotion regulation difficulties in general, are correlated with increased mental health symptomology- specifically increased anxiety and depression, suicidal tendencies, and PTSD (Sheppes et al., 2015). With emotion regulation difficulties and experiences of stress being so strongly associated with mental health outcomes, and LGBQ+ young adults experiencing emotion dysregulation and mental health symptoms more often than the general population, it is imperative to further understand how coping strategies are utilized within LGBQ+ young adult cohorts, and how coping strategies can be changed or improved to better target mental health disparities and emotion dysregulation.

**LGBQ+ Substance Use**

Because LGBQ+ young adults are significantly more likely to report worsened mental health and stressful experiences compared to their heterosexual peers, it is also likely that LGBQ+ young adults cope with this increased distress in ways that differ. Evidence supports this possibility, indicating that LGBQ+ young adults are more likely to engage in unhealthy coping behaviors compared to their heterosexual peers as a result of increased stress (Bostwick et al.,

2007; McCabe et al., 2010). Although substance use is often a common occurrence on college campuses and among college-aged students (Welsh et al., 2019), substance use and abuse is commonly reported as a coping mechanism among LGBQ+ young adults in response to stress (Felner et al., 2020). Specifically, LGBQ+ young adults are more likely to partake in binge drinking (Ebersole et al., 2012), and bisexual men and women are more likely to engage in marijuana and other drug use compared to heterosexual and other sexual minority young adults (Parnes et al., 2018). Furthermore, bisexual men and women are more likely to develop drug dependency compared heterosexual individuals (Green & Feinstein, 2012). A potential reason for the disparity in drug and alcohol use among this population, may be due to LGBQ+ college associating drug and alcohol use with a sense of relief, as building a new community and coming out to new peers, and navigating discrimination may increase stress (Rosario et al., 2014). Additionally, the stresses of emerging adulthood, namely moving out of the home for the first time and greater independence, coupled with greater access to substances, may further help to explain the prevalence of substance use and abuse among this population (Eliason et al., 2011). In addition to the experiences of minority stress as a contributing factor in mental health disparities and substance use among LGBQ+ young adults, global factors, like a pandemic, may also have influence over the functioning and wellbeing of LGBQ+ young adults.

**The Novel Coronavirus (COVID-19)**

In March of 2020, The World Health Organization (WHO) declared the novel Coronavirus (COVID-19) as a global pandemic (WHO, 2020). With this announcement, many schools and workplaces went fully remote, and non-essential workplaces shut down, effectively altering the way society functioned. During this time, young adults experienced a disruption in mental and physical health services, and school-based services (Byrne et al., 2021; Ormiston &

Williams, 2022). For young adults, COVID-19 likely increased stress that occurs naturally as a result of having little to no access to friends and peers and experiencing disruptions in school time and daily routines (Fegert et al., 2020).

While COVID-19 posed a risk to all individuals globally as a social and a political stressor, LGBQ+ young adults likely experienced a greater disruption in daily functioning on top of normative and minority related stress. Specifically, for many LGBQ+ young adults while at college, it may have been the first time they have been able to express their LGBQ+ identity openly, and the first time they have been able to escape the stresses of identity concealment at an unwelcoming family home (Salerno et al., 2020). The start of the COVID-19 pandemic likely reintroduced stressors, like identity concealment or unwelcoming home environments, back into LGBQ+ college students' lives (Gonzales et al., 2020; Salerno et al., 2020).

Among many LGBQ+ college students, the COVID-19 pandemic was accompanied with an increase in stress associated with being isolated at home with unsupportive or rejecting family members (Fish et al., 2020) on top of the stress of being isolated away from peers and community. Social distancing, or keeping a physical distance from others, likely increased stress among LGBQ+ college students by decreasing their ability to engage with social contexts that are accepting and welcoming of their identity (The Trevor Project, 2020). Additionally, the COVID-19 pandemic likely had a negative impact on LGBQ+ college students' ability to access mental health services, thus influencing mental health outcomes (Ormiston & Williams, 2022).

When evaluating the toll on LGBQ+ college student's mental health as a result of the COVID-19 pandemic, according to the US. Department of Education (2021) LGBQ+ college students were significantly more likely than their heterosexual peers to report worsened symptoms of depression and anxiety (Hoyt et al., 2021; Salerno et al., 2020). In an examination

of mental health among lesbian, gay, bisexual, transgender, queer, questioning, asexual, and other sexual and gender minority students (LGBTQ+) as a result of the COVID-19 pandemic, 61% of LGBTQ+ students reported frequent mental distress, 65% reported symptoms of anxiety, and almost 61% reported depression symptoms (Gonzalez et al., 2020). Additionally, almost 46% of respondents indicated that their families were unsupportive or did not know of their LGBTQ+ identity, thus increasing feelings of distress (Gonzalez et al., 2020). LGBQ+ college students and young adults who had to move back home with family as a result of the pandemic experienced worsened mental health and worsened overall well-being compared to those who did not have to do so (Salerno et al., 2021; Salerno et al., 2023).

On top of increasing anxiety and depression symptoms, LGBQ+ college students were also significantly more likely to experience loneliness and isolation (Rideout et al., 2021). Specifically, The Movement Advancement Project (2020) found that 44% of LGBTQ+ individuals struggled with isolation and coping abilities compared to only 22% of cisgender and heterosexual individuals. When coping with distress related to the COVID-19 pandemic, LGBTQ+ individuals were significantly more likely to report poor coping strategies, and substance use as a coping strategy compared to their heterosexual and cisgender peers (Slemon et al., 2022).

**Interventions for LGBQ+ Young Adults**

Due to the mental and physical health disparities along with the amount of stress faced by LGBQ+ young adults, this population is a priority for intervention (Fish, 2020). However, few interventions exist that are tailored specifically for LGBQ+ young adults and their unique stressors and experiences. However, a handful of programs have been adapted for LGBQ+ youth and adults (Drysdale et al., 2021; Hall et al., 2019; Weinhardt et al., 2021; Williams et al., 2020).

One particular program, Pride Camp, was adapted to specifically target resilience and health equity among LGBQ+ and gender non-conforming adolescents. Results from the pilot study of this program found that outcomes of resilience and health improved among the Pride Camp participants (Weinhardt et al., 2021). Although not an intervention program, Q Chat Space is an online community support program for LGBQ+ youth which aims to reduce isolation, rejection, and stress. Preliminary findings found initial feasibility and acceptability of the program (Fish et al., 2022).

Although data from randomized-controlled trials and replication studies are lacking for these adapted and tailored interventions, the preliminary findings suggest LGBQ+ specific interventions are needed, and they appear to be effective. However, due to the lack of specific programming for LGBQ+ populations, it is imperative to also explore how existing programs may affect outcomes in LGBQ+ young adults (Fish, 2020). LGBQ+ young adults are clearly an underserved population in intervention science as very few interventions aimed at reducing stress have been tested for efficacy and effectiveness with this population (Chaudoir et al., 2017; Pachankis et al., 2021). There are also clear disparities in the amounts of stress and mental health symptoms LGBQ+ young adults report compared to their heterosexual peers (Lewis, 2009; Meyer, 1995; Meyer, 2003; Mizock, 2017; Roberts et al., 2012; Strutz et al., 2015; Woodford et al., 2014). Thus, there is an importance to explore how existing interventions may be helpful in reducing health disparities and stress among this population.

**Mindfulness-Based Interventions**

There is a clear need for mental health interventions that help to mitigate the health disparities and negative outcomes seen within the LGBQ+ young adult population. One potential buffer to the effects of stressors experienced by LGBQ+ college students during the COVID-19

pandemic may be mindfulness-based interventions (MBIs). MBIs train participants to engage in a particular type of attention that involves being attuned to the present moment without judgment and utilizing specific approaches to navigate stress and emotions. These approaches include changing one's relationship with a stressful or emotional experience by building awareness, and by reducing judgment (Creswell & Lindsay, 2014; Metz et al., 2013). The mindfulness-stress buffering hypothesis posits that mindfulness alleviates stress and reduces reactivity, thus leading to improvements in health outcomes. Furthermore, this hypothesis states that the greatest effects of mindfulness will be seen in individuals and populations that experience high amounts of stress and experience disparities in health as a result (Creswell & Lindsay, 2014). Based on these postulations, LGBQ+ young adults could potentially benefit greatly from the effects of an MBI, as they experience higher amounts of stress and disparities in health compared to heterosexual young adults, as reviewed in previous sections.

Outcomes of MBIs on young adults generally include a reduction in psychological distress and a general improvement in wellbeing (Keng et al., 2011). I n a meta-analysis of eighteen randomized-controlled trials (RCTs) examining the effects of MBIs on adolescents and young adults found that MBI significantly reduced depression symptoms compared to a control group with moderate effects (Chi et al., 2018). Moreover, another RCT found that MBIs had a large effect on the reduction of levels of perceived stress, and a medium effect on the reduction of rumination symptoms in young adults compared to a control group (Dark-Freudman et al., 2022). Furthermore, young adults who completed an MBI after cancer treatment also reported higher quality of life and decreased emotional distress (Van der Gucht et al., 2017; Van der Gucht et al., 2018). It is clear that MBI has been largely helpful in the lives of young adults. Therefore, it is posited that due to the effects seen in heterosexual cohorts, that mindfulness may

act as a buffer to the stressors specific to LGBQ+ young adults, potentially reducing mental health disparities.

In addition to the effects of MBI seen on mental health symptomology, there is also data that indicates MBI may be helpful in treating substance use disorders, and to reduce substance use frequency among intervention participants. In a systematic review of 30 RCTs examining the effects of MBI on substance use in adults found that MBI had significant effects on changing attitudes toward substances, reducing frequency and amount of alcohol and drug use, and reducing the intensity of cravings with small to medium effects (Korecki et al., 2020). Although there are data examining the effects of MBI on mental and physical health outcomes, data examining the effects of MBI on substance use within the young adult population is lacking. Furthermore, research examining the effects of MBIs on LGBQ+ young adults specifically, is virtually non-existent. With the effects seen on mental and physical health within the general young adult population, MBI could prove to be effective at reducing alcohol and marijuana usage, and reducing negative consequences related to alcohol and marijuana usage in the LGBQ+ young adult community. Therefore, it is imperative that a research project examine how MBI may affect substance usage within the LGBQ+ young adult population.

**Current Study**

There is a clear need to further evaluate mindfulness interventions and their effects on LGBQ+ college student mental health outcomes and coping behaviors as mental health symptomology and experiences of stress remain high (Hatzenbuehler, 2009; Meyer, 1995; Meyer, 2003), and few services specific to the needs of LGBQ+ young adults exist (Chadouir et al., 2018; Pachankis et al., 2021). The LGBQ+ population continues to grow each year (Gallup, 2021), and mental health disparities and substance use, and abuse, rates continue to remain high

among this population. Thus, it is imperative for researchers to continue to evaluate programs for their efficacy in working with LGBQ+ populations.

The current study aims to fill gaps in the literature by examining the effects of a mindfulness intervention (delivered virtually) on the mental health and substance use behaviors/attitudes among LGBQ+ college students during the COVID-19 pandemic. Furthermore, this study aims to compare outcomes between LGBQ+ and heterosexual individuals to determine if universal interventions yield similar or differing outcomes based on sexual orientation. The literature currently is robust with the effects of mindfulness interventions on mental and physical health outcomes among adolescents and young adults in general (Chi et al., 2018; Klingbeil et al., 2017; Koerner et al., 2022; Lucas-Thompson et al., 2019a, b; Lucas-Thompson et al., 2021; Shomaker et al., 2019). However, there is a lack of evaluations of programs and their effects on LGBQ+ wellbeing specifically.

It is hypothesized that participation in an online mindfulness intervention will decrease mental health symptomology (anxiety and depression), decrease perceived stress, increase emotion regulation, increase mindful attention, and reduce rates of alcohol and marijuana use and negative consequences related to usage among LGBQ+ college students. Clinically significant changes in all outcome variables will be met if there is a reliable change index (RCI) greater than 1.96 in the majority of participants is observed (Jacobson & Truax, 1991). Pre- and post-changes in all outcome variables are expected to have at least small to medium effect sizes ($d \geq 0.2$) as this has been considered a statistically meaningful effect size within the context of previous studies evaluating MBIs (Dawson et al., 2020; Ma et al., 2019).

While it is predicted that participation in the mindfulness intervention will yield meaningful effects on outcome variables for all participants, it is predicted that LGBQ+

participants may benefit more greatly due to their increased need for programming, and the compounding effect of minority stress on health. Specifically, it is predicted that the differences in outcome variables at pre- and post-test will be larger among LGBQ+ participants compared to heterosexual participants. It is also hypothesized the difference in change between the two groups will be small, as both groups will show improvement. Lastly, the acceptability and feasibility of this program will be analyzed. It is hypothesized that the program will be highly accepted, as indicated by responses to quantitative measures of acceptability. Furthermore, it is hypothesized that the program will be feasible by and for all participants, as indicated by the dropout rate and by attendance rates. The program will be deemed feasible if the majority of participants from both groups attend at least 80% of sessions, and if the dropout rate is less than 15% for both groups.

## Methods

### Participants

Participants in the intervention were students who were enrolled in a university in the western United States. Each of the participants attended at least one of the six sessions of the L2B program ($n$=62) and completed both the pre-and post-test assessments ($n$=50). On average, students were 21.28 years old ($SD$= 4.17; range 18-42 years old). The majority (95%) of the sample was in the emerging adulthood developmental stage (18-29 years). Participants were predominantly White (82.3%) and Non-Hispanic/Latinx (85.5%), and predominantly female (71%). 6.4% of the sample identified as non-binary, gender fluid, or gender queer. 63 % of participants identified as straight, while 37% identified as Gay, Lesbian, Bisexual, Queer, Questioning, or Other. See Table 1 for a full breakdown of demographic data of the participants.

### Procedure

All procedures for the purposes of this study were reviewed and approved by the Institutional Review Board. All participants provided informed consent for participation. Participants were recruited through a university counseling center as well as through class lists. Those interested in participation completed an online screener to determine eligibility. Eligible participants were those that were experiencing stress and/or anxiety at least occasionally, and who also possessed a smartphone. Those deemed eligible for study participation were then sent more information about the study, and those who still showed interest were contacted via phone by study staff to provide informed consent. Once consent was obtained, participants completed baseline assessments of mindfulness, self-compassion, depression, anxiety, perceived stress, emotion regulation, internalized shame, consequences of alcohol and marijuana use, and frequency of alcohol and marijuana usage via REDCap (Harris et al., 2009). This dissertation was a part of a larger randomized controlled trial (RCT; Lucas-Thompson et al., in press). The participants were randomly assigned to one of five different groups with varying supplemental supports between the group sessions. All participants however, received the same L2B programming: each participant attended group sessions online for 1-1.5 hours, one time per week for a total of six weeks, and L2B sessions included the same information and activities for all participants. Therefore, for the purposes of this study, we will not be examining group effects based on supplemental supports, but rather the effects of L2B broadly.

Once the six-week program finished, participants were asked to complete post-test assessments of mindfulness, depression, anxiety, perceived stress, and attitudes toward alcohol and marijuana. Participants were also asked to complete a brief program evaluation. Participants were paid for their time completing all assessments and for their participation in the program.

**Measures**

***Depression***

Depression symptoms were assessed using the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). Participants answered 20 questions on their depression symptoms in the past week on a 4-point Likert scale (1= rarely or none of the time to 4= most or all of the time). A sample item included "I thought my life had been a failure." Scores on the scale were summed, with higher sums indicating higher levels of depression (baseline Cronbach's $\alpha$ = 0.91; post-test Cronbach's $\alpha$= 0.72).

***Anxiety***

To assess anxiety, participants completed the State-Trait Inventory, Trait version (Bieling et al., 1998). Participants answered 20 questions about their anxiety symptoms in the past week on a 4-point Likert scale (1= almost never to 4=almost always). A sample item included "I worry too much over something that really doesn't matter." Scores were summed, with higher scores indicating higher levels of anxiety (baseline Cronbach's $\alpha$ = 0.91; post-test Cronbach's $\alpha$=0.93).

***Perceived Stress***

Perceived levels of stress were measured utilizing the Perceived Stress Scale (S. Cohen et al., 1983). Participants responded to 14 items assessing their stress over the last month on a 5-point Likert scale (0= never to 4= very often). A sample item included "In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?" Higher scores on the scale indicated higher levels of perceived stress (baseline Cronbach's $\alpha$= 0.82; post-test Cronbach's $\alpha$= 0.91).

***Mindfulness***

To assess mindfulness, participants completed the Mindful Attention Awareness Scale (MAAS; Brown et al., 2011). The scale includes 14 items on a 5-point Likert scale (1= almost always to 5=very infrequently) assessing different indicators of mindful attention. A sample item included "I find it difficult to stay focused on what's happening in the present." Higher scores on this scale, after reverse scoring and averaging, indicated greater instances of mindfulness (baseline Cronbach's $\alpha$=0.83; post-test Cronbach's $\alpha$ =0.87).

***Self-Compassion***

To measure self-compassion, participants completed the Self-Compassion Scale-Short Form (SCS-SF; Raes et al., 2011). The scale includes 12 items on a 5–point Likert scale (1=almost never to 5=almost always) assessing individual levels of self-compassion. A sample item included "When I'm going through a very hard time, I give myself the caring and tenderness I need." Higher scores on this scale, after reserve coding and averaging, indicated higher levels of self-compassion (baseline Cronbach's $\alpha$=0.84; post-test Cronbach's $\alpha$ =0.85)

***Internalized Shame***

Internalized shame was measured using the Internalized Shame Scale (ISS; Cook, 1996). Participants answered 30 questions on shame and self-esteem on a 5-point Likert scale (0= never to 4= almost always). Sample items included "I feel like I'm never quite good enough," and "I scold myself and put myself down." Higher scored indicated greater levels of internalized shame (baseline Cronbach's $\alpha$= 0.96; post-test Cronbach's $\alpha$ =0.96).

***Emotion Regulation***

Difficulties with emotion regulation were measured using the Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004). The scale consisted of 24 items assessing different aspects of emotion regulation. Participants were asked to indicate how often certain

statement/scenarios applied to them on a 5-point Likert scale (1= *almost never* to 5= *almost always*). Sample items included: "I have trouble making sense of my feelings," and "When I'm upset, I become out of control." Higher scored indicated greater difficulties in emotion regulation (baseline Cronbach's $\alpha$ = 0.93; post-test Cronbach's $\alpha$= 0.93).

***Consequences of Alcohol & Marijuana***

Participants were asked their attitudes about the consequences of using alcohol and marijuana. To assess consequences of alcohol use, the Brief-Young Adults Alcohol Consequences Questionnaire was used (B-YAACQ; Kahler et al., 2005). Participants were assessed on 24 different consequences related to alcohol in the past 30 days. Answers to each of the items was either a yes or a no. Sample item included "While drinking, I have said or done embarrassing things," (baseline Cronbach's $\alpha$=0.93; post-test Cronbach's $\alpha$ =0.92).

To assess consequences of marijuana use, participants completed the Brief Marijuana Consequences Questionnaire (MACQ; Simons et al., 2012). Participants answered 21 items with a yes or a no answer. Items assessed consequences related to marijuana usage in the past 30 days. Sample items included: "While using marijuana I have said or done embarrassing things," and "I have become very ruse, obnoxious, or insulting after using marijuana," (baseline Cronbach's $\alpha$= 0.96; post-test Cronbach's $\alpha$ =0.93).

***Alcohol & Marijuana Usage***

Alcohol and marijuana usage was measured using two questions created by the larger research team to establish usage. Questions asked were: 'How many days have you had a drink in the past 30 days?" and 'How many days have you used marijuana in the past 30 days?'. Participants responded by entering a number between 0 and 30.

***Feasibility & Acceptability***

As a way to measure to feasibility, attendance was recorded for each of the sessions throughout the six-week program. Furthermore, the drop-out rate for each group of participants was calculated. To measure acceptability, all participants responded to three questions regarding how well they liked the program: “How much did you enjoy the program?”, “How useful did you find the program?”, and “Do you think what you learned would help other people?” Answers to these questions were averaged to denote acceptability. In addition to questions about the program itself, participants were also asked to rate the L2B facilitators by answering the questions “Were the leaders and trainers supports?” and “Did you feel comfortable to ask questions and share about your own experience?” For all five questions of acceptability, participants answered on a 5-point scale (1=definitely not to 5= definitely yes).

**Data Analytic Plan**

The analytic plan for this study is based on recommendations to develop and test hypotheses without relying on significance testing (Cumming, 2013; Eich, 2014; Kouros et al., 2014). Instead of traditional null hypothesis testing, an approach that relies on estimation of effect sizes and estimation of confidence intervals rather than dichotomous reject/retain decisions about the null hypothesis was used to determine statistically meaningful results. Unbiased Cohen’s *d* values and mean differences were calculated for all variables broadly, and for all variables between groups (LGBQ+ versus heterosexual). Specifically, pre-post changes in means overall, differences in pre-post changes in means between LGBQ+ and heterosexual participants, and pre-post changes in means within each group were analyzed and evaluated. Due to the nature of this being part of a pilot study, along with a smaller sample size, an unbiased calculation of Cohen’s *d* was helpful in comparing outcomes to Cohen’s (1988) guidelines for effect size reporting. Calculated confidence intervals provided information regarding the precision of the

effect size estimates for all variables. Visualizations of mean changes over time using graphs were produced using Excel and SPSS. RCIs for each participant were calculated and graphed in SPSS. In addition, calculations of estimated effect sizes and confidence intervals occurred in SPSS and are included in the graphed visualizations of change over time. Means, standard deviations, RCIs, confidence intervals, and Cohen's *d*s were reported in a table for ease of viewing all the quantitative data.

Acceptability ratings were analyzed to show any differences in acceptability between groups, and to report the overall acceptability of an online L2B program for college-aged students. Feasibility of the program was assessed using median attendance scores, and retention rates. The results for these tests are included in a diagram for the CONSORT flow for this study (Figure 1), a table of attendance rates, and a table depicting acceptability ratings of all of the participants broadly, and for each group (LGBQ+ versus heterosexual). These analyses were conducted in SPSS.

## Results

Of the participants that attended at least one L2B Session ($n$=62), 81% ($n$=50) completed post-test assessments, indicating a dropout rate of about 19%. Of the fifty participants that completed post-test assessments, nineteen participants identified as LGBQ+, and the remaining 31 participants identified as heterosexual. All individuals who completed a post-test assessment were included in the analyses. Independent samples $t$ tests and logistic regressions indicated that there were some demographic differences between those who completed and those who did not complete post-test assessments. Those who did not complete the post-test assessments had on average a higher level of income ($M$= 5.17, $SD$=2.89) compared to those who completed the post-test ($M$=3.83, $SD$=3.03); this difference was moderate in size ($d$=.44). The participants who

did not complete the post-test assessments were also older (*M*=21.83, *SD*=3.13) compared to those who completed post-test assessments (*M*=21.15, *SD*=4.41); this difference was small (*d*=.16). Lastly, those who did not complete the post-test assessments reported a lower level of education (*M*=3.83, *SD*=.58) compared to those who did complete the post-test assessments (*M*=4.08, *SD*=.70,); this difference was small-to-moderate in size (*d*=.37). Using logistic regression and appropriate methods to convert odds ratio (OR) to effect sizes (Chinn, 2000), compared to those who stayed, participants that dropped out of the study were more likely to be male (OR= 2.00, *d*=1.10), heterosexual (OR= 1.23, *d*=.68), Hispanic (OR=2.44, *d*=1.35) and Caucasian (OR=1.17, *d*=.65).

In addition to differences in demographics between those who dropped out of the study and those who completed post-assessments, there were also baseline differences in scores between groups. At baseline, there were large differences between groups for marijuana use (*d*=-1.14) and alcohol use (*d*=-.75). Those who dropped reported higher levels of marijuana use (*M*=15.67, *SD*=14.24) and alcohol use (*M*=8.50, *SD*=7.85) compared to participants who stayed in the study (*M*= 4.16, *SD*=8.86; *M*=3.78, *SD*=5.92). In addition, there were moderate differences between groups for depression symptoms (*d*=-.56), with those who dropped out more likely to have depression symptoms (*M*=43.00, *SD*=9.83) than those who stayed in the study (M=37.24, SD=10.50). Lastly, there were small differences between groups on difficulties with goal-oriented behavior (*d*=-.23), lacking acceptance (*d*=-.34), and overall difficulties in emotion regulation (*d*=-.25). Those who dropped out were more likely to report difficulties with goal-oriented behavior (*M*=3.88, *SD*=.77), lack of acceptance (*M*=3.44, *SD*=1.13) and overall difficulties in emotion regulation (*M*=3.05, SD=.62) compared to those who stayed in the study (respectively; *M*=3.68, *SD*=.89; *M*=3.04, *SD*=1.20; *M*=2.89, *SD*=.66). There were not

meaningful differences between groups for mindfulness, self-compassion, lack of impulse control, lack of awareness, lack of regulation strategies, lack of clarity, anxiety symptoms, perceived stress, and internalized shame (*ds*=-.05-.17). CONSORT Flow of participant recruitment can be found in Figure 1.

**Acceptance & Feasibility**

Overall, the program was adequately attended by those who completed post-test assessments. Overall, for the whole sample, the median attendance was five sessions (See Table 2 for detailed attendance information), and there were trivial differences between LGBQ+ and heterosexual participants in attendance (*d*=.02): among LGBQ+ participants, median session attendance was four sessions whereas heterosexual participants had a median attendance of five sessions. Furthermore, 81% of the baseline sample (*n*=50) completed post-test assessments, indicating a drop-out rate of 19% for the overall sample. Among LGBQ+ participants, of the original 23 participants at baseline, 19 completed post-test assessments, indicating a 17% dropout rate. Among heterosexual participants, of the original 39 participants at baseline, 31 completed post-test assessments, indicating a 21% dropout rate.

In addition, the program was well-liked by all participants. Both groups of participants rated the L2B program as highly acceptable, with small differences between acceptability ratings (*d*=.23, see Table 3), such that LGBQ+ participants had acceptability ratings that were slightly lower than heterosexual participants. However, there were trivial differences in facilitator rating (*d*=.02): LGBQ+ participants and heterosexual participants both rated the facilitators highly.

**Comparing LGBQ+ and Heterosexual Participant Outcomes**

Cohen's *d* for independent samples were used to estimate effect sizes and confidence intervals for differences in mean change and to explore any meaningful differences between the

LGBQ+ and heterosexual participants. Cohen's *d* for paired samples were used to estimate effect sizes and confidence intervals for differences in means within the LGBQ+ and heterosexual participant groups for all variables assessed before completing the intervention, and after the completion of the intervention. Listwise deletion was used when a participant did not answer a set of questions. Table 4 includes all quantitative data related to differences between groups and group outcomes, in addition to RCI calculations for each group and for each variable. Table 5 includes the percentages of each group who displayed reliable improvement, reliable deterioration (clinically significant worsening of symptoms), and no reliable change.

***Depression***

Overall, participants reported small decreases in depression symptoms at post-test (*M*=34.92, *SD*=10.92) compared to scores at pre-test (*M*= 36.85, *SD*=10.54, *d* =.21). In addition, there was a small difference in change in depression symptoms between the groups such that LGBQ+ participants greater reductions in depression compared to heterosexual participants (Figure 2). More specifically, LGBQ+ participants reported statistically meaningful reductions in depression symptoms at post-test compared to scores at pre-test with small-to-moderate effects. For LGBQ+ participants, the overall RCI for depression indicated that depression symptoms decreased for the sample, however the change was not clinically significant (Figure 3). In contrast, heterosexual participants reported trivial reductions in depression symptoms at post-test compared to scores at pre-test. For heterosexual participants, the overall RCI for depression indicated depression symptoms decreased however the change was not clinically significant (Figure 4).

***Anxiety***

Overall, participants reported moderate decreases in anxiety symptoms at post-test (*M*=35.77 *SD*=11.48) compared to pre-test (*M*=440.23, *SD*= 10.62, *d*=.49). In addition, there was a small difference in anxiety symptoms between the groups, such that LGBQ+ participants displayed greater decreases in anxiety compared to heterosexual participants (Figure 5). More specifically, LGBQ+ participants, on average, reported statistically meaningful reductions in anxiety symptoms at post-test compared to scores at pre-test with moderate effects. For LGBQ+ participants, the overall RCI for anxiety indicated that participants saw a reduction in anxiety symptoms, but the change was not clinically significant (Figure 6). Heterosexual participants also reported a statistically meaningful reduction in anxiety symptoms at post-test compared to scores at pre-test with small-to-moderate effects. For heterosexual participants, the overall RCI for anxiety indicated anxiety symptoms decreased, however the change was not clinically significant (Figure 7).

***Perceived Stress***

Overall, participants reported a moderate decrease in their levels of perceived stress at post-test (*M*= 25.65, *SD*=7.65) compared to scores at pretest (*M*=30.13, *SD*=6.95, *d*=.56) that was statistically meaningful for both groups. In addition, there were trivial differences in perceived stress levels between groups (*d*=.01, Figure 8). Moreover, RCI scores were similar: for LGBQ+ and heterosexual participants, the overall RCI for perceived stress indicated that perceived stress decreased for both groups but was not clinically significant (Figures 9 and 10, respectively).

***Internalized Shame***

Participants reported a moderate to large decrease in their levels of internalized shame at post-test (*M*=43.77, *SD*=23.91) compared to pre-test scores (*M*= 56.00, *SD*= 23.81, *d*=.68). There

were small differences in change between groups, such that LGBQ+ participants displayed greater reductions in internalized shame compared to heterosexual participants (Figure 11). More specifically, on average, LGBQ+ participants reported a statistically meaningful reduction in internalized shame scores with a medium-to-large effect. For LGBQ+ participants, the overall RCI for internalized shame indicated that there was a clinically significant reduction in internalized shame (Figure 12). On average, heterosexual participants experienced a statistically meaningful reduction in internalized shame scores with a medium effect. For heterosexual participants, the overall RCI for internalized shame indicated that there was a reduction in internalized shame that was not clinically significant (Figure 13).

***Mindfulness***

Overall, participants reported a moderate to large increase in mindfulness scores at post-test ($M$=3.78, $SD$=.71) compared to scores at pre-test ($M$=3.21, $SD$=.67, $d$=.67) that was statistically meaningful for both groups. There were trivial differences in the overall change between groups (Figure 14). Additionally, RCI scores for both groups were similar: for LGBQ+ and heterosexual participants, the overall RCI for mindfulness indicated both groups had increases in mindfulness that were not clinically significant (Figures 15 and 16, respectively).

***Self-Compassion***

Participants saw a large increase in self-compassion scores at post-test ($M$=2.57, $SD$=.58) compared to scores at pre-test ($M$= 3.21, $SD$=.71, $d$=1.04), that was statistically meaningful for both groups. However, between groups, there was no meaningful difference in scores (Figure 17). In contrast, there were differences in RCIs between groups. Among LGBQ+ participants, the overall RCI for self-compassion indicated the large increase in self-compassion was clinically significant (Figure 18). Although heterosexual participants saw a large improvement in

self-compassion, the overall RCI for heterosexual participants indicated the increase in self-compassion was *not* clinically significant (Figure 19).

***Difficulties in Emotion Regulation***

Changes in scores for difficulties in emotion regulation were calculated for each of the five sub-scales within this questionnaire, as well as for the questionnaire in its entirety for each participant. Overall participants saw a large decrease in difficulties in emotion regulation at post-test compared ($M$=2.34, $SD$=.61) to pre-test ($M$=2.86, $SD$=.66, $d$=.96). Furthermore**,** the difference in the amount of reduction between groups was small such that heterosexual participants displayed greater reductions in overall difficulties with emotion regulation compared to LGBQ+ participants (Figure 20). On average, LGBQ+ participants reported a statistically meaningful reduction in difficulties with emotion regulation at post-test compared to their scores at pre-test with large effects. For LGBQ+ participants, the overall RCI for difficulties in emotion regulation indicated that the reduction in emotion regulation difficulties was clinically significant (Figure 21). On average heterosexual participants reported a statistically meaningful reduction in difficulties with emotion regulation at post-test compared to their scores at pre-test with large effects. For heterosexual participants, the overall RCI for difficulties in emotion regulation indicated that the reduction in difficulties was not clinically significant (Figure 22).

**Goals**. Participants reported a moderate decrease in difficulties with goal-oriented behavior at post-test ($M$=3.13, $SD$=.94) compared to scores at pre-test ($M$= 3.68, $SD$=.88, $d$=.61). There was also a moderate difference between overall change between groups such that LGBQ+ participants displayed a greater reduction in difficulty with goal-oriented behavior compared to heterosexual participants (Figure 23). On average, for LGBQ+ participants experienced a statistically meaningful reduction in difficulties in goal-oriented behavior at post-test compared

to scores at pre-test with large effects. For LGBQ+ participants, the overall RCI for difficulties with goal-oriented behavior indicated that the reduction in difficulties with goal-oriented behavior was not clinically significant (Figure 24). Additionally, heterosexual participants experienced a statistically meaningful reduction in difficulties in goal-oriented behavior at post-test compared to scores at pre-test with medium effects. For heterosexual participants, the overall RCI for difficulties with goal-oriented behavior indicated the reduction in difficulties with goal-oriented behavior was not clinically significant (Figure 25).

**Clarity**. Overall, participants reported a moderate to large reduction in lack of clarity at post-test (*M*= 2.31, *SD*=.70) compared to scores at pre-test (*M*=2.76, *SD*= .73, *d*=.77), that was statistically meaningful for both groups. However, there were trivial differences between overall change between groups (Figure 26). Moreover, the RCIs for both groups were similar: for LGBQ+ and heterosexual participants, the overall RCI for lack of clarity indicated that the reduction in lack of clarity was not clinically significant for both groups (Figures 27 and 28, respectively).

**Strategies**. Participants saw large reductions in their difficulties in accessing regulation strategies at post-test (*M*=2.19, *SD*=.75) compared to scores at pre-test (*M*=2.83, *SD*=.89, *d*=.86). Additionally, there were small differences in change between groups such that LGBQ+ participants displayed greater reductions in difficulties in accessing regulation strategies compared to heterosexual participants (Figure 29). On average, LGBQ+ participants had a statistically meaningful reduction in difficulties accessing regulation strategies at post-test compared to scores at pre-test with large effects. For LGBQ+ participants, the overall RCI for difficulties in accessing regulation strategies indicated the reduction in difficulties with regulation strategies was not clinically significant (Figure 30). In addition, heterosexual

participants had a statistically meaningful reduction in difficulties accessing regulation strategies at post-test compared to scores at pre-test with medium-to-large effects. For heterosexual participants, the overall RCI for difficulties in accessing regulation strategies indicated the reduction in difficulties accessing regulation strategies was not clinically significant (Figure 31).

**Awareness**. Overall, participants saw moderate decreases in their lack of awareness scores at post-test (*M*=2.39, *SD*=.83) compared to scores at pre-test (*M*=2.76, *SD*=.95, *d*=.63), and there were very small differences between groups (Figure 32). On average, lack of awareness scores for LGBQ+ participants indicated a statistically meaningful improvement, with participants reporting lower scores at post-test compared to scores at pre-test with medium-to-large effects. For LGBQ+ participants, the overall RCI for lack of awareness indicated the decrease in lack of awareness was not clinically significant (Figure 33). In addition, lack of awareness scores for heterosexual participants also indicated a statistically meaningful improvement, with participants reporting lower scores at post-test compared to scores at pre-test with medium effects. For heterosexual participants, the overall RCI for lack of awareness indicated the reduction in lack of clarity was not clinically significant (Figure 34).

**Non-Acceptance**. Participants saw a large overall decrease in non-acceptance of emotional responses at post-test (*M*=2.25, *SD*= .95) compared to scores at pre-test (*M*=3.00, *SD*=1.20, *d*=.79), that was statistically meaningful for both groups. There were trivial differences between changes in non-acceptance between groups (Figure 35). Moreover, RCIs for both groups were similar: for LGBQ+ and heterosexual participants, the overall RCI for non-acceptance of emotional responses indicated the reduction in non-acceptance was not clinically significant for both groups (Figures 36 and 37, respectively).

**Impulses**. Participants overall saw a small to moderate reduction in difficulties with impulse control at post-test (*M*=1.94, *SD*= .75) compared to pre-test scores (*M*= 2.25, *SD*= .84, *d*=.37), that was statistically meaningful for both groups. There were trivial differences in change between groups (Figure 38). Moreover, both groups had similar RCIs: for LGBQ+ and heterosexual participants, the overall RCI for difficulties with impulse control indicated the decreases in difficulty with impulse control were not clinically significant (Figures 39 and 40, respectively).

***Consequences of Marijuana and Alcohol Use***

Participants overall reported a small reduction in consequences related to marijuana use at post-test (*M*=1.44, *SD*=3.37) compared to scores at pre-test (*M*=1.96, *SD*=4.13, *d*=.17). The difference in change between groups was small, such that LGBQ+ participants displayed a greater reduction in consequences related to marijuana use compared to heterosexual participants (Figure 41). On average, LGBQ+ participants reported a statistically meaningful reduction in consequences related to marijuana use at post-test compared to scores at pre-test with small effects. For LGBQ+ participants, the overall RCI for consequences of marijuana use indicated the reduction in consequences related to marijuana use was not clinically significant (Figure 42). Conversely, heterosexual participants reported only slightly fewer consequences related to marijuana use at post-test compared to scores at pre-test with trivial effects. For heterosexual participants, the overall RCI for consequences of marijuana use indicated the reduction in consequences related to marijuana use was not clinically significant (Figure 43).

Participants also reported a small reduction in consequences related to alcohol use at post-test (*M*=2.64, *SD*=4.34) compared to scores at pre-test (*M*=3.13, *SD*=3.93, *d*=.18). There were small differences in change between groups, such that heterosexual participants reported a

greater decrease in consequences related to consequences of alcohol use compared to heterosexual participants (Figure 44). On average, LGBQ+ participants reported greater consequences related to alcohol use at post-test compared to scores at pre-test with trivial effects. For LGBQ+ participants, the overall RCI for consequences of alcohol use indicated that the increase in consequences related to alcohol use was not clinically significant (Figure 45). Oppositely, heterosexual participants reported a statistically meaningful reduction in consequences of alcohol use at post-test compared to scores at pre-test with small effects. For heterosexual participants, the overall RCI for consequences of alcohol use indicated the reduction in consequences related to alcohol use was not clinically significant (Figure 46).

***Marijuana and Alcohol Usage***

Overall, participants had a small reduction in their marijuana use at post-test ($M$=3.52, $SD$=7.79) compared to usage at pre-test ($M$=4.27, $SD$=9.02, $d$=.15). There was a small difference in change between groups such that heterosexual participants reported a greater reduction in marijuana use compared to LGBQ+ participants (Figure 47). At post-test, LGBQ+ participants on average reported an increase in marijuana usage compared to usage at pre-test with little to no effect. Conversely, at post-test heterosexual participants reported a statistically meaningful reduction in marijuana usage compared to usage at pre-test with a small effect.

Participants also reported a small decrease in alcohol use at post-test ($M$=3.33, $SD$=5.18) compared to usage at pre-test ($M$=3.88, $SD$=6.02, $d$=.19). There was a small difference in change between groups such that heterosexual participants reported greater reductions in alcohol use compared to LGBQ+ participants (Figure 48). On average, LGBQ+ participants reported a decrease in alcohol use at post-test compared to usage scores at pre-test with little to no effect. Heterosexual participants also reported a statistically meaningful reduction in alcohol use at post-

test compared to usage scores at pre-test with a small effect. RCIs could not be calculated for marijuana and alcohol use since they were a one question item, and Cronbach's alpha could not be obtained.

## Discussion

The goal of this study was to investigate the differences in effects of an online MBI delivered during the COVID-19 pandemic on between LGBQ+ and heterosexual participants' mental health and stress, mindfulness and self-compassion, difficulties with emotion regulation, consequences related to substance use, and frequency of substance use, and to investigate acceptability and feasibility ratings between groups. Overall, there were meaningful group differences in several of the variables. LGBTQ+ participants displayed greater improvements in depression, anxiety, internalized shame, accessing regulation strategies, difficulty with goal-oriented behavior, and consequences of marijuana use. Conversely, heterosexual participants displayed greater improvement in overall difficulties in emotion regulation, consequences of alcohol use, and marijuana and alcohol usage. There were no meaningful differences between groups in mindfulness, self-compassion, perceived stress, mindfulness, self-compassion, difficulty with impulse control, non-acceptance of emotional responses, lack of awareness and lack of clarity.

Furthermore, the program had small group differences in acceptability scores, with heterosexual participants indicating greater acceptability, although both groups rated the program highly. In addition, L2B yielded high facilitator ratings by both groups, indicating that the program was acceptable to both groups of participants. Regarding feasibility, both groups had a dropout rate that was greater than 15% of the sample, although both groups attended the program

highly with trivial differences between median attendance rates. Feasibility indicators suggest that the program has room for improvement regarding the retention of its participants.

When examining the differences between LGBQ+ and heterosexual participants' outcomes, there are some meaningful differences in overall changes in scores. Although both groups experienced meaningful changes, corroborating existing literature (Chi et al., 2018; Dark-Freudamn et al., 2022), LGBQ+ participants had greater decreases in depression, anxiety and internalized shame compared to heterosexual participants. In addition, LGBQ+ participants saw greater improvements in accessing regulation strategies, difficulty with goal-oriented behavior, and consequences of marijuana use compared to heterosexual participants. Overall, these differences in changes between groups may be attributed to minority stress. LGBQ+ young adults are more likely to experience worsened mental health outcomes and a greater amount of stress compared to their heterosexual peers due to the compounding stress related to their minority identity (Lewis, 2009; Meyer, 1995; Meyer 2003; Mizock, 2017; Roberts et al., 2012; Strutz et al., 2015; Woodford et al., 2014). Moreover, LGBQ+ individuals are more likely to have trouble regulating emotions (Keating & Muller, 2019) and coping with compounding effects of stress (Bostwick et al., 2007; McCabe et al., 2010), indicating the need for assistance in these areas may be greater than in the heterosexual population. It could also be theorized that because there may have been a greater need in this population, participation in L2B allowed LGBQ+ participants to gain profound access to, and the ability to, identify regulatory strategies. This improvement in regulatory strategies likely lead to reductions in difficulty with goal-oriented behavior and consequences of marijuana use, as drug use and goal-directed behavior are related to emotion regulation strategies (Weiss et al., 2022).

Although LGBQ+ participants reported greater change than heterosexual participants for some variables, other variables indicated that heterosexual participants benefitted more greatly. Heterosexual participants experienced greater improvement than LGBQ+ participants related to overall difficulties in emotion regulation, consequences of alcohol use, and marijuana and alcohol usage. Compared to heterosexual young adults, LGBQ+ young adults are more likely to experience difficulties in emotion regulation (Keating & Muller, 2019), and are more likely to use marijuana and alcohol because of experiencing minority stressors (Rosario et al., 2014). The compounding effect of the stress of the pandemic combined with minority stressors may have made it increasingly difficult for LGBQ+ participants to cope during the timing of the intervention (Gonzales et al., 2020; Salerno et al., 2020) thus making alcohol and marijuana usage appealing, and perpetuating difficulties with emotion regulation. Therefore, the compounding effects of stress and its influence on access to coping strategies may be a likely reason for why heterosexual participants reported greater improvements in these outcomes (Bostwick et al., 2007; McCabe et al., 2010).

Lastly, LGBQ+ participants and heterosexual participants had no meaningful differences in scores for perceived stress, mindfulness, self-compassion, difficulty with impulse control, non-acceptance of emotional responses, lack of awareness and lack of clarity. Moreover, both groups reported comparable increases in mindfulness and self-compassion. These findings corroborate existing MBI literature associating mindfulness with self-compassion (Golden et al., 2021), as self-compassion is a key component of mindfulness (Hasselberg & Ronnlund, 2020). Therefore, it is reasonable that participants from both groups reported similar increases in both constructs after completion of the program. Finally, the lack of group differences in emotion regulation subcategories and perceived stress scores could be attributed to the added stress of

navigating COVID-19 for all participants in the study (Fegert et al., 2020). Although both groups saw improvements, during this time young adults experienced disruptions due to the pandemic, and experienced stressors outside of their control (i.e., fully remote work, stay-at-home orders; Byrne et al., 2021; Ormiston & Williams, 2022), which likely led to an increase in stress for all participants (Fegert et al., 2020). It may have been difficult for participants in this study to find clarity, accept the unpleasant feelings, and attune to emotions resulting from the circumstances of the COVID-19 pandemic that were outside of their control. Furthermore, COVID-19 lead to decreases in coping strategies for young adults, which likely explains the lack of group differences in impulse control (Slemon et al., 2022).

In addition to examining differences in effects between LGBQ+ and heterosexual participants, this study aimed to specifically examine the effects of an online MBI on LGBQ+ participants' outcomes. Based upon effect sizes, LGBQ+ participants indicated statistically meaningful improvement in fourteen of the seventeen variables, however only three variables yielded a clinically significant RCI. More specifically, LGBQ+ participants reported statistically meaningful decreases in depression, anxiety, perceived stress internalized shame, difficulty with emotion regulation, difficulty with goal-oriented behavior, difficulty with impulse control, non-acceptance of emotions, lack of clarity, lack of awareness, difficulty accessing regulation strategies, and consequences of marijuana use. Moreover, LGBQ+ participants saw meaningful increases in mindfulness and self-compassion. The changes in internalized shame self-compassion, and difficulty with emotion regulation were also clinically significant. Conversely, there was no meaningful change found for consequences of alcohol use, frequency of marijuana use, and frequency of alcohol use.

The reductions in mental health symptoms and perceived stress experienced by LGBQ+ participants of L2B corroborate past studies as MBIs are associated with reduction in psychological distress, mental health symptoms, and overall perceived stress (Chi et al., 2018; Dark-Freudamn et al., 2022), as well as adding an exciting finding to the literature pertaining to LGBQ+ participants and MBI. Specifically, LGBQ+ young adults are at an increased risk of experiencing worse mental health outcomes due to their minoritized identity and lack interventions targeted to their needs (Fish, 2020). The findings here indicate that MBI could be an effective tool in mitigating mental health disparities in the LGBQ+ population. Furthermore, these findings corroborate the mindfulness stress-buffering hypothesis, which indicates that the greater the stress in a population, the more beneficial MBI may be in reducing health disparities (Creswell & Lindsay, 2014).

Furthermore, self-compassion levels in LGBQ+ individuals are often inversely tied to levels of internalized shame, and the greater the amount of shame the less self-compassion LGBQ+ individuals show themselves (Vigna et al., 2018). Due to MBI's ability to train participants to be attuned to the present moment without judgment (Creswell & Lindsay, 2014; Metz et al., 2013), this likely led to LGBQ+ participants' ability to create space for self-compassion while also reducing their levels of internalized stigma.

In addition to increasing self-compassion, previous RCTs examining the effects of MBIs among heterosexual participants have shown increases in emotion regulation (Grossman et al., 2004; Sharma & Rush, 2014; Villalba et al., 2019). LGBQ+ participants reported reductions in overall difficulties with emotion regulation, in addition to reporting meaningful reductions in difficulty with goal-oriented behavior, lacking clarity, difficulty with emotion regulation strategies, lacking awareness, difficulty with impulse control, and non-acceptance of emotions.

Previous research investigating MBI has found that mindfulness practice is associated with reduced difficulty with emotion regulation (Grossman et al., 2004; Sharma & Rush, 2014; Villalba et al., 2019). Coupled with the notion that emotional regulatory processes are closely tied to anxiety and depression symptoms (Gratz & Tull, 2010; Vujanovic et al., 2011) it makes sense that in addition to acting upon depression and anxiety, L2B was effective in reducing difficulties with emotion regulation. Furthermore, these results add to the literature and indicate the MBIs have meaningful effects on LGBQ+ participants' ability to regulate emotions.

Although LGBQ+ participants saw meaningful improvements in several outcomes, the experience of minority stress coupled with the stressors of a global pandemic likely attributed to the lack of meaningful changes related to substance use. During the COVID-19 pandemic, LGBQ+ college students likely experienced a greater number of stressors compared to heterosexual college students at that time due to being reintroduced to stressors related to their minority identity that they may have been able to escape within a college environment (i.e., identity concealment, unwelcoming home environments; Gonzales et al., 2020; Salerno et al., 2020). Increases in stressors related to their minority identity coupled with a greater difficulty in coping during the COVID-19 pandemic are likely reasons that LGBQ+ participants reported an increase in marijuana use and did not report meaningful changes in consequences related to alcohol use and frequency of alcohol use. LGBQ+ young adults are more likely to engage in substance use compared to their heterosexual peers (Ebersole et al., 2012; Felner et al., 2020; Green & Feinstein, 2012). This trend was also seen during the pandemic, with LGBQ+ young adults more likely to turn to substances like marijuana and alcohol to cope with the stress resulting from the COVID-19 pandemic (Slemon et al., 2022). LGBQ+ participants did, however, report a small decrease in consequences related to marijuana use. MBIs have evidence

of effecting substance use in adults, which could explain this change (Korecki et al., 2020), however due to the lack of changes in other substance use variables, more investigation into the role MBI can play in reducing substance use and consequences related to substance use in the LGBQ+ young adult population specifically is needed.

### Limitations

One limitation of this study is related to the sample size. The sample size for LGBQ+ participants was smaller compared to the number of heterosexual participants that participated in the study. Furthermore, the sample was quite homogenous related to race, ethnicity, gender, and socioeconomic status. Therefore, the results from this study may not be generalizable to participants with more diverse backgrounds. Future studies should aim for a balanced design and an overall more diverse sample to better compare MBI effects between LGBQ+ and heterosexual participants, and to generalize the findings more broadly. Also, the post-assessment took place shortly after the intervention's last session was completed. Due to this, it is unclear if the effects lasted over time. Future research should include follow-up periods to assess sustained changes over time, as previous meta-analyses have indicated effects of MBI may strengthen over time (Galante et al., 2023; Solhaug et al., 2019). Despite these limitations, the current study shows preliminary evidence that online MBI can be effective in reducing mental health symptoms, overall stress, and difficulties in emotion regulation while increasing self-compassion and mindfulness in LGBQ+ young adults. Future studies should aim to replicate these findings, and further investigate the effects of MBI on substance use and consequences related to substance abuse in LGBQ+ participants.

## Conclusion

Although LGBQ+ young adults face disparities in outcomes compared to their heterosexual peers, the results of the current study suggest that MBI has great potential in reducing negative outcomes among the LGBQ+ population. The role of mindfulness in the mitigation of health disparities among LGBQ+ populations is an understudied area of research. Therefore, the results from this pilot study indicate that further investigation is necessary and warranted, but also provide important preliminary evidence for the possible benefits of MBI for LGBQ+ young adults. Future iterations of L2B programming should aim to investigate outcomes specific to LGBQ+ participants to further reduce health disparities and promote health equity in this underserved community.

# Chapter 2: Pilot and Feasibility Study of a Mindfulness-Based Intervention Adapted for LGBTQ+ Adolescents

Individuals identifying as lesbian, gay, bisexual, transgender, queer, and gender and sexuality diverse individuals (LGBTQ+) often have unique developmental experiences and risk factors related to their identities (Lothwell et al., 2020). As compared to heterosexual and cisgender individuals, LGBTQ+ individuals unfortunately experience major health disparities in the domains of mental and physical health (Kelleher, 2009). On account of unjust experiences of discrimination, including structural and systemic barriers to mental health and medical health care, LGBTQ+ persons are heightened risk for concerns in social, psychological, and physical dimensions of well-being (Williams et al., 2017). These risks are amplified for LGBTQ+ people in the adolescent years.

Adolescence, referring to the second decade of life or 10-19 years of age, is a dynamic, sensitive developmental period often characterized by increased need for autonomy, increased responsibility at school and home, navigation of changes in peer and family relationships, exploration of values and identities, and stressors related to identity development (Gutgesell & Payne, 2004). This period of development also is associated with dynamic changes in cognitive and emotional functioning, as the brain undergoes maturation (Romeo, 2017). How adolescents weather the turning points and transitions of adolescence has implications for their health during adolescence as well as health trajectories into adulthood (Larsen & Luna, 2018).

## Stressors in Adolescence

Stress is a normative experience for many adolescents (Compas et al., 1993). However, the intensity, frequency, and various ways in which stressors are experienced vary among

adolescents and affect their well-being (Lindholdt et al., 2022; Miller et al., 2021; Pascoe et al., 2020). Some adolescents perceive that they are constantly navigating the stress of managing expectations and pressures at school, at home, and in their peer groups. Chronic exposure to stressors and high levels of perceived stress in adolescence have been connected to increased mental health symptomatology, including diagnoses of anxiety and depression (Romeo, 2017; Sheth et al., 2017).

In addition to these normative changes and increased stressors of adolescence, adolescents who identify as LGBTQ+ face added stressors specific to their sexual and/or gender minority identity. Minority stress theory underscores that multiple and persistent stressors related to one's lived experiences with a minority identity status, including discrimination, stigma, and prejudice, negatively impact health (Meyer, 1995; Meyer, 2003). Effects of minority stress can be especially pronounced for individuals with a sexual and gender minoritized identity, as they all too often experience isolation, discrimination, and rejection, which may lead to an internalized lack of self-acceptance (Lick et al., 2013). A 2022 U.S. study with over 22,000 LGBTQ+ adolescents revealed that in the past year, 76% experienced verbal harassment, 54% sexual harassment (e.g., unwanted touching or sexual remarks), 31% physical harassment (e.g., pushed or shoved), and 13% physical assault (e.g., punched, kicked, or injured) based on sexual or gender identity (Kosciw, et al., 2022). In this same cohort, 17% of LGBTQ+ adolescents reportedly had to change schools due to feeling unsafe or uncomfortable at school. In addition, social isolation due to feeling unsafe at school was a major concern: 79% of LGBTQ+ students reported avoiding school functions and extracurricular activities and 43% reported missing school because they felt unsafe in their school environment (Kosciw, et al., 2022). These

national data underscore the harrowing stressors that many LGBTQ+ adolescents in the U.S. face in their daily lives.

**Mental Health Disparities**

Such experiences of stigma, harassment, and discrimination contribute to mental and physical health disparities within the LGBTQ+ adolescent population (Meyer, 1993, 2005). Compared to heterosexual and cisgender peers, LGBTQ+ adolescents report alarmingly high rates of negative mental health experiences and symptomatology (Kosciw, et al., 2022). LGBTQ+ adolescents are six times more likely to experience elevated symptoms of depression compared to their heterosexual/cisgender peers (Kosciw, et al., 2022). In a survey of LGBTQ+ adolescents aged 14-21 years, 41% of youth had seriously considered suicide, and 14% of youth had at least one attempt in the past year (Trevor Project, 2023). Unfortunately, these statistics are even more alarming for transgender and non-binary youth, with 50% of transgender youth seriously considering a suicide, and 1 in 5 youth reporting a suicide attempt in the past year (Trevor Project, 2023). These distressing data highlight the incredible mental health disparities facing LGBTQ+ adolescents and an urgent need for interventions that support mental health of LGBTQ+ young people.

**Physical Health Disparities**

Minority stressors commonly experienced within the LGBTQ+ population also are likely to play a role in physical health disparities. Stress in general has been associated with a range of poorer physical health indicators in adults (Boehmer et al., 2007; Caceres et al., 2017; Fredriksen-Goldsen, 2011; Juster et al., 2017; Lick et al., 2013; Meyer, 2015). In sexual and gender minority adults, research suggests that lesbian and bisexual women are more likely than heterosexual women to have high weight (Boehmer et al., 2007). Further, LGBTQ+ adults have

higher rates of disability and cardiovascular diseases compared to heterosexual and cisgender adults (Caceres et al., 2017; Fredriksen-Goldsen, 2011, Fredriksen-Goldsen et al., 2023). There is very little research on LGBTQ+ physical health in adolescents; yet there are some data suggesting higher rates of prediabetes and type 2 diabetes among LGBTQ+ adolescents as compared to heterosexual/cisgender adolescents (Beach et al., 2018a; Beach et al., 2018b). Studies also have shown connections between stressors distinct to sexual and gender minority identity, such as family rejection and/or disapproval of one's sexual and/or gender identity, and worse overall physical health among LGBTQ+ adolescents (Ryan et al., 2010).

Taken together, LGBTQ+ adolescents' whole health—mental and physical health—likely is strongly impacted by minority stressors. In addition to social justice efforts needed to address stressors and injustices to LGBTQ+ youth and communities at a systemic level, determining the most effective ways of supporting LGBTQ+ adolescents to cope with stressors and associated distress is sorely needed, and is anticipated to ultimately mitigate the adverse impacts on health.

**Coping**

Coping has been defined as the utilization of strategies to manage situations that are stressful, or strategies that reduce negative responses triggered by stress (American Psychological Association Dictionary of Psychology, 2023). Individuals can only cope with, or handle, so much stress. Excessive or toxic stress, referring to extended activation of the body's stress response system in response to chronic or overwhelming stressful events, undermines a person's capacity to cope effectively (National Scientific Council to the Developing Child, 2005). As a whole, and in light of the toxic stress often facing the LGBTQ+ community, maladaptive coping strategies are common. For example, substance use, and abuse are frequently

reported as a coping mechanism among LGBTQ+ young adults in response to stress (Felner et al., 2020). LGBTQ+ adolescents are more likely to engage in alcohol, marijuana, and tobacco use as compared to heterosexual and cisgender adolescents (Goldbach et al., 2017; Johns et al., 2019). Further, LGBTQ+ adolescents report cutting and other forms of non-suicidal self-harm (Liu & Mustanksi, 2012; Taliaferro & Muehlenkamp, 2017) and engage in these self-injurious behaviors as a form of coping, more frequently than heterosexual and cisgender adolescents (McDermott et al., 2008; Taliaferro & Muehlenkamp, 2017).

Additionally, greater LGBTQ+ minority stress experiences in adolescence have been related to more reliance on unhelpful coping strategies. For instance, LGBTQ+ adolescents who have experienced heterosexism report using more hazardous forms of coping (Goldbach & Gibbs, 2015). Compared to heterosexual and cisgender adolescents, LGBTQ+ youth are ~five times more likely to attempt suicide (Goldbach et al., 2021; Toomey et al., 2018). However, LGBTQ+ adolescents who experience multiple minority stressors are almost 12 times more likely to attempt suicide as compared to LGBTQ+ adolescents who do not report experiences of minority stress (Green et al., 2021). One underlying driver of these serious mental health concerns likely has to do with LGBTQ+ youth being at risk for coping through social isolation, which is partially driven by experiences of discrimination, stigma, and bullying/victimization (Compas et al., 2001; Garcia et al., 2020). Importantly, when LGBTQ+ adolescents are 'othered,' referring to being explicitly made to feel different from their peers due to their identity (Brown & Kelly, 2018), they may respond to that stress by isolating (Garcia et al., 2020). LGBTQ+ adolescents may be at risk for isolating especially if they lack a LGBTQ-inclusive community or perceive social situations as unsafe (Garcia et al., 2020; Kosciw, et al., 2022),

because, sadly, being alone may be perceived as a way to feel safe and in control of one's environment.

## Stress-Related Health Behaviors

Additionally, there is some research suggesting that stress-related health behaviors, particularly eating patterns in response to stress and sleep dysregulation, are heightened in LGBTQ+ individuals.

### *Disordered Eating*

In young adults with high weight, LGBTQ+ individuals were more likely than heterosexual and cisgender young adults to engage in vomiting, fasting, and other unhealthy weight control behaviors (Nagata et al., 2018). Indeed, adults identifying as a member of the LGBTQ+ community are more likely to be diagnosed with an eating disorder compared to heterosexual and cisgender adults (Coelho et al., 2019; Kamody et al., 2020). When examining eating and diet behaviors among sexual minority adolescents, results from the Centers for Disease Control and Prevention's Youth Risk Behavior Survey indicate that binge eating, purging and use of diet pills or laxatives were common and occurred significantly more among sexual minority youth than in heterosexual adolescents (Calzo et al., 2019). More research is needed to examine disordered eating and diet behaviors in transgender adolescents. To my knowledge, the only study examining these behaviors in transgender adolescents indicated that, compared to cisgender adolescents, transgender adolescents were more likely to fast, use diet pills, and take laxatives to manage their weight (Guss et al., 2017).

### *Sleep Problems*

Sleep health may be another stress-related health behavior domain impacted by LGBTQ+ identity-related minority stress. Higher rates of bullying or victimization among LGBTQ+

adolescents are related to greater disruption in sleep patterns and lower daytime energy (Gini & Pozzoli, 2013; Gini & Espelage, 2014). A majority of adolescents, regardless of sexual or gender identity, report insufficient sleep duration (e.g., on account of staying up late communicating with friends, completing homework, etc.), and in reverse, sleeping or being in bed excessively (in the absence of efficient or sound sleep) is related to greater depressive symptoms (Carskadon, 2011a; Carskadon, 2011b). However, for LGBTQ+ adolescents, sleep dysregulation may occur for multiple additional reasons related to minority stress-related experiences, such as seeking connection within live action gaming that continues late into the night or spending time in bed as an avoidant coping response to stress (Butler et al., 2020). Ultimately, these irregular sleep patterns are likely to exacerbate existing precursors for broader health disparities in the immediate and distant future (Buysse, 2014), as a lack of quality sleep has been associated with greater depression (Baglioni, 2011a; Baglioni, 2011b), greater risk for metabolic and coronary diseases (Appelhans et al., 2013; Knutson et al., 2011; Troxel et al., 2010; Yaggi et al., 2006), and earlier mortality (Hublin et al., 2007; Hublin et al., 2011; Rod et al., 2011).

**Protective Factors**

The overwhelming negative health disparities experienced by the LGBTQ+ community often overshadow positive aspects of identifying as a sexual and/or gender minority. However, positive aspects are equally important to consider. For example, LGBTQ+ individuals have the capacity to experience a unique sense of connectedness to a community of like-identified or allied people (Garcia et al., 2020). Furthermore, although the process of identity development as a sexual and/or gender minority individual can often be stressful and painful, many individuals, at least eventually, report experiencing identity euphoria or identity pride (Chang et al., 2021). These positive experiences connected to one's gender and/or sexual identity may serve as critical

buffers for protecting LGBTQ+ adolescents from the negative impacts of toxic stress. Thus, promotion of these positive identity and community belongingness factors is anticipated to be an important antidote to minority stressors. One especially adverse psychological phenomenon is internalized homophobia/heterosexism and/or internalized transphobia/genderism, which is characterized by an internalized negative view of one's own or others' sexual and/or gender minority identities (Puckett et al., 2015). Taken together, stress interventions are critical, but must be tailored specifically for LGBTQ+ adolescents to address their particular minority stressors and support greater attunement to identity pride and belongingness.

**Stress Interventions**

In aiming to reduce stress, mindfulness-based intervention (MBI) may be a particularly useful approach for helping LGBTQ+ adolescents navigate stressors and respond to stressors more healthfully. Rather than mitigating stressors completely in persons facing high levels of stressors, MBI delivery aims to reduce psychological and somatic symptoms of distress and their effects on stress-related health behaviors and health outcomes (Grossman et al., 2004). MBI is focused on mindfulness training, meaning practices that promote present-moment awareness, fostering a non-judgmental stance of acceptance, and allowing individuals to experience thoughts and feelings in a non-judgmental way with a sense of equanimity (Aguilar-Raab et al., 2021; Nyklíček & Kuijpers, 2008; Sharma & Rush, 2014). In addition to cultivating non-judgmental, moment-to-moment mind, body, and emotional awareness, MBI targets other helpful coping strategies such as self-compassion, healthy emotion regulation (e.g., acceptance vs. avoidance), expressing and feeling gratitude, and bodily awareness (Grossman et al., 2004; Sharma & Rush, 2014; Villalba et al., 2019). The cultivation of such strategies through MBI has

led to reductions in mental and physical health concerns of highly stressed young adults compared to a randomized control group (Aguilar-Raab et al., 2021).

### Learning to Breathe (L2B)

One empirically supported MBI for adolescents is *Learning to Breathe* (L2B; Broderick, 2013; Broderick, 2021; Broderick & Metz, 2009). L2B is centered on improving emotion regulation and attentional skills via interactive and experiential education and activities to foster mindfulness of body, thoughts, and feelings (Broderick & Jennings, 2012). Of note, the L2B curriculum was developed for an adolescent target audience, with materials and activities geared toward this developmental period. L2B provides instruction and opportunities to learn and practice mindfulness individually (e.g., guided meditation, breath awareness) and through group activities (e.g., gentle yoga, discussion about stress and its effects).

L2B has been tested in a small but growing body of studies, with data showing positive results regarding improvements in perceived stress, self-regulation skills, and mood among adolescents compared to a control group (Bluth et al., 2016; Broderick & Frank, 2014; Broderick & Jennings, 2012; Dvořáková et al., 2017; Eva & Thayer, 2017; Felver et al., 2018; Metz et al., 2013). Although preliminary results are compelling, researchers have begun to examine how adding or adapting elements of the program may strengthen positive outcomes. In particularly, making adaptations to particular stakeholder groups is an important ingredient for boosting the engagement and positive health effects (Gonzales, 2017).

### Adapted Interventions

Cultural adaptations to evidence-based interventions are crucial because such adaptations can help minimize disparities in health and well-being and ensure equitable outcomes and access to services among minoritized populations (Gonzales, 2017). Adapting interventions to bolster

stakeholder acceptability is crucial, as lack of acceptability or engagement is a large barrier to program completion and involvement for underrepresented populations (Winslow et al., 2016). Adaptations that are culturally sensitive to LGBTQ+ lived experiences could incorporate specific imagery, values, and relevant examples within the program. Likewise, the mode and formatting of delivery may be adapted to an online format to accommodate for structural barriers LGBTQ+ adolescents may experience in coming to in-person sessions (Chambers & Norton, 2016).

Few adapted programs specific for LGBTQ+ adolescents exist. One exception, Pride Camp, was adapted to specifically target resilience and health equity among LGBTQ+ adolescents. Results from the pilot study of this program found that resilience, quality of life, and self-esteem improved among Pride Camp participants from before to after participation (Weinhardt et al., 2021). In adults, LGBTQ+ adapted programs that address mental health (Hall et al., 2019), cancer screening (Drysdale et al., 2021), and smoking cessation (Williams et al., 2020) have all found reductions in negative mental and physical health outcomes among LGBTQ+ participants in preliminary testing.

Furthermore, programs that currently exist may benefit from adaptations that are sensitive to needs specific to the LGBTQ+ community. One example is sex education. In the United States, many states implement abstinence-only sex education, which has been associated with teen pregnancy, sexually transmitted diseases, and peer victimization of LGBTQ+ adolescents (Barnett & Hurst, 2003; Centers for Disease Control and Prevention, 2021; Hauser, 2005; Silva, 2002; Stanger-Hall & Hall, 2011). Conversely, comprehensive sex education has been associated with better outcomes for all adolescents, including LGBTQ+ adolescents, as the curriculum includes examples and experiences specific to both heterosexual and LGBTQ+ adolescents (Sexual Information and Education Council of the United States [SIECUS], 2021;

Stanger-Hall & Hall, 2011). Although there are several empirically supported, adapted interventions for LGBTQ+ adults, there is a dearth of interventions that target the specific needs and stressors of LGBTQ+ adolescents (Fish, 2020).

**Adaptation of L2B**

To fill this gap, and in line with intervention best practices which highlight the importance of cultural adaptation, L2B was tailored to target the unique stressors in the LGBTQ+ adolescent community through systematic information gathering and feedback; first from an LGBTQ+ steering committee, and second from a series of focus groups comprised of LGBTQ+ adolescents and separately, community stakeholders (Quirk et al., in preparation). Broadly, adaptations were made to each of the six modules of L2B that correspond to the BREATHE acronym: "B", body awareness; "R", reflections or understanding and working with thoughts; "E", emotions or understanding and working with feelings; "A", awareness of thoughts, feelings, and bodily sensations; "T", tenderness, reducing harmful self-judgments; and "H", healthy habits, integrating mindful awareness into daily life. Each module included psychoeducation, discussion, practice, and activities. Specific modifications included changing all fictional story characters portrayed in the activities to have gender neutral pronouns, as well as m the stories used in the activities to be scenarios common among LGBTQ+ adolescents. For example, one activity centered on how to more mindfully handle a stressful event wherein a student named "Amy" forgot to complete her homework. Adaptation of this story included changing the pronouns to "they," changing the character name to a more gender ambiguous name of "Sam," and changing the scenario to being misgendered by a teacher. Overall, adaptations were made to best speak to unique stressors that LGBTQ+ adolescents face, and to

frame these specific stressors within contexts and characters most closely matching the experiences of sexual and gender minority adolescents.

L2B-Q, the resulting adapted program, contains the suffix "Q", reflecting the word "Queer", which has been largely reclaimed by the LGBTQ+ community as a positive self-referential term (Brontsema, 2004; Rand, 2014). This reclaiming is reflective of "linguistic reclamation," which refers to the appropriation of a previously pejorative epithet by its target/population (Brontsema, 2004). The word "queer" has also been used recently within the LGBTQ+ community as an umbrella term and/or shorthand to refer to each of the growing number of identities subsumed under the acronym.

## Summary and Current Study

LGBTQ+ adolescents are an underserved population who have disparities in mental and physical wellbeing compared to their heterosexual and cisgender counterparts (Beach et al., 2018a; Beach et al., 2018 b; Cohelo et al., 2019; Kamody et al., 2020; Gini & Pozzoli, 2013 Gini & Espelage, 2014; Kosciw, et al., 2022; Meyer, 1993; Meyer, 2005; Trevor Project, 2022). Minority stress, combined with everyday stressors attributed to adolescence, contribute to the growing rates of mental health problems, including disproportionately high suicide rates, in this population. Given the vulnerability of LGBTQ+ adolescents, programs that are created to specifically target and address their unique stressors, while also providing strategies to cope with stress, are vital. This study aims to address this need by examining the initial feasibility and acceptability of an adapted mindfulness program specific for LGBTQ+ youth.

The primary aim of the current single-arm pilot study was to determine acceptability and feasibility of the L2B-Q program to LGBTQ+ adolescents. It was predicted that L2B-Q would be acceptable to participants, as indicated by at least 80% of participants attending the majority

(at least 80%) of intervention sessions. It was also expected that themes from post-intervention focus groups would be reflective of perceived likeability and utility of program participation, a further indicator of acceptability. Finally, it was expected that recruitment and retention would be feasible, with a rate of recruitment conducive to enrolling at least ten LGBTQ+ adolescents for an L2B-Q cohort within a 12-week timeframe, as well as no more than a 15% dropout rate at post-intervention.

The secondary aim was to describe baseline to post-intervention changes in mental health, stress-related health behaviors, physical stress experiences, mindful attention, and LGBTQ+ identity variables among LGBTQ+ adolescents. Although efficacy testing is beyond the scope of single-arm pilot feasibility trials (Evans, 2010), safety/tolerability were monitored and reported. It was predicted that no more than 5% of participants would show a worsening in anxiety or depression symptoms. It was also hypothesized that there would be a signal for a clinically meaningful reduction in anxiety and depression symptoms, which was operationalized as the majority of participants showing either a 20% reduction in anxiety/depression continuous symptom score or a reduction in level of clinical elevation threshold (i.e., moving from severe anxiety to moderate anxiety based upon established cut-points). Furthermore, it was hypothesized that stress-related health behaviors and physical stress effects would be meaningful, reflected as at least half of participants showing a 20% increase in intuitive eating and physical activity, and a 20% reduction in sleep disturbances and physical stress experiences. Next, it was hypothesized that identity-related variables would change in a clinically meaningful way, as reflected as the majority of participants showing a 20% increase in positive identity and community connectedness, and a 20% reduction in internalized stigma. Likewise, it was

predicted that mindful attention would show a clinically meaningful signal, reflected by at least half of the participants showing a 20% increase in mindfulness.

In addition, clinically significant changes in all outcome variables would be indicated if the reliable change index (RCI) was greater than 1.96 in the majority of participants (Jacobson & Truax, 1991), and meaningful change would be achieved if at least small effect sizes were observed. It was expected that all of these indicators would have at least small-to-moderate effect sizes ($d \geq 0.2$) for baseline to post-intervention change, as this has been considered a meaningful effect size within the context of previous studies evaluating MBI (Dawson et al., 2020; Ma et al., 2019).

## Methods

### Participants

All procedures for the purposes of this study were reviewed and approved by the Colorado Multiple Institutional Review Board. Participants were recruited throughout a western area of the U.S., including rural and urban areas. Recruitment flyers and emails were sent to LGBTQ+ area organizations, including pride centers, LGBTQ+ support centers, schools, therapeutic settings serving sexual and gender minority individuals, and LGBTQ+ online community settings. Specific organizations that provided letters of support prior to beginning the study also directly reached out to eligible youth and partner organizations. In addition, potential participants were informed about the study through word of mouth.

Interested parties who responded to recruitment efforts were contacted over the phone and screened for eligibility. Prior to the eligibility screening, potential participants were given pre-screening consent to inform them they could stop the eligibility inquiry at any time, and that their name and identifying information would not be recorded unless they qualified for the study.

Participants who were eligible to participate were middle or high school students between the ages of 12 and 18 years. They also had to identify as lesbian, gay, bisexual, transgender, gender non-conforming, queer, questioning, or another sexual or gender minority. All participants had to be residents of Colorado and needed to have access to a smart phone or computer with a webcam and stable internet access, which was necessary for L2B-Q program participation. Participants who agreed to participate in the L2B-Q intervention were provided a postcard consent document. The postcard consent document was sent electronically via a link in REDCap where participants could download and print the consent form, as well as access the baseline survey. For the purpose of safety, parental consent was not required for this study, as LGBTQ+ adolescents may face prejudice and discrimination at home. To ameliorate any risk to wellbeing by having to 'out' themselves or to seek parental approval to participate, consent was waived.

Twenty LGBTQ+ adolescents were recruited to participate in the L2B-Q intervention and completed the baseline survey over two successive cohorts (cohort 1: $n$=11, cohort 2: $n$=9). All adolescents completed baseline questionnaires prior to participation in the intervention. At post-intervention, $n$=18 participants completed the post-intervention survey. A CONSORT flow diagram was created to depict the entire study flow from recruitment through post-intervention follow-up and focus groups.

At baseline, participants' average age was 16.5 years ($SD$=0.94, range 14-18 years old). The majority of participants were Black (60%), male (45%), and Gay (40%). Seventy percent of participants reported their ethnicity as non-Hispanic or non-Latinx. For a full description of demographic data, please see Table 6.

**Procedure**

L2B-Q is an MBI specific to LGBTQ+ adolescents that was adapted from the original L2B program (Broderick, 2013; Broderick, 2021) utilizing feedback, first, from an LGBTQ+ youth steering committee (Quirk et al., in preparation). This youth steering committee helped to inform intervention adaptations and protocol for focus groups. Next, two focus groups were conducted, one comprised of LGBTQ+ youth and one comprised of key adult stakeholders within the LGBTQ+ community. Focus group participants provided feedback on the initial L2B-Q curriculum and suggested any changes prior to the first iteration of the program (Walls et al., under review). For more detailed information on the adaptation process of the L2B-Q program please see Quirk et al. (in preparation).

Once adaptations were incorporated from youth and adult stakeholders, the L2B-Q program was conducted with two separate cohorts of LGBTQ+ youth. Both cohorts of participants engaged in 1-hour long sessions conducted over secure videoconferencing for six weeks. The six sessions each had a different theme: 1) body awareness, 2) reflections and understanding and working with thoughts, 3) emotions and understanding and working with feelings, 4) awareness of thoughts, feelings, and bodily sensations, 5) tenderness and reducing harmful self-judgments; and 6) healthy habits and integrating mindful awareness into daily life. Within these broad themes, the L2B-Q program included: basic mindfulness breathing techniques to cope with stress, exploration of ruminative thoughts related to LGBTQ+ identities, identification of emotions tied to one's identities, unpacking identity-based stress experiences, practicing coping skills, self-compassion, and loving kindness as it relates to LGBTQ+ identities, and promotion of gratitude and pride around identities. Furthermore, each session of the program contained specific stressors LGBTQ+ youth may experience, and activities with gender-neutral names and pronouns.

Prior to the first session of the intervention, participants completed consent and pre-intervention questionnaires. After the sixth session, participants completed post-intervention questionnaires and participated in a focus group to gather acceptability data and to share feedback about the L2B-Q program. In addition to the pre-intervention and post-intervention questionnaires and post-intervention focus groups, participants also completed weekly mood monitoring surveys. All surveys were completed online using REDCap software (Harris et al., 2009).

## Measures

### *Mental Health*

The Generalized Anxiety-7 was utilized to measure anxiety (GAD-7; Williams, 2014). The scale has seven items rated on a 4-point Likert scale (1=Not at all to 4=Nearly every day), assessing anxiety symptoms over the previous two weeks. Example items include: "Feeling nervous, anxious, or on edge," and "Feeling afraid as if something awful might happen," (Williams, 2014). Higher scores indicated higher levels of anxiety. Cronbach's $\alpha$ at baseline ($\alpha$=.93) and post-intervention ($\alpha$=.95) were acceptable. To assess depression, the Patient Health Questionnaire for Depression (PHQ-8) was used (Kroenke et al., 2001; Wu et al., 2020). This scale has 8 items, rated on a 4-point Likert scale (1=Not at all to 4=Nearly every day), assessing depression symptoms over the previous two weeks. Example items include: "Little interest or pleasure in doing things" and "Feeling down, depressed or hopeless," (Kroenke et al., 2001). Higher scores indicated higher levels of depression. Internal reliability was acceptable at baseline ($\alpha$=.95) and post-intervention ($\alpha$=.87).

At any time point, if a participant reported a score of 10 or higher on the GAD-7 or the PHQ-8, indicative of elevated anxiety and depression symptoms, respectively (Kroenke et al.,

2001; Williams, 2014; Wu et al., 2020), they were contacted via phone by a trained member of the research team and referred to appropriate mental health resources, as indicated. Unless counter-indicated, they were allowed to remain in the study.

***Stress-Related Health Behaviors***

Eating behavior was assessed using the Intuitive Eating Scale (Dockendorff et al., 2012; Tylka, 2006). The scale consists of five items, rated on a 5-point Likert scale (1=Never to 5=Always). Example items include: "I find myself eating when feeling emotional (e.g., anxious, depressed, sad), even when I'm not physically hungry," and "I use food to help sooth negative emotions, such as feeling sad or angry" (Dockendorff et al., 2012; Tylka, 2006). Lower scores indicate greater (more positive) intuitive eating. Cronbach's $\alpha$ at baseline ($\alpha$=.97) and post-intervention ($\alpha$=.85) suggested acceptable internal consistency.

Sleep was measured using the PROMIS Pediatric-Sleep Disturbance-Short Form 4a (Forrest et al., 2018), which includes four items rated on a 5-point Likert scale (1=Never to 5=Always). Participants indicated sleep health over the last 7 days, for example: "I had difficulty falling asleep" and "I had a problem with my sleep" (Forrest et al., 2018). Higher scores indicate greater sleep disturbance. Cronbach's $\alpha$ at baseline ($\alpha$=.83) and post-intervention ($\alpha$=.55) suggested acceptable internal consistency at baseline, but not at follow-up.

A one-item measure from the Healthy Kids Colorado Survey (Colorado Department of Public Health and the Environment, 2021) was used to assess physical activity: "During the past seven days, on how many days were you physically active for a total of at least 60 minutes per day?" Answer options were between zero and seven days.

***Physiological Stress Experiences***

Participants completed the PROMIS Pediatric Physical Stress Experiences-Short Form 8a (Bevans et al., 2013; Bevans et al., 2018). They responded to eight items on a 5-point Likert scale (1=Never, 5=Always) based on their experiences in the last seven days. A sample item is: "My heart beat faster than usual, even when I was not exercising or playing hard." Higher scores reflect greater (more negative valence) physical stress experiences. Cronbach's $\alpha$ at baseline ($\alpha$=.81) and post-intervention ($\alpha$=.86) suggested acceptable internal consistency.

***Dispositional Mindfulness***

Participants completed the Mindful Attention Awareness Scale (MAAS; Brown et al., 2011). The scale includes 5 items on a 5-point Likert scale (1=Almost always to 5=Very infrequently) assessing different indicators of mindful attention. A sample item includes: "I find it difficult to stay focused on what's happening in the present." Higher scores on this scale, after reverse scoring and averaging, have more positive valence. Cronbach's $\alpha$ at baseline ($\alpha$=.77) and post-intervention ($\alpha$=.92) suggested acceptable internal consistency.

***LGBTQ+ Identity Dimensions***.

An adapted version of the Gender Minority Stress and Resilience Measure for Adolescents (GMSR-A) was used to examine experiences of internalized stigma and feelings of community connectedness (Hidalgo et al., 2019). Items were adapted slightly to include both gender and/or sexual identity. For example, "I resent my gender identity" was changed to "I resent my sexual and/or gender identity."

Two subscales were used: internalized stigma (eight items) and community connectedness (five items). All items were answered on a 5-point Likert scale (1=Strongly disagree to 5=Strongly agree). Example items from each of these respective scales include: "I resent my sexual and/or gender identity" (internalized stigma), and "I feel part of a community

of people who share my sexual and/or gender identity," (community connectedness). The GMSR-A also generates a total score which is the average of all of its items. For the internalized stigma subscale, Cronbach's $\alpha$ at baseline ($\alpha$=.97) and post-intervention ($\alpha$=.92) suggested acceptable internal consistency. For the community connectedness subscale, Cronbach's $\alpha$ at baseline ($\alpha$=.65) and post-intervention ($\alpha$=.61) suggested moderate to low internal consistency

To assess positive identity, the Lesbian, Gay, and Bisexual Positive Identity Measure (LGB-PM) was used (Riggle et al., 2014). The scale consists of two subscales: self-awareness and authenticity, each with five items answered on a five-point Likert Scale (1=Strongly disagree to 5= Strongly agree). Sample items include: "My LGBT identity leads me to important insights about my life", and "I embrace my LGBT identity." A total score consisting of the average of all of the items also can be calculated. Higher scores indicate a greater (more positive) feeling of positive identity. Cronbach's at baseline ($\alpha$=.95) and post-intervention ($\alpha$=.95) for the total score indicated high internal consistency.

***Mood Monitoring***

Participants completed a weekly mood monitoring survey (Harris et al., 2009) online via REDCap, in which they were asked to answer the GAD-7 (Williams, 2014) and PHQ-8 (Kroenke et al., 2001; Wu et al., 2020). Mood monitoring surveys were monitored weekly by a licensed psychologist. Any participant indicating elevated anxiety or mood symptoms were contacted via phone and referred to the appropriate mental health resources.

## Data Analytic Plan

The analytic plan for the primary objective centered on assessment of acceptability and feasibility indicators of the L2B-Q program. Acceptability indicators were described overall for the whole sample and separately by cohort to explore any differences in acceptability between

the two cohorts. A CONSORT flow diagram for this study was created to describe recruitment, enrollment, attendance, and retention rates. Qualitative focus group data were analyzed using best practices in grounded theory and qualitative methods. Specifically, themes of feasibility and acceptability (e.g., implementation, demand, practicality) were identified and coded utilizing Bowen and colleagues' (2009) guidelines on how to design a feasibility study. Transcripts of the participants' responses were coded by two different coders using guidelines for acceptability and feasibility studies, and rapid qualitative analysis methods. In line with rapid qualitative analysis techniques, participant quotes were placed into a matrix to analyze overarching themes, and to identify sub-themes. The coders reviewed the quotes and their placement within the matrix as well as their interpretation as either a positive response, negative response, or a suggested change that was neutral.

The analytic plan for the secondary objective was based on recommendations to develop and test pilot and feasibility hypotheses without relying on significance testing (Cumming, 2013; Eich, 2014; Kouros et al., 2014). Instead of traditional null hypothesis testing, we used an approach that relies on estimation of effect sizes, estimation of confidence intervals, and calculations for changes in means from baseline to post-test. Unbiased Cohen's *d* values along with mean differences were calculated for all variables broadly and were used to assess statistically meaningful changes in outcomes. Due to the nature of this being a pilot study with a small sample size, an unbiased calculation of Cohen's *d* is helpful in comparing outcomes to Cohen's (1988) guidelines for effect size reporting. Calculated confidence intervals also provide information regarding the precision of the effect size estimates for all outcome variables. calculations of estimated effect sizes and confidence intervals occurred in SPSS and were included in the graphed visualizations of change over time. Visualizations of pre-post mean

changes over time using graphs were produced using Excel and SPSS. RCIs were calculated and graphed for each participant for each outcome variable using SPSS.

## Results

### Primary Aim: Quantitative Indicators of Acceptability & Feasibility

CONSORT study flow is presented in Figure 49. In line with the goal of enrolling at least ten participants in a 12-week timeframe, L2B-Q successfully enrolled 20 participants in a 12-week timeframe. More specifically, in terms of recruitment feasibility, within a 12-week time frame, 27 participants were screened prior to eligibility assessment. Twenty-two participants were assessed for eligibility, with only two declining to participate in the intervention.

With respect to the attendance indicator of acceptability, of the 20 adolescents in the intervention phase, median attendance was six out of six L2B-Q sessions. However, only 11 adolescents (55%) received at least 80% of the intervention dosage (five or more sessions), which is just shy of the goal of 80% of participants attending at least 80% of sessions. In terms of retention feasibility, of the 20 participants who completed baseline assessments, 90% ($n$=18) completed a post-intervention assessment, which indicated a 10% drop-out rate. See Table 7 for attendance data.

### Primary Aim: Qualitative Indicators of Acceptability & Feasibility

75% of participants ($n$=15) attended a focus group discussion after session six of the intervention to provide feedback. Focus groups were conducted over Discord, with one research assistant leading the interview, and a second research assistant transcribing participant answers. The moderator guide included questions related to acceptability (i.e., *Is there anything you'd like the facilitators to know about how you enjoyed the program?),* implementation (i.e., *What did you think of the program materials and activities shared?*), and practicality (i.e., *Was the time*

*duration acceptable?*). Questions about demand were not explicitly asked, but participants offered comments related to the program's demand (i.e., participants recommending the intervention to their friends). See Table 8 for qualitative information.

***Acceptability***

Sub-themes of acceptability included themes related to facilitator characteristics, platform, mindful practice, and camera usage. The participants rated the facilitators highly, stating "[the facilitators] were so professional and mindful" and that they "were awesome." Participants indicated that "Discord is awesome," and rated the platform highly. Overall, participants spoke highly of L2B-Q and the mindfulness practices. Participants indicated they "enjoyed [the program] and it was helpful," and, "it was inspirational and perhaps relived some stress." In contrast, participants noted a lack of comfort with the need to be on camera. For example, one participant indicated "I just wished cameras wasn't mandated. I wasn't comfortable." Several other participants indicated feeling uncomfortable with cameras being encouraged during group sessions. Other than some negative responses related to camera usage, overall, the participants indicated the program was highly accepted.

***Implementation***

Sub-themes of implementation included activity changes, participant engagement, and group connection. Participants thought that the activities were enjoyable, but that "some written instructions" would have been helpful prior to beginning activities. They also indicated that "having some visuals perhaps" would be helpful. When responding how the program could be more engaging, responses included adding "songs," and "fun activities like games." When asked about the group connection, participants made comments that could improve the group component of the intervention, including "[the groups were] too small and sometimes we lacked

proper communication." Overall, implementation themes suggested that the participants would like to see several changes to the program to improve activities, engagement, and group connection.

### *Practicality*

The sub- theme of practicality was the timing of the intervention. Participants mentioned that the timing of the intervention was "a little late" and could have been conducted "maybe an hour earlier," in the evening. Other participants indicated that they wished they could stay longer. Responses related to practicality indicated that the intervention was low in practicality.

### *Demand*

The sub-theme of demand included was peer recruitment (i.e., peer interest in L2B-Q participation). Several participants indicated that they knew of others who would enjoy the program or friends who were "mad [they] didn't get invited [to the program]." Responses related to demand indicate that the demand for the L2B-Q program was high.

## Safety/Tolerability

At baseline, seven participants endorsed elevated anxiety and/or depression symptoms, which triggered a check-in from a licensed psychologist. At the post-intervention interval, four of the original seven participants at baseline endorsed elevated anxiety and/or depression symptoms, which triggered a psychologist check-in. These four participants, in addition to a fifth participant that did not require a check-in, also indicated mental health scores that were slightly higher at post-intervention compared to baseline. Thus, about 28% of participants who completed post-intervention assessments indicated a slight increase in either depression or anxiety symptoms. Throughout the intervention phase, frequency of elevated anxiety/depression and

correspondingly, psychologist check-in frequency, on average, decreased week by week (Table 9).

**Baseline to Post-Intervention Changes in Mental Health**

Cohen's *d* for paired samples were used to estimate effect sizes and confidence intervals for differences in means for all variables assessed before completing the intervention, and after the completion of the intervention. Little's MCAR test indicated that data were missing at random ($X^2$=41.50, $p$=.24) and given the small nature of this pilot study, listwise deletion was used when a participant did not answer a survey. Of the 18 participants who completed the post-intervention assessments, variables with only 17 participant responses included anxiety, mindfulness, sleep, internalized shame, and positive identity. Depression, intuitive eating, perceived stress, and community connectedness received responses from all 18 participants. See Table 10 for changes in means, CIs, and Cohen's *d*s for all outcome variables. Table 11 includes all RCI calculations for each outcome variable.

***Depression Symptoms***

There was a statistically meaningful decrease in depression symptoms from baseline ($M$= 8.67, $SD$=1.71) to after the completion of L2B-Q ($M$=5.11, $SD$=4.89), which represented a large effect ($d$=.82; Figure 50). In clinically meaningful terms, 11 out of 18 adolescents (61%) reported at least a 20% reduction in depression symptoms, and 13 out of 18 (72%) reported reduction of any magnitude (ranging from 12%-100%) in depression symptoms. In terms of RCI, six of 18 participants (33% of the sample) had an RCI greater than 1.96, reflecting a reliable reduction in depression symptoms (Figure 51). None of the participants indicated reliable deterioration or worsening in depression symptoms. The overall RCI for depression was -1.55, indicating the reductions in depression were not clinically significant.

### *Anxiety Symptoms*

Anxiety symptoms showed a statistically meaningful decrease from baseline intervention (*M*=7.59, *SD*=5.31) to after the completion of L2B-Q (*M*=4.82, *SD*=5.98), with a medium-to-large effect (*d*=.65; Figure 52). In clinically significant terms, eight out of 17 participants (47%) reported a 20% or greater reduction in anxiety symptoms, and 9 out of 17 participants (53%) had a decrease in anxiety of any magnitude (ranging from 11%-100%). Seven of 17 adolescents (41% of the sample) had an RCI greater than 1.96, indicating a reliable decrease in symptoms of anxiety after L2B-Q participation (Figure 53). None of the participants indicated reliable deterioration or worsening in anxiety symptoms. The overall RCI for anxiety was -1.39, indicating the decrease in anxiety symptoms was not clinically significant.

### *Mindfulness*.

Dispositional mindfulness had a statistically meaningful improvement from baseline (*M*=3.40, *SD*=1.20) to post-intervention (*M*=3.78, *SD*=1.631), with a small effect (*d*=-.23; Figure 54). Seven of 17 participants (41%) reported a 20% or greater improvement in mindfulness and eight of the 17 participants (47%) reported improvement in mindfulness of any magnitude (ranging from 8%-329%). With respect to reliable change, five of 17 participants (29% of the sample) had an RCI greater than 1.96, which reflected a reliable, positive increase in mindfulness. One participant (6% of the sample) had an RCI greater than 1.96, which was reflective of reliable deterioration in mindfulness (Figure 55). The overall RCI for mindfulness was .48, indicating the increase in mindfulness was not clinically significant.

## Baseline to Post-Intervention Changes in Stress-Related Health Behaviors

### *Sleep*

Participants experienced a statistically meaningful reduction in sleep problems after the completion of L2B-Q (*M*=9.53, *SD*=3.55), compared to before the intervention (*M*=10.59, *SD*=2.06), with a small effect (*d*=.33; Figure 56). Five out of 17 participants (29%) indicated a 20% or greater improvement in sleep problems, and eight out of 17 participants (47%) indicated improvement in sleep problems of any magnitude (ranging from 9%-67%). With respect to reliable change, seven of 17 participants had an RCI greater than 1.96, with five adolescents (29% of sample) showing reliable improvement in sleep problems and two participants (12%) endorsing reliable deterioration in sleep problems (Figure 57). The overall RCI for sleep was -.91, indicating the decrease in sleep problems was not clinically significant.

***Intuitive Eating***

There was a statistically meaningful improvement in intuitive eating from baseline (*M*=16.39, *SD*=5.71) to post-intervention (*M*=13.33, *SD*=4.93), with a medium effect (*d*=.47; Figure 58). In clinically meaningful terms, eight of the 18 participants (44%) indicated at least 20% improvement in intuitive eating, and 11 out of 18 (61%) showed any magnitude of improvement (ranging from 7%-75%). Ten of 18 participants had an RCI greater than 1.96, with eight of these adolescents (44% of sample) showing reliable improvement in intuitive eating and two adolescents (11%) reporting a reliable worsening of intuitive eating (Figure 59). The overall RCI for intuitive eating was -2.19, indicating the improvement in intuitive eating was clinically significant.

***Physical Activity***

Reported physical activity frequency showed a statistically meaningful increase among participants after the completion of L2B-Q (*M*=5.17, *SD*=1.69), compared to baseline (*M*=4.56, *SD*=1.79), with a medium effect (*d*=.56; Figure 60). Eight out of 18 participants (44%) reported a

20% or greater improvement in physical activity, and nine out of 18 (50%) had improvement of any magnitude (ranging from 17%-67%). Two participants (11%) had no room for improvement, as they reported baseline physical activity frequency of seven days a week at both baseline and post-intervention. RCIs were not calculated for physical activity because it was a one-item assessment.

### *Physiological Stress Experiences*

Participants experienced a statistically meaningful reduction in perceived stress from baseline (*M*=19.39, *SD*=6.07) to completion of L2B-Q (*M*=17.61, *SD*=6.03), with a small-to-medium effect (*d*=.35; Figure 61). Five out of 17 adolescents (29%) reported a 20% or greater improvement in physiological stress, and 11 out of 17 (65%) reported a reduction in physiological stress of any magnitude (5%-48%). Three of 18 participants had an RCI greater than 1.96, indicating that 17% of the sample showed a reliable decrease in physiological stress experiences. One participant (6% of the sample) indicated an RCI greater than 1.96, which is reflective of reliable worsening of physiological stress experiences (Figure 62). The overall RCI for physiological stress experiences was -.47, indicating the decrease in perceived stress was not clinically significant.

## Baseline to Post-Intervention Changes in LGBTQ+ Identity Dimensions

### *Internalized Shame*

Adolescents' reports of internalized shame, on average, did not change (*d*=.11) from baseline (*M*=18.18, *SD*=6.70) to post-intervention (*M*=19.00, *SD*=8.46; Figure 63). Four of 17 participants (14%) reported a 20% or greater reduction in internalized shame, and eight of 17 (47%) reported any improvement (range of 5%-36% reduction). Four of 17 participants (24% of sample) had an RCI greater than 1.96, showing reliable reduction in shame and two (12%)

showing reliable worsening of internalized shame (Figure 64). The overall RCI for internalized shame was .50, indicating there was a slight increase in internalized shame that was not clinically significant.

### *Community Connectedness*

At post-intervention, adolescents' LGBTQIA+ community connectedness scores indicated a statistically meaningful increase ($M$=19.00, $SD$=3.24), as compared to baseline ($M$=18.22, $SD$=3.37), with a medium effect ($d$=.43; Figure 65). Three of 18 participants (17%) reported a 20% or greater increase in community connection, and 10 of 18 participants (56%) reported any improvement (ranging from 5%-64%) in community connectedness. Two of 18 participants (11%) had an RCI greater than 1.96, reflecting a reliable increase in community connectedness (Figure 66). None of the participants indicated reliable deterioration in community connectedness. The overall RCI for community connectedness was .44, indicating the increase in community connectedness was not clinically significant.

### *Positive Identity*

There was a statistically meaningful increase in LGBTQIA+ positive identity at post-intervention ($M$=42.24, $SD$=6.41), as compared to baseline ($M$=38.41, $SD$=9.80), with a small-to-medium effect ($d$=.36; Figure 67). In clinically meaningful terms, four of 17 participants (24%) reported a 20% or greater increase in positive identity, and eight of 17 (47%) had any improvement (ranging from 3%-400%). Six of 17 participants had an RCI greater than 1.96, with five of these (29% of sample) showing a reliable increase in positive identity and one adolescent (6%) showing a reliable worsening in positive identity (Figure 68). The overall RCI for positive identity of 1.22, indicating the increase in positive identity was not clinically significant.

## Discussion

The current single-arm pilot/feasibility and proof-of-concept study described changes in mental health, health/stress-related behaviors, and LGBTQ+ adjustment during a newly adapted mindfulness intervention, L2B-Q, aimed at increasing mindful coping in response to stressors specific to the LGBTQ+ adolescent community. LGBTQ+ individuals, especially adolescents, are at increased risk of experiencing mental health difficulties such as depression, anxiety, and suicidality (Russell & Fish, 2016). These mental health concerns are tightly linked to higher rates of minority stressor experiences, such as bullying and misgendering (Mongelli et al., 2019). Although interventions aimed at improving adolescents' responses to stressors have been shown to be effective in reducing negative mental health outcomes, culturally adapted interventions have been shown to exhibit even stronger impacts (Gonzales, 2017). To date, very few interventions have been adapted to specifically address the unique stressors and experiences of LGBTQ+ adolescents, and far fewer have explored the role of MBI's utility for this community. A series of a priori hypotheses were evaluated regarding benchmarks for feasibility, acceptability, and changes in hypothesized outcomes. Specifically, regarding acceptability and feasibility measures, it was hypothesized that the program would be highly liked and have utility based upon focus group qualitative feedback and if attendance rates showed at least 80% of participants attending at least five sessions, with no more than a 15% drop out rate. It was hypothesized that recruitment would be feasible with enrollment being complete within a 12-week time frame. In addition, it was predicted that during safety and tolerability checks, no more than 5% of participants would show a worsening in mental health concerns at post-intervention. Furthermore, we hypothesized that there would be improvements in all outcome variables with small to medium effects, and that at least fifty percent of participants would indicate a 20% improvement in outcome between baseline and post-intervention, with at least 50% of

participants would have a clinically significant RCI value for each outcome variable (excluding physical activity).

**Feasibility**

Within a 12-week time frame, 20 adolescents were allocated to each of the two L2B-Q cohorts. Of the 27 adolescents originally screened, 22 completed eligibility screening and baseline measures. Two participants declined to participate, indicating that 91% of those eligible enrolled in the intervention. Only one participant attended zero sessions and 90% of the participants completed post-test assessments indicating 10% attrition. These results indicate that recruitment and participation in the program were feasible. Feasibility indicators can include rate of recruitment and participants' ability to attend or adhere to the protocol (Teresi et al., 2022). With successful recruitment efforts within the designated timeline the current results suggest that L2B-Q is a feasible intervention.

**Acceptability**

Just over half (55%) of L2B-Q participants attended at least 80% of the sessions or more. This attendance threshold was lower than the expected 80% of participants attending at least five sessions and indicates room for improvement. Although attendance could have been higher, focus group data indicated that many aspects of L2B-Q were accepted; no participant indicated a dislike for the program, and they rated the mindfulness components, facilitators, and the platform all highly. Focus group participants also indicated that the demand for a program like L2B-Q is high. Several participants indicated that they had friends who were upset they could not participate, and several participants indicated they would tell their friends about their experience. Responses from participants were indicative of a strong need and a want for a program like L2B-Q.

Focus group data also shed light on factors that might potentially have implicated for lower-than-expected attendance. One aspect of L2B-Q which was not well liked was the encouragement to be on camera. For some LGBTQ+ adolescents and adults, concealment of their LGBTQ+ identity may serve as a way to feel safe (Kirby et al., 2024; Schmitz & Tyler, 2018). Some participants expressed feeling uncomfortable on camera or feeling shy, and the desire for safety through concealment could be a contributing factor. Future iterations of L2B-Q would benefit from taking some extra time and care in creating an affirming space for participants in an effort to make participants feel more comfortable being on camera (McGregor et al., 2023). Exploring differences in effects between participants who have cameras on versus who remain off-camera would also be beneficial in exploring the role being on camera makes in the overall success of the program. Likewise, implementation themes indicated constructive feedback to inform future iterations of L2B-Q. Participants indicated that they would have liked more opportunities to connect as a group. Although the mindfulness activities were well liked, participants offered several suggestions on how to modify activities, and ideas on how to increase engagement. Furthermore, when exploring practicality, some participants indicated that they would have liked longer sessions; however, the timing and the day of the week the sessions are offered could be modified. Overall, focus group participants indicated that the program was highly acceptable and had a high amount of utility. However, there are some modifications that could be made to make the experience of participating in L2B-Q improved for future participants. Due to the nature of L2B-Q being a pilot study, responses regarding implementation will be helpful in addressing themes of adaptability in future iterations of the study.

**Safety/Tolerability**

Safety and tolerability were monitored throughout the intervention. Between baseline and post-intervention, fewer check-ins with a psychologist were required week-to-week. However, of the seven participants who needed a check-in at baseline, four still required check-ins at post-intervention. In addition, five participants (28% of sample) indicated a slight elevation in mental health symptoms, which was higher than the 5% originally predicted. This indicates that L2B-Q alone may not be enough for some participants to reduce mental health symptoms. During check-ins, a psychologist provided participants with mental health resources. Some youth may require extended intervention or additional conjoint therapies.

**Quantitative Outcomes**

Results revealed statistically meaningful decreases in depression and anxiety symptoms from baseline to post-intervention with large effects following L2B-Q. These findings are in line with the broad literature that asserts mindfulness practices offer the potential to improve mental health and increase individuals' capacity to cope with depression and anxiety (Aguilar-Raab et al., 2021). The current findings suggest that LGBTQ+ adolescents who participated in L2B-Q may have learned and engaged in mindfulness-based ways of coping that supported reductions in experiences of depression and anxiety. Furthermore, over half of participants saw a 20% or greater reduction in depression symptoms, and about 50% of participants saw similar reductions in anxiety, suggesting that L2B-Q may have clinically significant implications. However, the overall RCIs for depression and anxiety did not indicate clinical significance, likely due to some participants indicating worsening of mental health symptoms and the overall small sample size of the study. Future iterations of L2B-Q would benefit from an increased sample size and modifying aspects of mood monitoring in an effort to increase clinical significance.

The effects on depression and anxiety seen among L2B-Q participants are in line with some other pilot findings on the effects of L2B among at-risk youth, not identified as sexual and gender minorities, which have found that L2B demonstrated moderate-to-large effects in reducing depression symptoms (Bluth et al., 2016). Of note, meta-analysis of MBI for adolescents show only small effects for reducing anxiety and depression (Fulambarkar et al., 2023). Therefore, the results seen among L2B-Q participants seem to confirm the mindfulness-stress buffering hypothesis (Creswell & Lindsay, 2014), further indicating that MBI may be most beneficial in populations with greater amounts of stress, including LGBTQ+ adolescents.

In addition to reductions in depression and anxiety, L2B-Q participants had a statistically meaningful increase in mindfulness that was small in its effect. About 41% of participants saw at least a 20% increase in their mindfulness score, and 29% of participants indicated a clinically significant increase in mindfulness. However, the overall RCI for mindfulness was not clinically significant. The findings from L2B-Q are in line with other reviews of MBIs, indicating effects on mindfulness are often small (Dawson et al., 2020; Ma et al., 2019). Additionally, the increase in mindfulness among L2B-Q participants adds to the literature that MBI is effective at increasing mindfulness in LGBTQ+ adolescent populations.

Changes in self-reported, stress-related health behaviors after completing L2B-Q were also explored. At post-intervention, L2B-Q participants reported improved sleep with small effects. A little less than one-third of participants indicated reductions in sleep disturbances greater than or equal to 20%, raising the possibility worth testing in the future as to whether L2B-Q has the potential improve sleep health. These findings are in line with a small body of literature, which indicates that MBI may be associated with small improvements in sleep (Metz

et al., 2013). In addition, this finding adds to the literature that MBI may offer potential to mitigate the effects of stress on sleep for LGBTQ+ adolescents.

L2B-Q increased intuitive eating from pre-to-post evaluation with medium effects. About 44% of the participants indicated a 20% or greater improvement with intuitive eating, and the overall RCI for intuitive eating was -2.19, indicating L2B-Q had clinically significant effects on intuitive eating in this sample. Further investigation is needed with a larger sample. Consistent with implementation of MBI in other adolescent and adult samples (Bernstein et al., 2021; Dunn et al., 2018; Grohmann & Laws, 2021; Rogers et al., 2017; Shomaker et al., 2019), this pattern indicates that MBIs may act as a way to intervene upon maladaptive eating behaviors and help LGBTQ+ adolescents be more mindful when choosing to engage in eating patterns. Furthermore, this finding is indicative of mindfulness practices as a tool for LGBTQ+ adolescents to engage in when responding to stress in place of responding with disordered eating behaviors (Bernstein et al., 2021; Dunn et al., 2018; Rogers et al., 2017).

Historically, LGBTQ+ adolescents do not report engagement in physical activity as a coping strategy when responding to stressful situations (Brown & Kelly, 2018; Garcia et al., 2020). However, L2B-Q participants reported an increase in physical activity frequency at post-intervention with a medium effect. Almost half of the adolescents reported a 20% or greater increase in physical activity, indicating that L2B-Q may hold clinical significance in affecting physical activity. To confirm this, further research using objective capture of physical activity (e.g., accelerometry) is needed. This preliminary finding is interesting to consider in light of the literature that MBI may increase body awareness and movement (Grossman et al., 2004; Sharma & Rush, 2014; Villalba et al., 2019).

In addition, reported physiological stress experiences decreased among adolescents after participation in L2B-Q. Extant data underscore that LGBTQ+ youth often experience high levels of stress due to the compounding effects of minority stressors (Green et al., 2022; Meyer, 1995; Ryan et al., 2010; Salerno et al., 2020). Past literature also indicates that MBI has shown the ability to reduce physiological signs of stress (Aguilar-Raab et al. 2021; Grossman et al., 2004); therefore, it follows that LGBTQ+ adolescents may benefit from stress reduction through participating in L2B-Q. L2B-Q does not have the power to remove stressful experiences from the lives of LGBTQ+ adolescents, however L2B-Q may have provided participants with tools to be more mindful as a way to mitigate physical effects of stress. This result highlights that MBI may be beneficial in combating physiological manifestations of stress among LGBTQ+ youth.

Changes in identity-related variables in response to L2B-Q showed mixed results. On the one hand, adolescents reported increased feelings of connectedness to the LGBTQ+ community following their participation in the L2B-Q program with small effects. Connectedness to one's community has been shown to be highly influential for a host of outcome variables, including mental and physical health (Garcia et al., 2020; Kaniuka et al., 2019; Logie et al., 2022). This result highlights the important secondary impact on social connectedness that a culturally adapted program may have, beyond the intended influence on outcome variables related to intervention curriculum. Due to the focus of L2B-Q on cultural attunement and the fact participants were all members of the LGBTQ+ community, participants likely felt a sense of being seen, accepted, and understood. While building community connectedness was not a specific component of the program, participants spent several weeks working on mindfulness techniques and engaging in L2B-Q activities together. By just participating in the intervention, it seems that community connectedness increased for some participants. Yet, only three participants reported increased

feelings in connections that were equal or greater than 20%. Combined with the feedback from the focus groups which indicated a greater desire for connection among participants, L2B-Q has room to enhance facilitation of community connection.

Next, feelings of positive identity increased among 47% of the participants, with 24% of the sample indicating increases greater than 20% from prior to the intervention. Increases in positive identity yielded small effects among the sample, indicating the L2B-Q likely requires augmentation to support more robust, clinically meaningful effects on positive identity. Likewise, internalized shame did not show meaningful change at post-test following L2B-Q engagement, with little effect. Only 14% of the sample reported meaningful change in internalized shame, however almost 50% of the sample reported any reduction at all in internalized shame. Yet, 35% reported increases in internalized shame after completing L2B-Q. These results seem to contradict previous literature, which has found associations between MBI and increased self-acceptance and a decrease in shame (Broderick & Metz, 2009; Woods & Proeve, 2014).

There are several potential explanations for these mixed results. Although cultural adaptation likely increases the ability of participants to interact with other similarly identifying individuals, this is unlikely to change the perception of one's own identity in such a short time. It may be that one feels more connected and finds ways to express one's identity with others, while also continuing to struggle to achieve real and sustained self-acceptance. In addition, the L2B-Q program is not intended to address systemic stressors (i.e., rejection from parents or peers), and does not specifically target positive identity of internalized stigma, which likely sustains internalized stigma and can act as a barrier to positive identity. Additionally, the intervention only lasted six weeks, which does not lend a lot of time to increase positive identity nor reduce internalized stigma. If results had been more meaningful, we would posit that long-term effects

may not persist. Future studies should examine data on positive identity and internalized stigma at a third time point post-intervention to see if any meaningful changes occur after the program's completion.

Overall, L2B-Q participants reported improvements in both mental health and health behaviors, in addition to community connectedness, at the end of the L2B-Q intervention. The results highlight the importance of culturally adapted interventions for minoritized populations. The overall improvements in mental health and health behaviors among LGBTQ+ adolescents by introducing mindfulness as a coping strategy are similar to the improvements seen in heterosexual adolescents. Thus, it is imperative that interventions targeting health outcomes in the LGBTQ+ population consider tailoring interventions to specific minority stressors and experiences of the participants.

**Limitations and Future Directions**

Several important limitations to this study should be noted. First, when measuring outcomes, the research relied on self-reported health behaviors, as opposed to objective measures like actigraphy, test meals, or food diaries or dietary recalls. Likewise, there were no objective measures of physical health (i.e., blood pressure, glucose regulation, lipids), which would be added value in a future study. Self-reported mental health and health behavior data, given its the participants' self-assessment of health, is a strong proxy (Fosse & Haas, 2009). In addition, the research team did not collect data on how adolescents explicitly coped with or responded to stress (i.e., how they handled stressors, specific coping strategies, etc.). Therefore, the research team was unable to assess if specific coping strategies and responses to stress changed after the completion of the intervention. This singe-arm pilot study, by design, lacked a control group. Future iterations of L2B-Q should utilize a control group and randomization to show stronger

evidence of the effects L2B-Q on the observed changes in outcome variables in addition to including more comprehensive assessments of both health behaviors and health effects.

Longer-term follow-up to characterized durability of effects would also be important. The research team did not conduct a long-term follow up after the conclusion of L2B-Q. A six-month and/or one-year follow-up is needed in the future to see if the effects on mental and health behaviors continue. Follow-ups would also help to determine if identity related variables yield more meaningful results, or if modifying the program to address identity related topics specifically offer different results.

Due to the study's nature as a pilot study, this study had a small sample size that was largely urban due to its nature as a pilot study. This characteristic is problematic due to the limited variability of influences of more diverse groups (i.e., people from more rural areas, more gender and sexually diverse folks, and more socioeconomic diversity). The next phases of testing the efficacy and effectiveness of L2B-Q will include larger sample sizes.

## Conclusion

LGBTQ+ adolescents face a variety of unique stressors in addition to typical developmental challenges. Quality evidence-based interventions that target these stressors are direly needed to prevent the subsequent health disparities observed in the LGBTQ+ community later in life. The findings presented in this study underscore the need for culturally adapted interventions to be further tested and implemented among LGBTQ+ youth. Therefore, it is imperative that L2B-Q continues to be tested and interventions replicated within the LGBTQ+ adolescent community to further gain insight into the effects of this ground-breaking program. Further testing of this intervention among rural LGBTQ+ populations, and among LGBTQ+

adolescents living in geopolitically conservative areas where stressors may be more intense and frequent, is a necessary step in helping mitigate health disparities among this population.

# Chapter 3: Comparing the Effects of a Non-Adapted versus an Adapted Mindfulness Program among LGBTQ+ Populations

The use of MBI among LGBTQ+ specific populations is a budding area of research, with few studies examining the effects of MBI in LGBTQ+ populations specifically. The two preceding studies examined the effects of online-delivered MBIs among LGBQ+ young adults and LGBTQ+ adolescents, respectively. However, one of the programs (L2B) was a universal program, and the other program (L2B-Q) was adapted to specifically address stressors unique to the LGBTQ+ population. Because there is a great need for interventions to mitigate health disparities in the LGBTQ+ population (Fish, 2020), investigating possible programs that are effective is crucial to fill in gaps in the literature. In addition, investigating how adapted programs that are tailored specifically to LGBTQ+ individuals compared to universal programs is paramount in pushing the needle forward in meeting the needs of the LGBTQ+ community. The following discussion will compare and contrast the effects seen in the first two chapters.

## Acceptability and Feasibility

Both programs yielded high acceptability and feasibility. In addition, both programs were able to recruit participants in a reasonable time frame. Additionally, based on qualitative (L2B-Q only) and quantitative feedback (L2B and L2B-Q), both L2B and L2B-Q were well liked by participants, and facilitators were perceived positively by both groups of participants. However, attendance differed between studies; LGBQ+ young adults in L2B had a median attendance of four sessions, whereas L2B-Q participants had a median attendance of six sessions. Furthermore, 48% of L2B participants attended at least five sessions, whereas 55% of L2B-Q participants attended at least five sessions. An explanation for the difference in attendance could be

attributed to the adaptations made to the L2B-Q program, as minoritized populations have been more likely to attend and engage in an intervention if the program is adapted to their distinct needs (Winslow et al., 2016).

## Differences in Overlapping Outcome Variables

### Depression and Anxiety Symptoms

Both studies included a pilot examination of changes in depression and anxiety symptoms after MBI. Both L2B and L2B-Q yielded statistically meaningful reductions in depression symptoms for LGBTQ+ participants. However, LGBTQ+ adolescents who received L2B-Q had larger reductions in depression symptoms compared to LGBQ+ participants in L2B. A similar pattern was observed in the reduction of anxiety symptoms; both programs yielded statistically meaningful reductions in anxiety symptoms, however L2B-Q adolescents had larger reductions compared to young adults in L2B. Both programs failed to yield clinically significant RCIs for depression and anxiety among participants.

### Stress

Both programs evaluated stress, however the way stress was assessed was different. L2B participants were asked to rate their perceived stress, whereas L2B-Q participants answered questions related to their physiological stress experiences. Among LGBQ+ young adults who received L2B, there was a trivial-sized decrease in perceived stress. In contrast, adolescents who received L2B-Q had a small-to-medium reduction in physiological stress experiences that was statistically meaningful. The reductions in stress for participants in both programs was not clinically significant.

### Mindfulness

In addition to evaluating depression and anxiety, both programs evaluated changes in mindfulness. Participants of both programs saw statistically meaningful increases in mindfulness, however L2B participants saw increases in mindfulness that were quite large. Conversely, participants of L2B-Q saw small increases in mindfulness. Both programs did not yield clinically significant RCIs for mindfulness among participants.

**Explanation of Outcome Differences in Overlapping Variables**

One possible reason for the larger decreases in depression, anxiety, and stress seen among L2B-Q participants compared to L2B participants may be the nature of L2B-Q as an adapted program. LGBTQ+ youth have multi-faced needs related to their mental health due to the nature of their identity (Fish, 2020); therefore, addressing these specific needs is crucial when aiming to reduce mental health disparities and the effects of minority stress. L2B-Q was adapted from the L2B curriculum using stakeholder and steering committee feedback to specifically address the unique needs and stressors of LGBTQ+ youth (Quirk et al., in preparation). These specific adaptations are likely directly applicable to the lives of the adolescents and could have contributed to the larger reductions seen among L2B-Q youth compared to the participants in L2B, as adapted interventions that address the specific needs of a minoritized group are essential in reducing disparities in minoritized populations (Gonzales, 2017).

In addition to the benefits that an adapted program likely had on the outcomes seen among L2B-Q participants, one additional explanation for the difference in effects seen between the participants of L2B-Q and L2B regarding mental health and stress outcomes could be participant attendance. L2B-Q participants had a greater median attendance rate than L2B participants by two sessions. Additionally, the majority (55%) of L2B-Q participants attended at

least five sessions, whereas L2B participants only had 48% of participants attending at least five sessions. While the data on the dosage-response relationship between participant outcomes and MBI participation is lacking, interventions targeting weight-loss, smoking cessation, and depression specifically have shown that participants with the highest attendance are more likely to have better outcomes compared to participants who attend fewer sessions (Donkin et al., 2011; Smith & Liu, 2020). Furthermore, lower attendance rates may actually mask the true effects of a program (Atkins et al., 1999). Therefore, if attendance rates were similar between L2B and L2B-Q participants, the similarities and differences in outcomes between groups may change as L2B-Q likely had greater benefits due to their higher rates of attendance.

One outcome variable where L2B participants saw larger effects was regarding mindfulness. L2B participants saw a large increase in mindfulness, whereas L2B-Q participants only experienced a small increase. A potential reason for this difference could be the difference in supplemental supports L2B participants received to facilitate mindfulness practice, compared to L2B-Q participants. Carmody and Baer (2008) found that the time participants spent engaging in at-home mindfulness practice was significantly related to increases in mindfulness; such that the more participants engaged in at-home mindfulness practice, the greater their level of mindfulness. L2B-Q participants did not receive any supplemental support in between sessions to facilitate participation in at-home mindfulness activities. Conversely, the participants in L2B were randomly assigned to one of five different groups with varying supplemental supports between L2B sessions, which could have better facilitated at-home mindfulness practice. Supplemental support included receiving an online library of mindfulness practices, just-in-time stress support, receiving intervention messages, or a combination of all three supports. Participants in L2B who received supports compared to those who completed L2B as usual saw

larger increases in mindfulness (Lucas-Thompson et al., in press). Although the increase in mindfulness seen among L2B-Q participants is in line with previous literature examining the effects of MBI on levels of mindfulness in adolescents (Dunning et al., 2019), L2B-Q may benefit from providing supplemental materials to future participants.

### Identity Related Variables

Because internalized shame is closely related to levels of self-compassion (Puckett et al., 2015; Seabra et al., 2022) and positive identity (Green & Britton, 2013; Lick et al., 2013), these variables will be discussed all together. Regarding internalized shame scores, there was a surprising difference between programs. LGBQ+ young adults after completion of L2B had a moderate-to-large reduction in their internalized shame scores that was statistically meaningful and clinically significant. Conversely, adolescents following L2B-Q had a trivial increase in their internalized shame. Although self-compassion and positive identity measures are not entirely conceptually the same, self-compassion is directly linked to increased positive identity in LGBTQ+ individuals (Crews & Crawford, 2015; Goshorn et al., 2022). L2B explored the effects of self-compassion on participants; LGBQ+ participants of L2B saw clinically significant increases in self-compassion after the completion of the program. In comparison, participants of L2B-Q saw statistically meaningful increases in positive identity, however these increases were small to moderate and not clinically significant.

One potential reason for the large difference in internalized shame and self-compassion/positive identity scores could be that L2B-Q did not address internalized shame related to identity specifically. Although self-compassion is often a by-product of MBI (Golden et al., 2021), and self-compassion/positive identity are linked to internalized shame (Green & Britton, 2013; Lick et al., 2013; Puckett et al.,2015; Seabra et al., 2022), L2B-Q did not

specifically include examples or activities addressing shame. Furthermore, L2B-Q was adapted to specifically address minority stressors LGBTQ+ adolescents may face. These examples likely included experiences that participants have experienced in real life, or stressful and discriminatory experiences that participants are fearful of experiencing. The non-adapted L2B program did not include minority stress examples in the programming. Although the goal of the L2B-Q program was to better equip participants to cope with stress, some of the activities and examples may have unintendedly increased shame by reminding participants of potential negative experiences directly related to their identity.

A second potential reason for the differences in shame and self-compassion scores between L2B and L2B-Q participants is related to participant age. The participants in the L2B program were older, with most participants in the emerging adulthood developmental stage, whereas L2B-Q participants were adolescents. Adolescence is a time marked by exploring one's identities, often for the first time (Erikson, 1980), whereas emerging adulthood is a time in which identity is further solidified (Arnett, 2000). Due to the uncertainty and novelty that adolescence brings related to identity exploration, this could be a likely explanation for the large difference in scores for internalized shame between adolescent participants of L2B-Q and the emerging adult participants of L2B.

Lastly, L2B participants were comprised of a heterogeneous group of participants, whereas L2B-Q participants were all members of the LGBTQ+ community. Therefore, the differences in questions related to shame could have played a large factor in the differences in scores. L2B participants were asked generally about self-compassion and internalized shame due to participants being both LGBQ+ and heterosexual. However, L2B-Q participants were asked questions regarding internalized shame that were specific to their LGBTQ+ identity and were not

asked specific questions related to self-compassion. If the specificity of identity and its relationship to internalized shame and self-compassion were asked among L2B participants, scores may change. Additionally, if L2B-Q participants were asked questions about internalized shame and self-compassion that were more generalized rather than being related to their LGBTQ+ identity, it is likely that scores would also differ, as stigma related to one's LGBTQ+ identity can be a primary source of internalized shame and lack of self-compassion in adolescence (Goffnett et al., 2022; Hossain & Ferreira, 2019).

Future iterations of L2B-Q would benefit from exploring how internalized shame and self-compassion may be directly addressed within the programming. LGBTQ+ youth are coming out at younger ages each year (Dunlap, 2016). Coupled with the notion that adolescence is a time marked by identity exploration and building self-acceptance (Erikson, 1980), L2B-Q would likely better meet the demands of participants with further adaptations. Whether through mindfulness prompts the participants are expected to follow and practice, or through examples given to participants during session, curriculum should be adapted to address internalized shame and self-compassion in general, and as it relates to LGBTQ+ identity.

## Variables without Overlap

### Emotion Regulation vs. Stress-Related Health Behaviors

One area where data collection differed between programs was regarding emotion regulation and stress-related health behaviors. LGBQ+ participants answered questions regarding difficulties in emotion regulation, whereas L2B-Q participants answered questions related to stress-related health behaviors which included intuitive eating, difficulties with sleep, and physical activity. LGBQ+ participants of L2B saw meaningful reductions in overall difficulties with emotion regulation, along with meaningful reductions in difficulties with all sub-categories

of difficulties with emotion regulation (e.g., goals, clarity, strategies, awareness, non-acceptance, and impulses). The change in overall difficulties with emotion regulation was clinically significant for LGBQ+ participants of L2B as well. None of the sub-categories yielded clinically significant changes although they were meaningful. In comparison, participants of L2B-Q saw meaningful reductions in both sleep problems and lack of intuitive eating. The change in intuitive eating was clinically significant for L2B-Q participants. L2B-Q participants also saw meaningful increases in physical activity, with 50% of the participants reporting increases in physical activity.

Although the variables collected between studies differed, there are meaningful connections that can be made between the studies. Overall, LGBTQ+ individuals are significantly more likely than heterosexual youth and young adults to struggle with emotion regulation (Keating & Muller, 2019). Furthermore, emotion regulation has been found to be directly related to eating behaviors; increased emotion regulation is associated with a decrease in maladaptive eating behaviors (Evers et al., 2010; Harrist et al., 2013; Prefit et al., 2019). Additionally, increased emotion regulation is highly related to coping strategies (Compas et al., 2017), engaging in physical activity (Isasi et al., 2013; Yuan et al., 2018), and reduction in sleep problems (Palmer & Alfano, 2017; Palmer et al., 2018). Although emotion regulation was not explicitly explored in L2B-Q, it stands to reason that a meaningful change in emotion regulation difficulties would be hypothesized. To further position L2B-Q as an effective MBI in addressing health disparities among LGBTQ+ youth, future iterations would benefit from collecting data specifically on emotion regulation strategies.

**Marijuana and Alcohol Variables**

One final assessment variation was regarding the investigation into marijuana and alcohol variables. Participants of L2B were asked questions regarding changes in consequences of marijuana use, consequences of alcohol use, and their frequency of marijuana and alcohol use. However, there was no meaningful change in any of the variables except for a small reduction in consequences related to marijuana usage. Participants of L2B-Q were not asked questions related to consequences of, and frequency of, substance use. LGBTQ+ youth and young adults are significantly more likely than their heterosexual peers to engage in substance use and abuse, and to experience negative consequences of substance use (Felner et al., 2020; Goldbach et al., 2017; Johns et al., 2019). Given that LGBQ+ young adults in L2B did not have meaningful reductions in alcohol use and marijuana use, nor reductions in consequences of alcohol use, this highlights the need for programs to specifically address substance use in the LGBTQ+ population. Future iterations of L2B-Q would benefit from adding measures related to substance use and abuse to investigate how an adapted program may be better equipped to address disparities and negative outcomes in this area. Furthermore, including measures of substance use and abuse could further inform any additional adaptations to the L2B-Q program.

**Community Connectedness**

Community connectedness was a third identity-related variable that was explored in the L2B-Q program. Participants of L2B-Q saw moderate increases in community connection that were meaningful. A variable of similar interest was not explored in L2B, and therefore comparisons cannot be made regarding this variable.

**Limitations**

There were some clear limitations with the set studies. Firstly, there were differences in variables that were investigated. Although there was some overlap in outcome variables, in

addition to some outcomes being highly correlated to one another, to draw true comparisons between an adapted versus a non-adapted program, variables and constructs should be consistent between studies. One limitation specific to L2B-Q is the absence of substance use variables, therefore conclusions regarding an adapted MBI and its effects on substance use in LGBTQ+ participants are still lacking in the literature. Additionally, due to the nature of both studies being pilot and feasibility trials, future iterations of both programs would benefit from increased sample sizes to lend statistical power not only to the outcomes seen among participants, but also when drawing comparisons and differences between the two programs.

Furthermore, there were limitations regarding the participants. Firstly, both studies were pilot studies and had less than 20 LGBTQ+ participants in each program. Future iterations of both programs should aim to recruit a larger sample of LGBTQ+ participants. In addition, participants of each program differed in demographics. Participants of the L2B program were college-aged students, who on average, were in the emerging adulthood developmental stage. Furthermore, results from the L2B study were limited to sexual minority students and did not account for participants that identified as a gender minority (i.e., non-binary, transgender). Conversely, L2B-Q participants were adolescent middle and high school students and included both sexual and gender minority participants. Although developmental tasks and certain stressors may overlap between both demographics (Adams & Berzonsky, 2008; Gutgesell & Payne, 2004; Konstam, 2015), they are different developmental stages (Arnett, 2000; Larsen & Luna, 2018). Moreover, health disparities among gender minority individuals are often worse than those seen between sexual minority individuals and heterosexual/cisgender participants (Trevor Project, 2023). Because L2B-Q is an intervention specifically adapted to address the needs of LGBTQ+ adolescents, future comparisons of L2B-Q to other mindfulness programs may benefit from both

populations consisting of adolescent participants that are diverse in sexual orientation and gender identity in order for true comparisons to be made.

Lastly, both programs ran for six sessions, and included baseline and post-assessment data collection. However, both studies lacked a follow-up period after post-assessment. Without a follow-up it is unclear if there are meaningful differences between programs in sustaining long-term effects, or if the programs themselves yield long term effects. Future studies utilizing L2B or L2B-Q, or that are comparing L2B-Q to a non-adapted version of L2B should include follow-up questionnaires at one or two time points to assess for long term effects.

## Conclusion

The outcomes of both studies provide evidence that MBI can be effective in LGBTQ+ young adult and adolescent populations. Together, outcomes from participation in L2B and L2B-Q provide evidence that MBI can improve mental health, stress, self-compassion, mindfulness, emotion regulation, and stress-related health behaviors among LGBQ+ young adults and LGBTQ+ adolescents. Though L2B-Q did not yield meaningful improvement in internalized shame, evidence from L2B suggests that MBI can also be effective in reducing shame among LGBQ+ young adults. The results from L2B and L2B-Q fill a gap in the literature and indicate that MBI can be effective in reducing health disparities and negative outcomes among LGBTQ+ participants. Future studies examining MBIs should include LGBTQ+ populations to further explore the role MBI can play in reducing health disparities.

In addition to providing evidence that MBI can be effective among LGBTQ+ participants, the results also indicate that an adapted program tailored specifically to the needs of the LGBTQ+ population may be even more helpful when the goal is to reduce mental health symptomology and stress. Participants of L2B-Q saw larger improvements in their mental health

and stress compared to the participants in L2B, suggesting that tailoring L2B-Q to the specific stressors and needs of LGBTQ+ adolescents was beneficial to participants. Continuing to adapt L2B-Q based upon participant feedback and the current limitations is paramount in continuing to investigate the scope an adapted MBI, like L2B-Q, can have in promoting mindfulness, self-compassion, emotion regulation, and internalized shame.

One area where further research and adaption is evident is regarding substance use. L2B participants did not yield meaningful improvements in alcohol and marijuana use, nor consequences related to alcohol use. L2B-Q did not investigate substance use or consequences of use. Substance use and abuse among LGBTQ+ youth populations continue to be disproportionately higher than heterosexual and cisgender youth (Day et al., 2017; Mereish, 2019), and is directly related to poorer mental health outcomes among LGBTQ+ youth (Day et al., 2017; Watson et al., 2018). Therefore, it is imperative that future iterations of L2B-Q investigate the role an adapted may play in reducing substance use among LGBTQ+ youth, as that is an area in which MBI has not seen as meaningful of results.

## Tables

**Table 1**.
*Baseline Characteristics of Participants at Pre-Test*

| Identity | Number(*N*=62) | Percentage (%) |
|---|---|---|
| Gender | | |
| Female | 44 | 71.0 |
| Male | 14 | 22.6 |
| Non-Binary | 2 | 3.2 |
| Gender Fluid | 1 | 1.6 |
| Gender Queer | 1 | 1.6 |
| Sexual Orientation | | |
| Heterosexual | 39 | 63.0 |
| Gay | 4 | 6.5 |
| Bisexual | 11 | 17.7 |
| Queer | 3 | 4.8 |
| Questioning | 2 | 3.2 |
| Other | 3 | 4.8 |
| Ethnicity | | |
| Asian, Pacific Islander | 3 | 4.8 |
| Caucasian | 51 | 82.3 |
| Latinx | 2 | 3.2 |
| African American & Caucasian | 1 | 1.6 |
| Asian/Pacific Islander & African American | 1 | 1.6 |
| Asian/Pacific Islander & Caucasian | 3 | 4.8 |
| Mayan | 1 | 1.6 |
| Hispanic | 9 | 14.5 |
| Non-Hispanic | 53 | 85.5 |
| Age | | |
| 18 | 11 | 17.7 |
| 19 | 8 | 12.9 |
| 20 | 14 | 22.6 |
| 21 | 14 | 22.6 |
| 22 | 3 | 4.8 |
| 23 | 1 | 1.6 |
| 24 | 1 | 1.6 |

**Table 1** (cont.)
*Baseline Characteristics of Participants at Pre-Test*

| Age | Number (*N*=62) | Percentage (%) |
|---|---|---|
| 25 | 2 | 3.2 |
| 26 | 1 | 1.6 |
| 29 | 2 | 3.2 |
| 31 | 1 | 1.6 |
| 33 | 1 | 1.6 |
| 42 | 1 | 1.6 |
| No Response | 2 | 3.2 |

**Table 2.**
*Attendance Based on Sexual Identity*

| Number of sessions attended | LGBQ+ Participants | Heterosexual Participants | All Participants |
|---|---|---|---|
| 1 | 1 (5%) | 4 (13%) | 5 (10%) |
| 2 | 1 (5%) | 3 (10%) | 4 (8%) |
| 3 | 1 (5%) | 3 (10%) | 4 (8%) |
| 4 | 7 (37%) | 1 (3%) | 8 (16%) |
| 5 | 6 (32%) | 8 (26%) | 14 (28%) |
| 6 | 3 (16%) | 12 (39%) | 15 (30%) |
| Total Participants | 19 | 31 | 50 |
| Median Session Attendance | 4 | 5 | 5 |

*Note*: Percentages were rounded to the nearest whole number

**Table 3.**
*Acceptability Ratings by Participants Based on Sexual Identity*

| Sexual Orientation | Facilitator *M* | Facilitator *SD* | Acceptability *M* | Acceptability *SD* |
|---|---|---|---|---|
| LGBQ+ | 4.37 | .74 | 4.12 | .88 |
| Heterosexual | 4.38 | .53 | 4.29 | .57 |

**Table. 4**

*Differences in Means and Size of Change Among LGBQ+ & Heterosexual Participants*

| | Group comparison | LGBQ+ participants | | | | Heterosexual participants | | | |
|---|---|---|---|---|---|---|---|---|---|
| Outcome | *d* (*CI*) | *M (SD)* t1 | *M (SD)* t2 | Δ *d* (*CI*) | RCI | *M (SD)* t1 | *M (SD)* t2 | Δ *d* (*CI*) | RCI |
| Depression | .30 (-.28, .88) | 38.37 (9.34) | 34.40 (8.81) | -.39 (-.85, .09) | -.89 | 35.86 (11.30) | 35.03 (12.26) | -.09 (-.45, .28) | -.17 |
| Anxiety | .24 (-.34, .82) | 42.95 (9.76) | 37.16 (10.51) | -.59 (-1.07, -.09) | -1.31 | 38.45 (10.95) | 34.86 (12.16) | -.41 (-.79, -.03) | -.77 |
| Perceived Stress | .01 (-.57, .59) | 31.16 (6.01) | 26.63 (7.68) | -.48 (-.95, 0.00) | -1.09 | 29.45 (7.53) | 25.00 (7.69) | -.63 (-1.02, -.22) | -.99 |
| Mindfulness | -.08 (-.65, .49) | 3.23 (.54) | 3.80 (.63) | .73 (.21, 1.23) | 1.43 | 3.20 (.75) | 3.79 (.78) | .64 (.25, 1.02) | 1.34 |
| Self-Compassion | -.05 (-.63, .52) | 2.59 (.60) | 3.25 (.69) | .96 (.41, 1.50) | 2.00 | 2.55 (.57) | 3.18 (.60) | 1.09 (.63, 1.53) | 1.91 |
| Internalized Shame | .22 (-.36, .80) | 58.42 (22.66) | 43.74 (23.08) | -.71 (-1.20, -.19) | -2.21 | 54.41 (24.79) | 43.79 (24.84) | -.65 (-1.05, -.25) | -1.51 |
| Difficulty with Emotion Regulation | .20 (-.38, .78) | 2.94 (.64) | 2.36 (.65) | -.92 (-1.45, -.37) | -2.32 | 2.80 (.67) | 2.33 (.60) | -1.01 (-1.45, -.55) | -1.88 |
| Difficulty with Goals | .46 (-.13, 1.04) | 3.83 (.77) | 3.03 (1.01) | -.79 (-1.30, -.26) | -1.81 | 3.59 (.95) | 3.20 (.90) | -.49 (-.87, -.10) | -.83 |
| Difficulty with Impulse | -.11 (-.69, .47) | 2.23 (.86) | 1.97 (.87) | -.27 (-.73, .19) | -.54 | 2.27 (.84) | 1.92 (.68) | -.44 (-.82, -.05) | -.73 |
| Difficulty with Non-Acceptance | .01 (-.57, .59) | 3.05 (1.27) | 2.30 (1.09) | -.61 (-1.09, -.11) | -1.56 | 2.96 (1.18) | 2.21 (.87) | -1.06 (-1.51, -.60) | -1.60 |
| Difficulty with Clarity | -.10 (-.68, .48) | 2.82 (.71) | 2.41 (.67) | -.73 (-1.24, -.22) | -.92 | 2.72 (.75) | 2.25 (.72) | -.78 (-1.19, -.35) | -.92 |

**Table 4** (cont.)
*Differences in Means and Size of Change Among LGBQ+ & Heterosexual Participants*

| | Group comparison | LGBQ+ participants | | | | Heterosexual participants | | | |
|---|---|---|---|---|---|---|---|---|---|
| Outcome | *d* (*CI*) | *M (SD)* t1 | *M (SD)* t2 | Δ *d* (*CI*) | RCI | *M (SD)* t1 | *M (SD)* t2 | Δ *d* (*CI*) | RCI |
| Difficulty with Awareness | .15 (-.43, .73) | 2.80 (.90) | 2.37 (.77) | -.70 (-1.19, -.19) | -.90 | 2.74 (.99) | 2.40 (.88) | -.68 (-.97, -.18) | -.67 |
| Difficulty with Strategies | .35 (-.24, .93) | 3.01 (.84) | 2.22 (.80) | -1.07 (-1.63, -.49) | -1.76 | 2.71 (.91) | 2.17 (.73) | -.73 (-1.13, -.31) | -1.15 |
| Consequences of Marijuana Use | .32 (-.29, .94) | 1.13 (3.59) | .19 (.40) | -.34 (-.84, .17) | -.72 | 2.31 (4.42) | 2.14 (4.04) | -.06 (-.43, .30) | -.14 |
| Consequences of Alcohol Use | -.33 (-.94, .28) | 2.53 (3.39) | 2.59 (4.33) | .03 (-.45, .50) | .04 | 3.50 (4.24) | 2.68 (4.42) | -.28 (-.66, .09) | -.52 |
| Marijuana Use | -.29 (-.87, .29) | .68 (1.16) | .84 (2.36) | .07 (-.38, .52) | - | 6.62 (11.01) | 5.28 (9.50) | -.21 (-.58, .16) | - |
| Alcohol Use | -.19 (-.77, .39) | 3.00 (6.27) | 2.79 (6.49) | -.10 (-.52, .34) | - | 4.45 (5.89) | 2.68 (4.42) | -.23 (-.59, .14) | - |

*Notes*: RCI was not obtained for marijuana and alcohol use

**Table 5.**
*Percentages of Reliable Change for LGBTQ+ & Heterosexual Groups*

| | LGBQ+ participants | | | Heterosexual participants | | |
|---|---|---|---|---|---|---|
| Outcome | % Reliable improvement | % Reliable deterioration | % No reliable change | % Reliable improvement | % Reliable deterioration | % No reliable change |
| Depression | 16% | 16% | 68% | 14% | 10% | 76% |
| Anxiety | 37% | 0% | 63% | 24% | 3% | 73% |
| Perceived Stress | 26% | 5% | 69% | 28% | 3% | 69% |
| Mindfulness | 42% | 0% | 58% | 29% | 6% | 65% |
| Self-Compassion | 37% | 0% | 63% | 53% | 0% | 47% |
| Internalized Shame | 37% | 5% | 58% | 34% | 0% | 66% |
| Difficulty with Emotion Regulation | 53% | 0% | 47% | 41% | 0% | 59% |
| Difficulty with Goals | 53% | 5% | 42% | 21% | 0% | 79% |
| Difficulty with Impulse | 21% | 5% | 74% | 24% | 7% | 69% |
| Difficulty with Non-Acceptance | 37% | 0% | 63% | 28% | 0% | 72% |
| Difficulty with Clarity | 21% | 0% | 79% | 21% | 0% | 79% |
| Difficulty with Awareness | 16% | 5% | 79% | 21% | 0% | 79% |
| Difficulty with Strategies | 37% | 0% | 63% | 28% | 0% | 72% |

**Table. 5** (cont.)
*Percentages of Reliable Change for LGBTQ+ & Heterosexual Groups*

| | LGBQ+ participants | | | Heterosexual participants | | |
|---|---|---|---|---|---|---|
| Outcome | % Reliable improvement | % Reliable deterioration | % No reliable change | % Reliable improvement | % Reliable deterioration | % No reliable change |
| Consequences of Marijuana Use | 13% | 0% | 87% | 10% | 7% | 83% |
| Consequences of Alcohol Use | 6% | 6% | 88% | 11% | 4% | 85% |

*Note*: Percentages were rounded to the nearest whole number.

**Table 6.**
*Baseline Characteristics of Participants at Pre-Test*

| Identity | Number (Total *N*=20) | Percentage (%) |
|---|---|---|
| Gender | | |
| Female/Woman | 7 | 35.0 |
| Male/Man | 9 | 45.0 |
| Non-Binary | 3 | 15.0 |
| Transgender | 1 | 5.0 |
| Sexual Orientation | | |
| Lesbian | 7 | 35.0 |
| Gay | 8 | 40.0 |
| Bisexual | 3 | 15.0 |
| Asexual | 1 | 5.0 |
| Demisexual | 1 | 5.0 |
| Race | | |
| Black | 12 | 60.0 |
| Asian | 1 | 5.0 |
| Native Hawaiian | 1 | 5.0 |
| White | 6 | 30.0 |
| Ethnicity | | |
| Hispanic | 5 | 25.0 |
| Non-Hispanic | 14 | 70.0 |
| No Response | 1 | 5.0 |
| Age | | |
| 14 | 1 | 5.0 |
| 16 | 9 | 45.0 |
| 17 | 7 | 35.0 |
| 18 | 3 | 15.0 |

**Table 7.**

*Participant Attendance by Cohort*

| Number of sessions attended | **Cohort 1** | **Cohort 2** | **Combined Cohorts** |
|---|---|---|---|
| 0 | 1 (9%) | 0 (0%) | 1 (5%) |
| 1 | 0 (0%) | 0 (0%) | 0 (0%) |
| 2 | 0 (0%) | 0 (0%) | 0 (0%) |
| 3 | 1 (9%) | 0 (0%) | 1 (5%) |
| 4 | 3 (27%) | 4 (44%) | 7 (35%) |
| 5 | 0 (0%) | 0 (0%) | 0 (0%) |
| 6 | 6 (55%) | 5 (56%) | 11 (55%) |
| Total participants: | 11 | 9 | 20 |
| Median session attendance: | 6 | 6 | 6 |

*Note*: Percentages were rounded to the nearest whole number

**Table 8.**

*Focus Group Themes & Sub-Themes*

| Themes | Sub-Themes | Example Responses: |
|---|---|---|
| Acceptability | Facilitator Characteristics | *"Looking forward to meeting every week thanks to the moderators we had."*<br>*"It was all good and the moderators were the best."* |
| | Platform | *"Discord for sure."*<br>*"Discord is perfect"* |
| | Mindful Practice | *"These [activities] helped a lot always looking forward*."<br>*"Gratitude practice helps you be more thankful and it was a boost to my self-esteem."* |
| | Camera Usage | *"Trying to stay anonymous"*<br>*"I'm an introvert I don't like being seen."* |
| Implementation | Activity Changes | *"Some visuals would be nice"*<br>*"Maybe some written instructions."* |
| | Participant Engagement | *"Good contents and activities will always bring anyone back. It'll keep us coming for more."*<br>*"Sometimes I get carried away by other stuff like a date night or friends' night out."* |
| | Group Connection | *"[The groups were] too small and sometimes we lacked proper communication."*<br>*"More introductions and maybe got to know each other a bit more I would be more willing to show my face."* |
| Practicality | Timing | *"The time is a little late,"*<br>*"I want to stay longer."* |
| Demand | Peer Recruitment | *"[I will] play by my friends."*<br>*"[My friend] moved out of Colorado, she would have loved to join."* |

*Notes*: Responses include quotes from both cohorts of the L2B-Q program.

**Table 9.**

*Safety & Mood Monitoring Week-to-Week*

| | Number of Check-Ins with Psychologist | | |
|---|---|---|---|
| Assessment Week | **Cohort 1** (*n*=10) | **Cohort 2** (*n*=9) | **Total** (*n*=19) |
| Pre-Test | 5 | 2 | 7 |
| Week 1 | 7 | 3 | 10 |
| Week 2 | 3 | 3 | 6 |
| Week 3 | 2 | 3 | 5 |
| Week 4 | 3 | 2 | 5 |
| Week 5 | 3 | 1 | 4 |
| Post-Test | 3 | 1 | 4 |

*Note*: Cohort 1 had one participant drop out prior to starting the intervention, and did not complete mood monitoring after pre-test assessment

**Table 10.**

*Differences in Pre-Post Data Using Paired T-Tests*

| Variable Name | Pre-Test | | Post-Test | | *Mdiff* | Cohen's *d* | 95% C.I. | Overall RCI |
|---|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | | | | |
| Depression | 8.67 | 7.24 | 5.11 | 4.89 | -3.56 | -.82 | (-1.34, -.27) | -1.55 |
| Anxiety | 7.59 | 5.30 | 4.82 | 5.98 | -2.76 | -.65 | (-1.17, -.12) | -1.39 |
| Mindfulness | 3.40 | 1.20 | 3.78 | 1.31 | .38 | .23 | (-.25, .71) | .48 |
| Sleep Disturbance | 10.59 | 2.06 | 9.53 | 3.56 | -1.06 | -.33 | (-.81, .17) | -.91 |
| Non-Intuitive Eating | 16.39 | 5.71 | 13.33 | 4.93 | -3.06 | -.47 | (-.03, .95) | -2.19 |
| Physical Activity | 4.56 | 1.79 | 5.17 | 1.69 | .61 | .56 | (.05, 1.05) | - |
| Physiological Stress | 19.39 | 6.07 | 17.61 | 6.03 | -1.78 | -.35 | (-.82, .14) | -.47 |
| Internalized Shame | 18.18 | 6.70 | 19.00 | 8.46 | .82 | .11 | (-.37, .58) | .50 |
| Community Connectedness | 18.33 | 3.03 | 19.44 | 2.77 | 1.11 | .36 | (-.12, .83) | .44 |
| Positive Identity | 38.41 | 9.80 | 42.23 | 6.41 | 3.82 | .36 | (-.13, .85) | 1.22 |

*Note: Mdiff* is the difference in means from post-test to pre-test. * indicates a clinically significant RCI value. RCI value not obtained for physical activity.

**Table 11.**

*Reliable Change Indexes by Variable*

| ID | Reliable Change Index | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Depression (*n*=18) | Anxiety (*n*=17) | Mindfulness (*n*=17) | Sleep (*n*=17) | Intuitive Eating (*n*=18) | Physiological Stress (*n*=18) | Internalized Shame (*n*=17) | Community Connection (*n*=18) | Positive Identity (*n*=17) |
| 3 | -.87 | 1.01 | -.25 | .85 | -.71 | -.27 | 1.22 | -.79 | -2.24 |
| 4 | -5.6 | 0.0 | -1.52 | -4.27 | -6.43 | .27 | 0.0 | 0.0 | 0.0 |
| 5 | -1.75 | .51 | -1.52 | .85 | .71 | 1.33 | -.61 | .79 | 1.28 |
| 9 | .87 | -.51 | -.76 | - | -2.86 | -1.07 | -3.05 | -1.19 | 0.0 |
| 10 | 0.0 | 0.0 | 2.03 | 0.0 | -10.00 | 0.0 | 0.0 | 0.0 | -1.60 |
| 11 | -.87 | .51 | - | .85 | -.71 | -5.3 | 0.0 | .40 | -.64 |
| 12 | -1.31 | -2.02 | .25 | -.85 | -5.00 | -.27 | -.61 | -1.58 | 2.24 |
| 13 | -3.06 | -6.06 | 2.03 | 1.71 | -5.00 | -1.07 | -2.44 | 0.0 | - |
| 14 | -2.62 | -3.03 | .76 | -5.13 | -4.29 | .27 | 1.22 | .40 | .96 |
| 15 | 0.0 | 0.0 | 2.03 | -3.42 | 5.71 | -1.60 | -3.66 | 1.58 | 3.19 |
| 16 | -.87 | -1.01 | -.51 | -.85 | -.71 | .80 | -.61 | -.40 | .32 |
| 17 | -.87 | -2.02 | .51 | 0.0 | .71 | -2.13 | .61 | .40 | 3.19 |
| 18 | -5.24 | - | 5.82 | 2.56 | -7.14 | -2.93 | 3.66 | .79 | 0.0 |
| 19 | 1.31 | 0.0 | 2.28 | 3.42 | 5.71 | 2.67 | - | 3.56 | 0.0 |
| 20 | -3.49 | -6.06 | -3.54 | -6.84 | -10.71 | -2.67 | .61 | .41 | -.61 |
| 21 | -1.31 | -2.53 | -1.01 | -1.71 | 1.43 | -.53 | -3.05 | 2.37 | 2.56 |
| 23 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 17.07 | 0.0 | 12.78 |
| 24 | -2.18 | -2.53 | -.51 | -2.56 | 0.0 | -.80 | -1.83 | 1.19 | -.61 |

**Table 11** (cont.)

*Reliable Change Indexes by Variable*

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Total Showing Reliable Change | 6 (33%) | 7 (41%) | 5 (29%) | 5 (29%) | 8 (44%) | 3 (17%) | 4 (24%) | 2 (11%) | 5 (29%) |

*Notes*: Physical Activity was excluded due to not having a calculable RCI since it was a one-question item. Scores $\geq \pm 1.96$ indicate reliable change. The +/- sign for each variable indicates either reliable improvement or reliable deterioration based on directionality. Reliable change is indicated by green squares, and deterioration is indicated by red squares. Scores of 0.0 indicate no change in score from pre- to post-test. '**-**' indicates RCI could not be calculated due to missing data. Percentages were calculated based on the *n* for each variable and rounded to the nearest whole number

## Figures

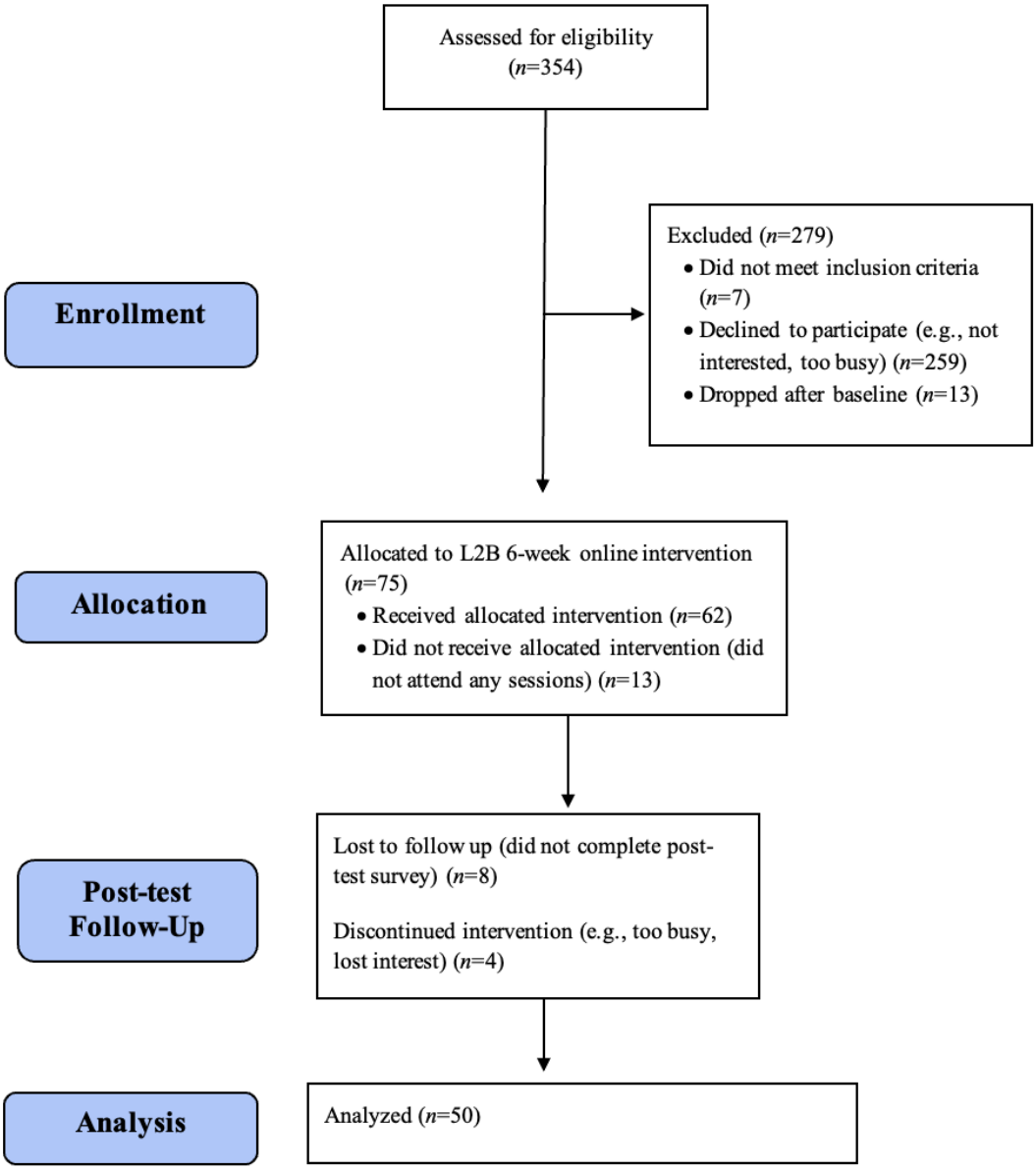


***Figure 1***. CONSORT Pilot Study Flow of L2B.

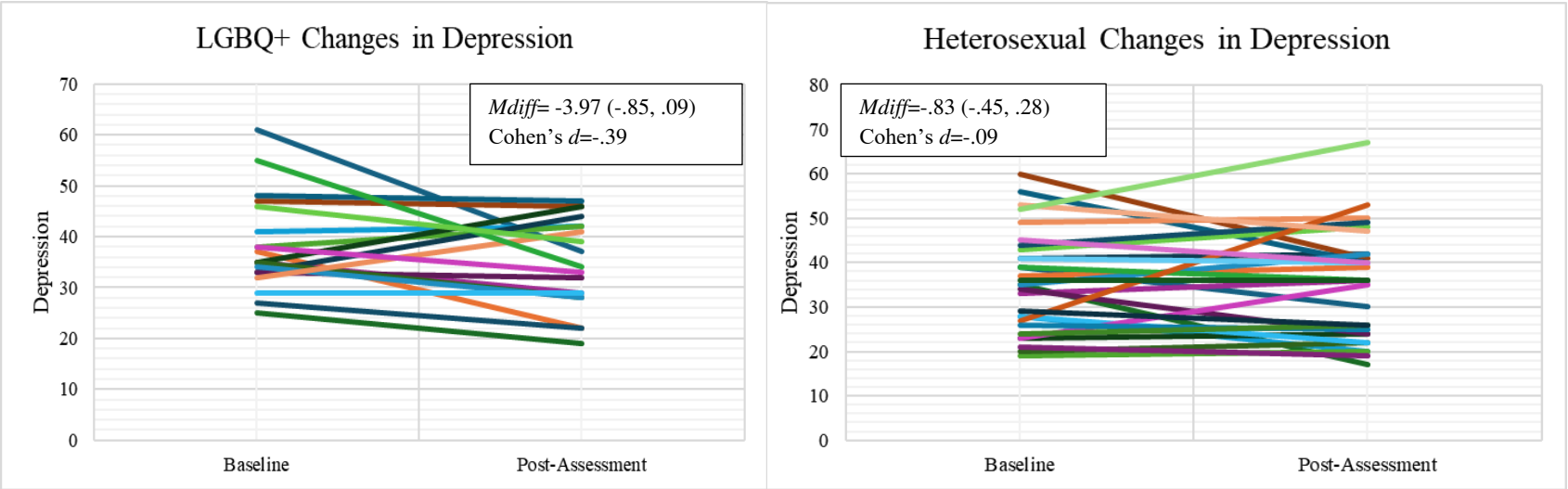


***Figure 2.*** Changes in Depression Scores based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

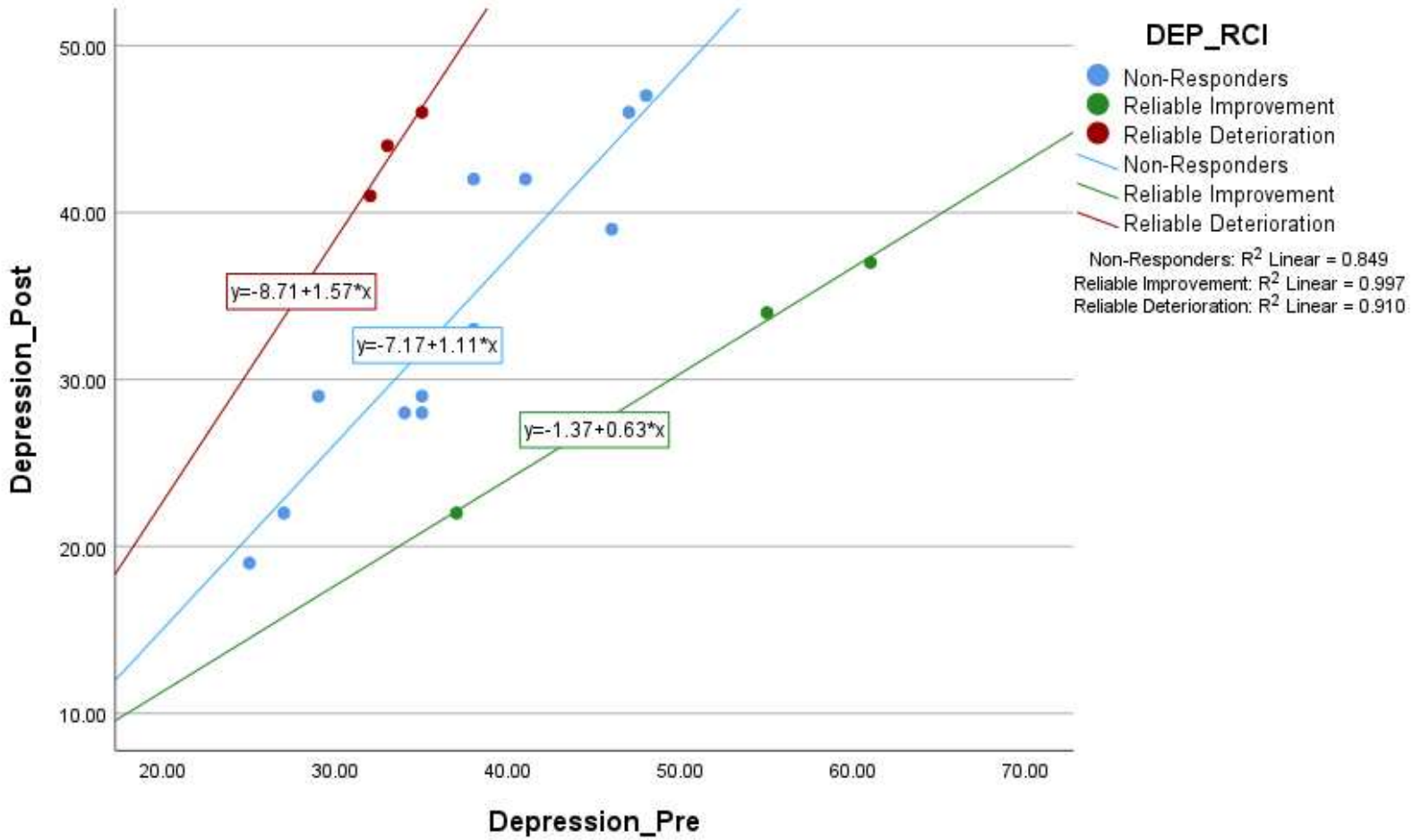


***Figure 3.*** LGBQ+ Depression RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

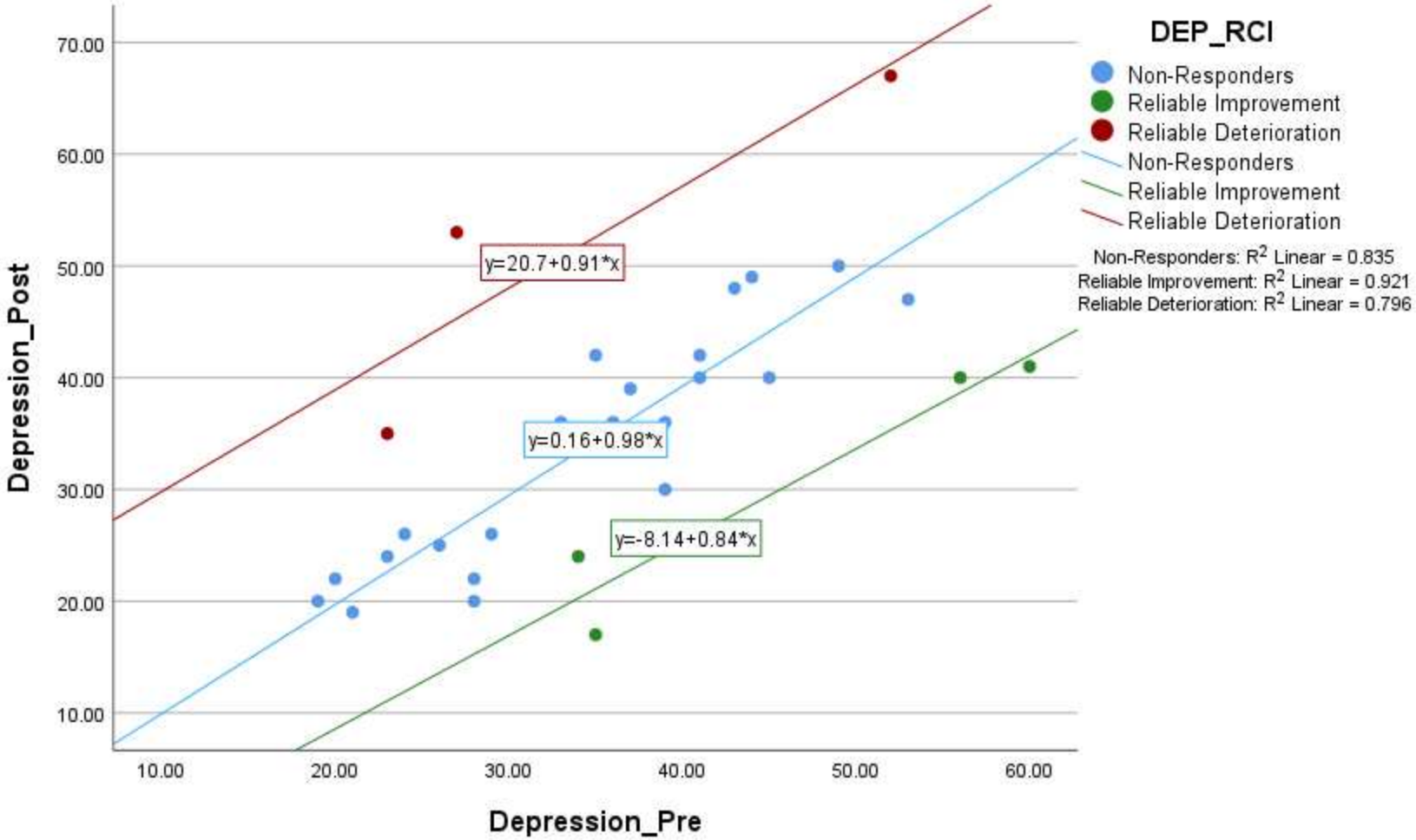


***Figure 4.*** Heterosexual Depression RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

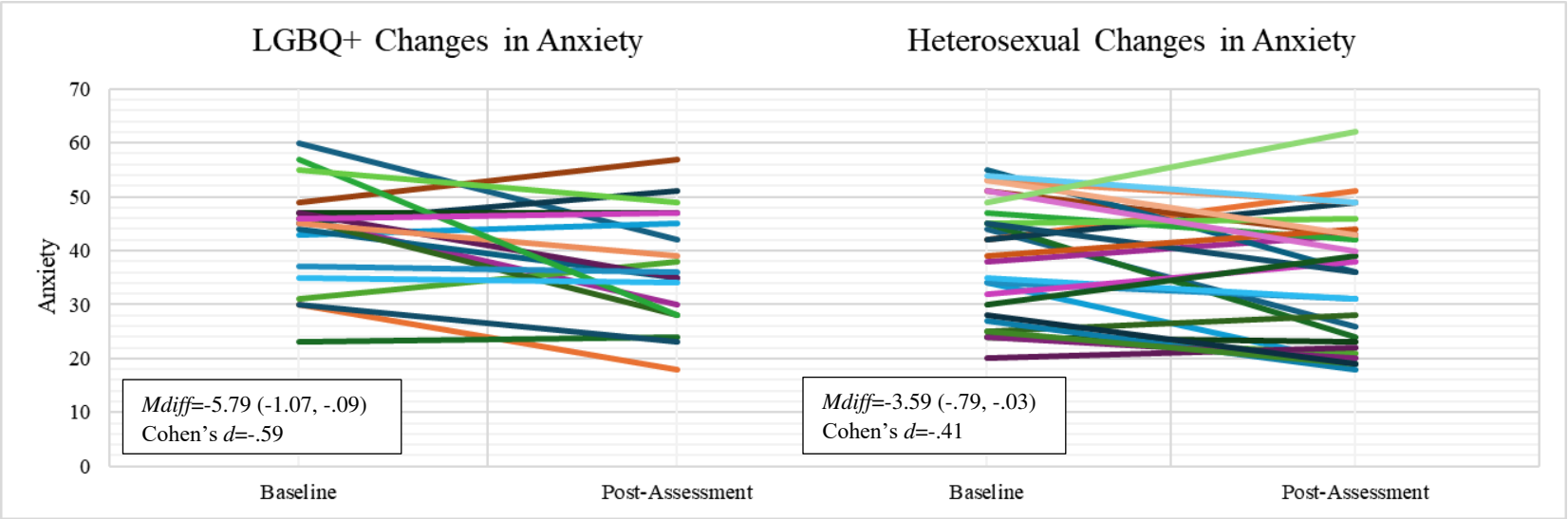


***Figure 5.*** Changes in Anxiety Scores based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

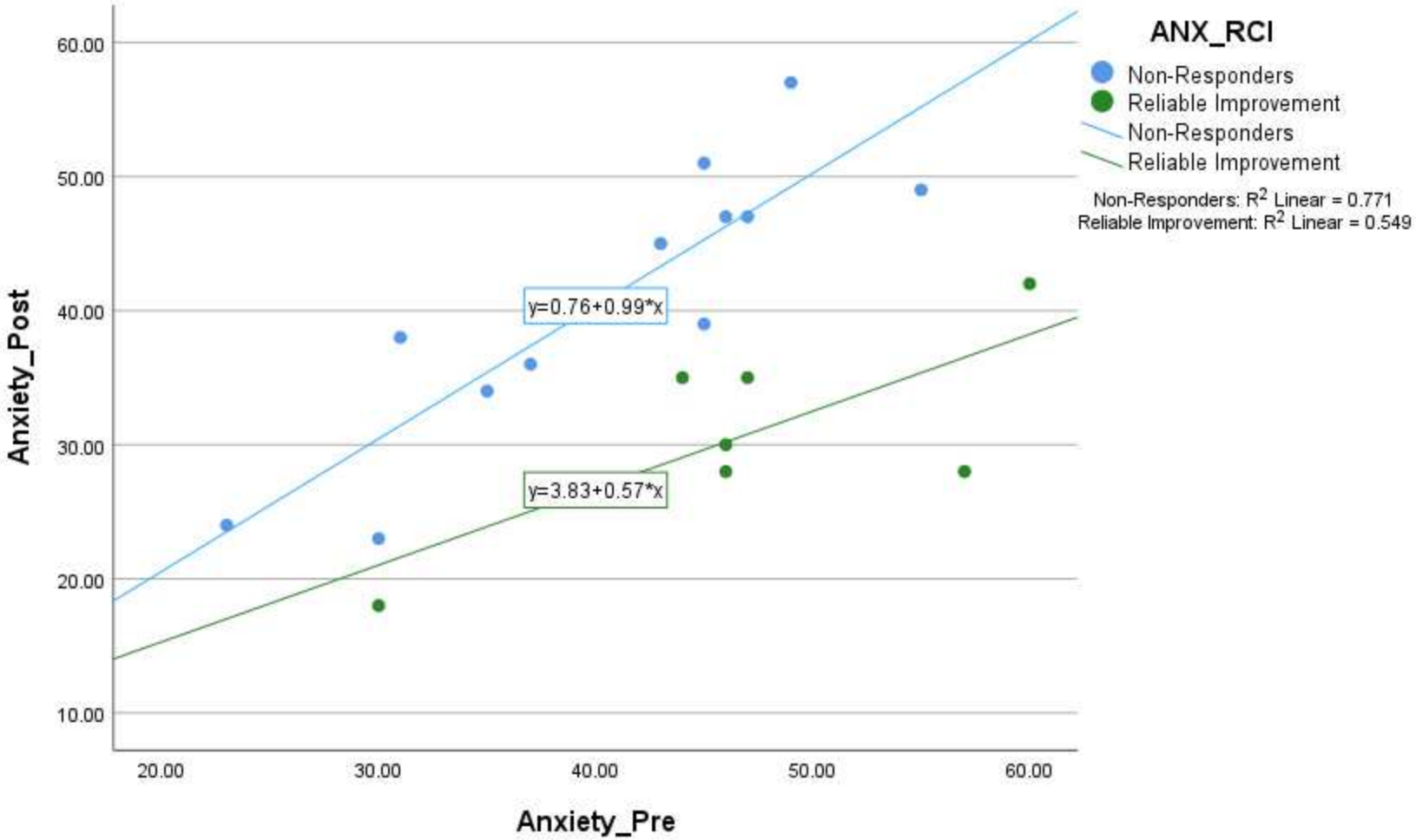


***Figure 6.*** LGBQ+ Anxiety RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

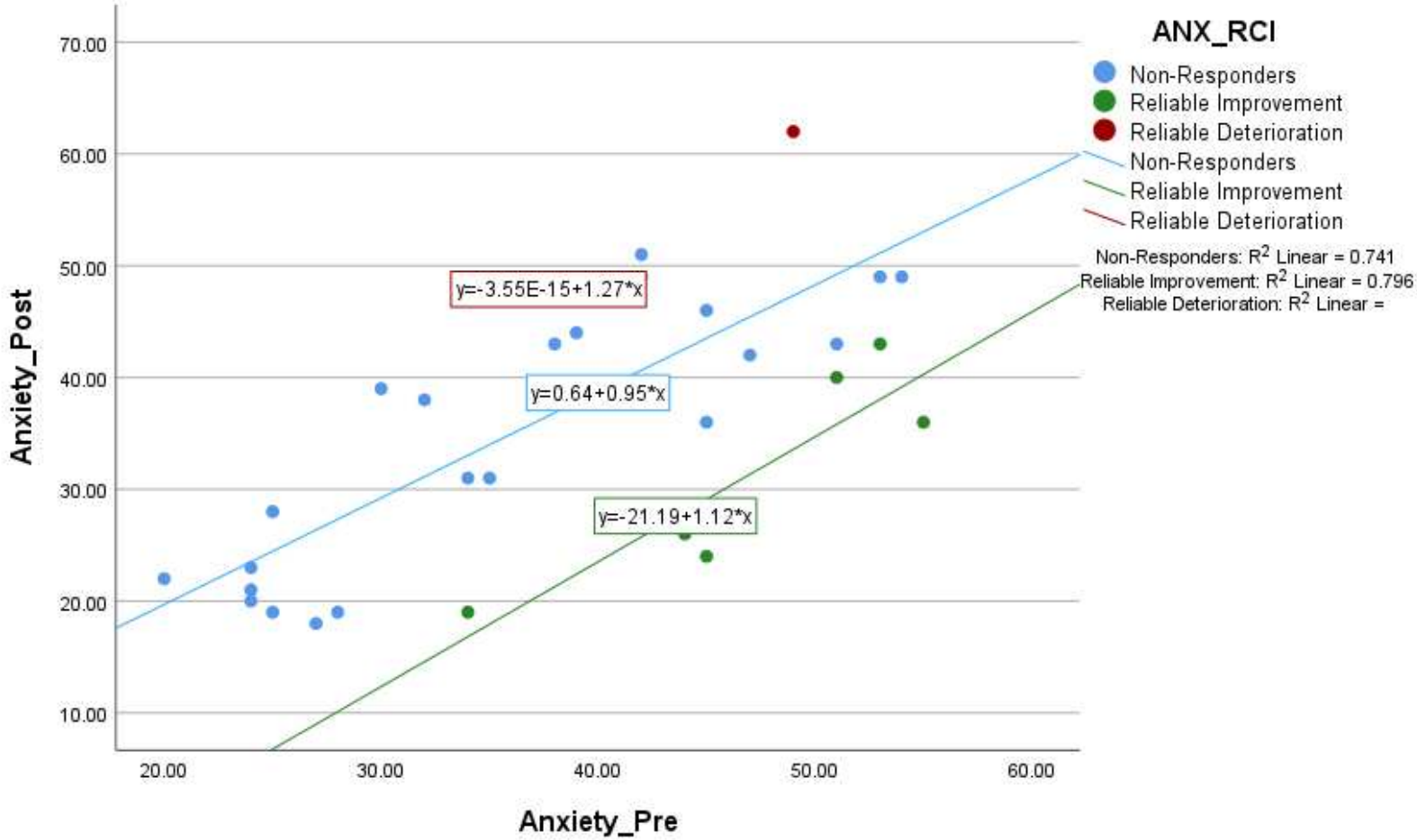


***Figure 7.*** Heterosexual Anxiety RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

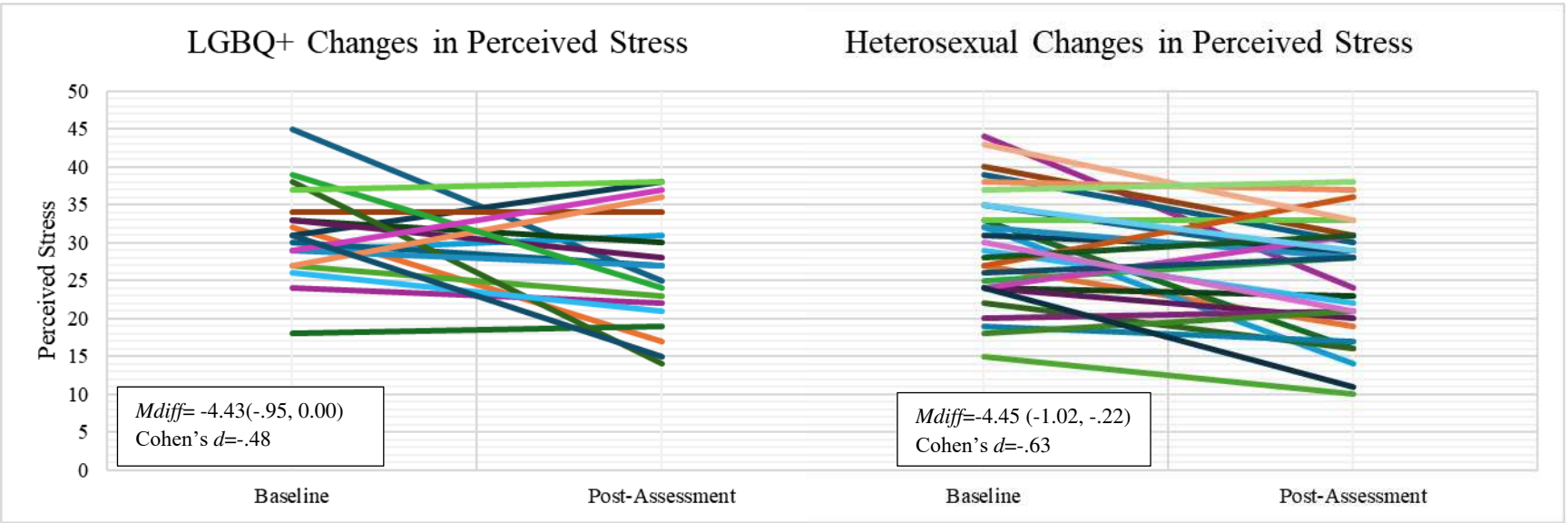


***Figure 8.*** Changes in Perceived Stress Scores based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

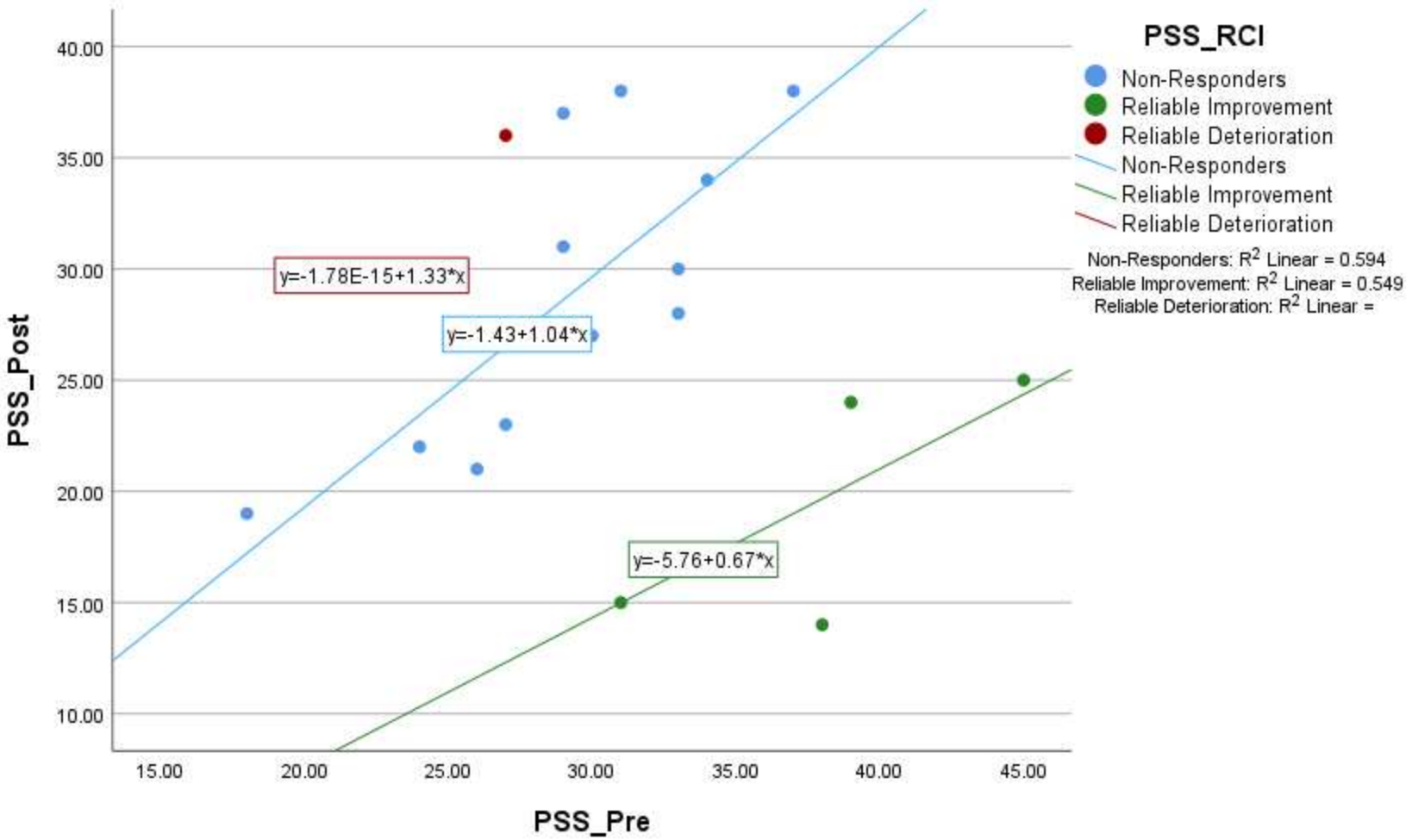


***Figure 9.*** LGBQ+ Perceived Stress RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

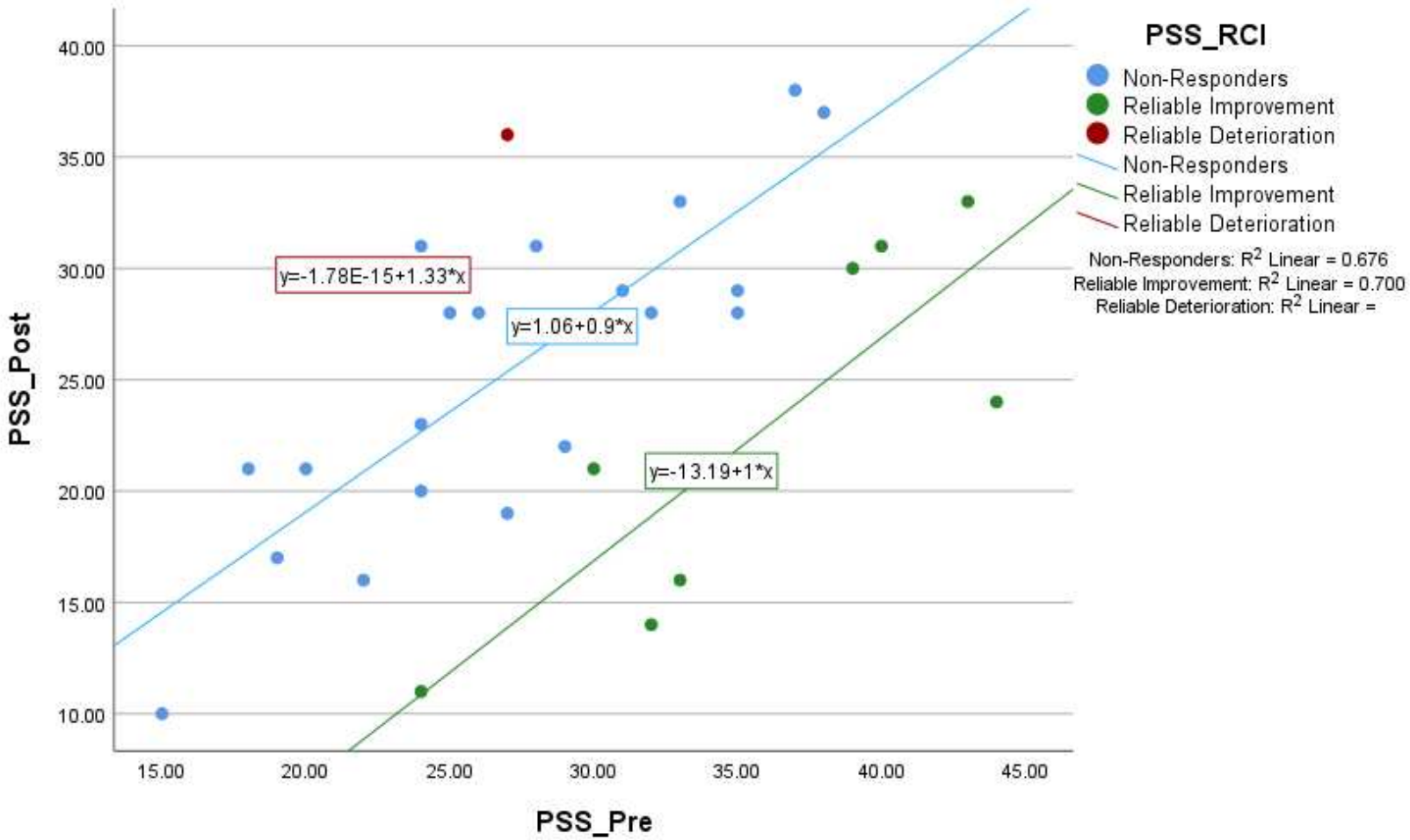


***Figure 10.*** Heterosexual Perceived Stress RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

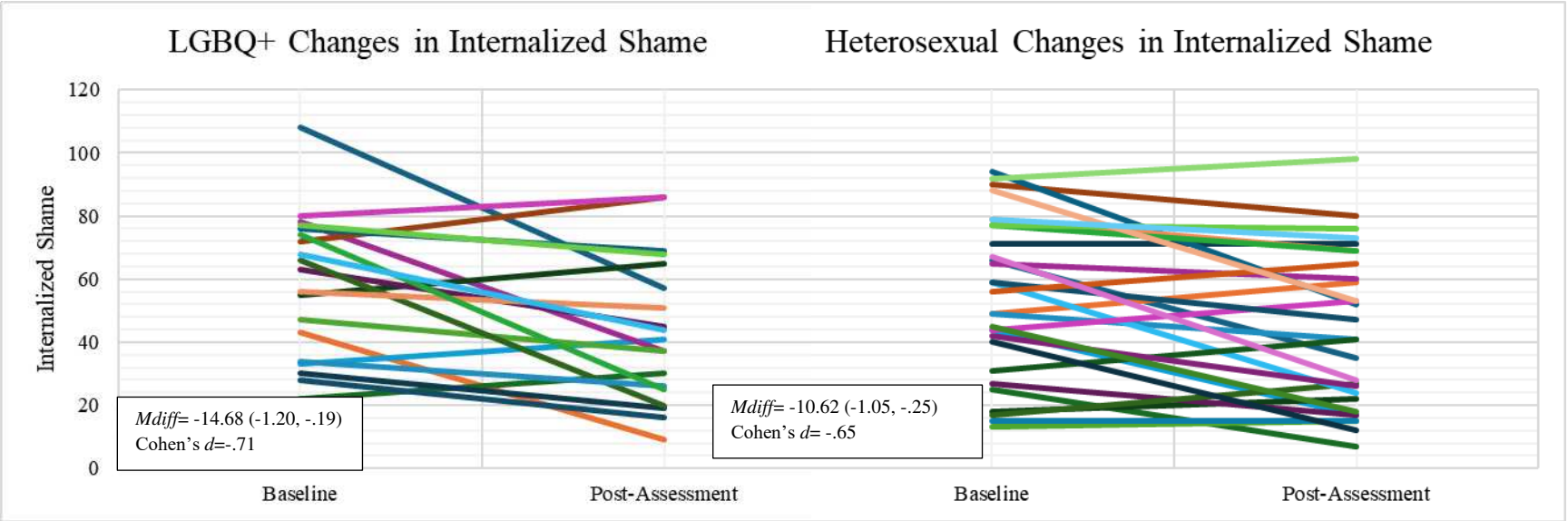


***Figure 11.*** Changes in Internalized Shame Scores based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

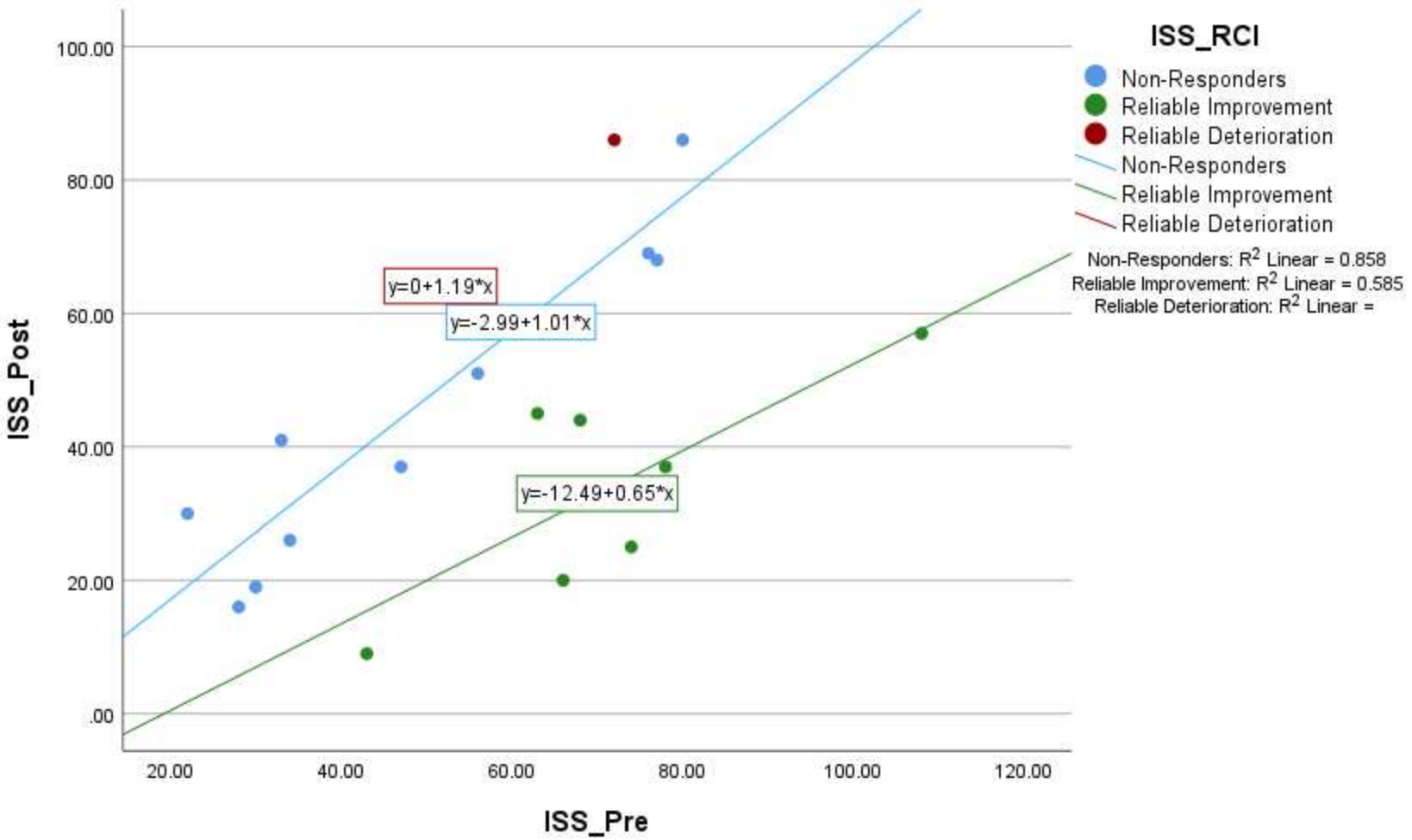


***Figure 12.*** LGBQ+ Internalized Shame RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

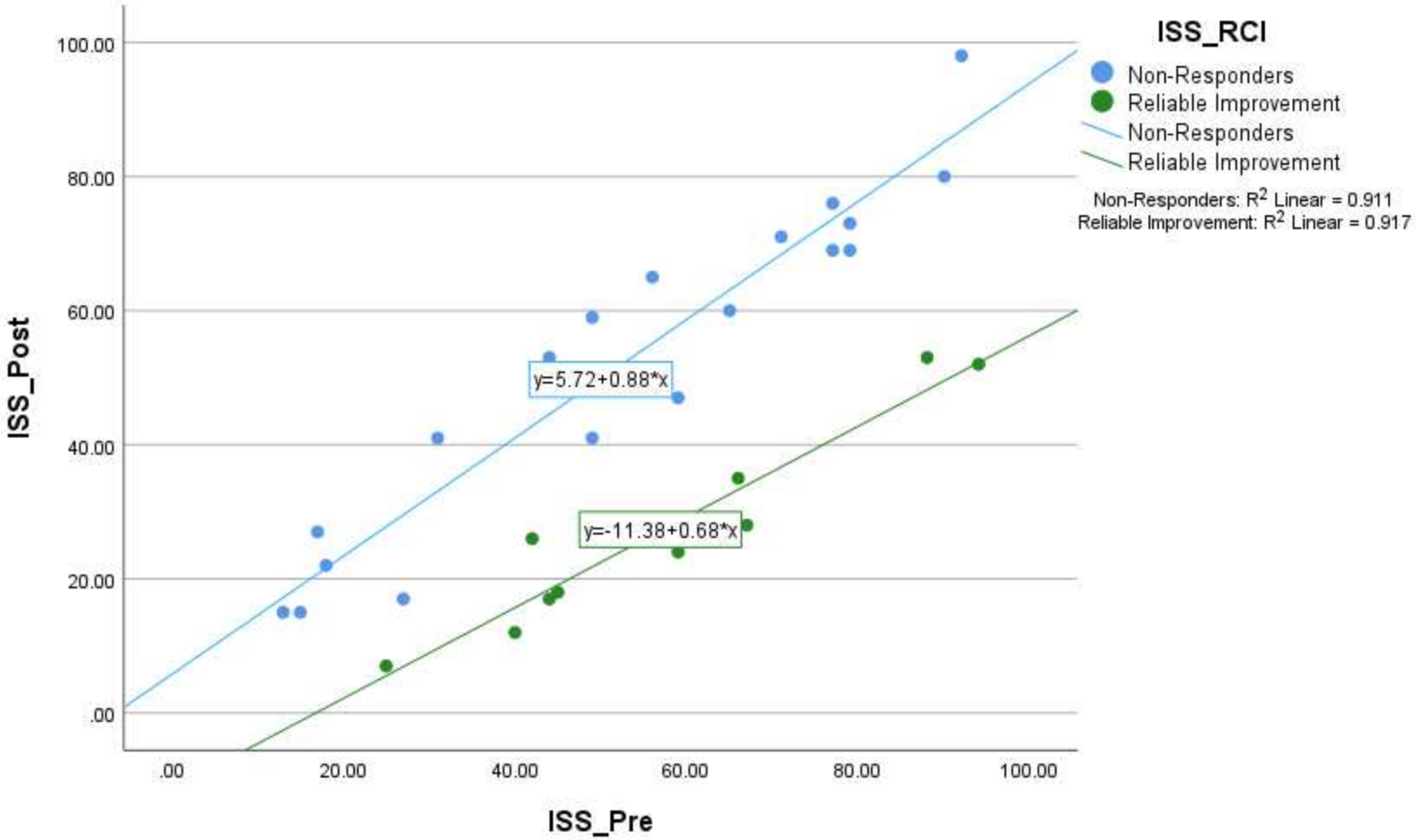


***Figure 13.*** Heterosexual Internalized Shame RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

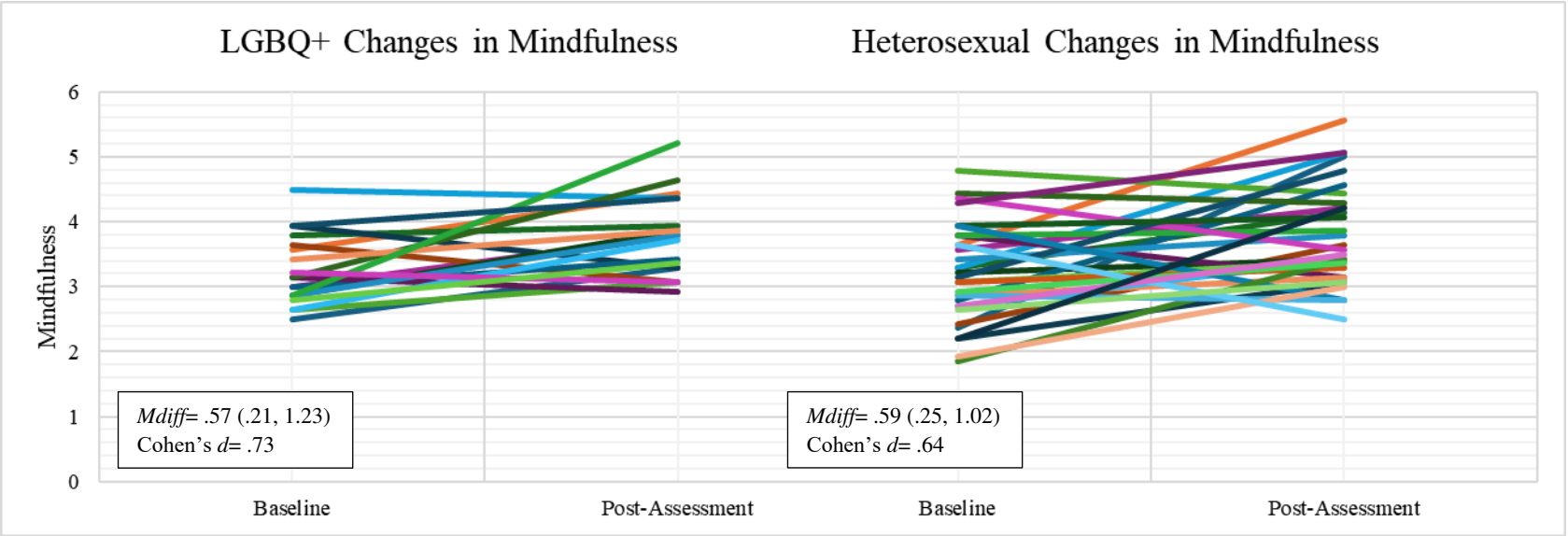


***Figure 14.*** Changes in Mindfulness Scores based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

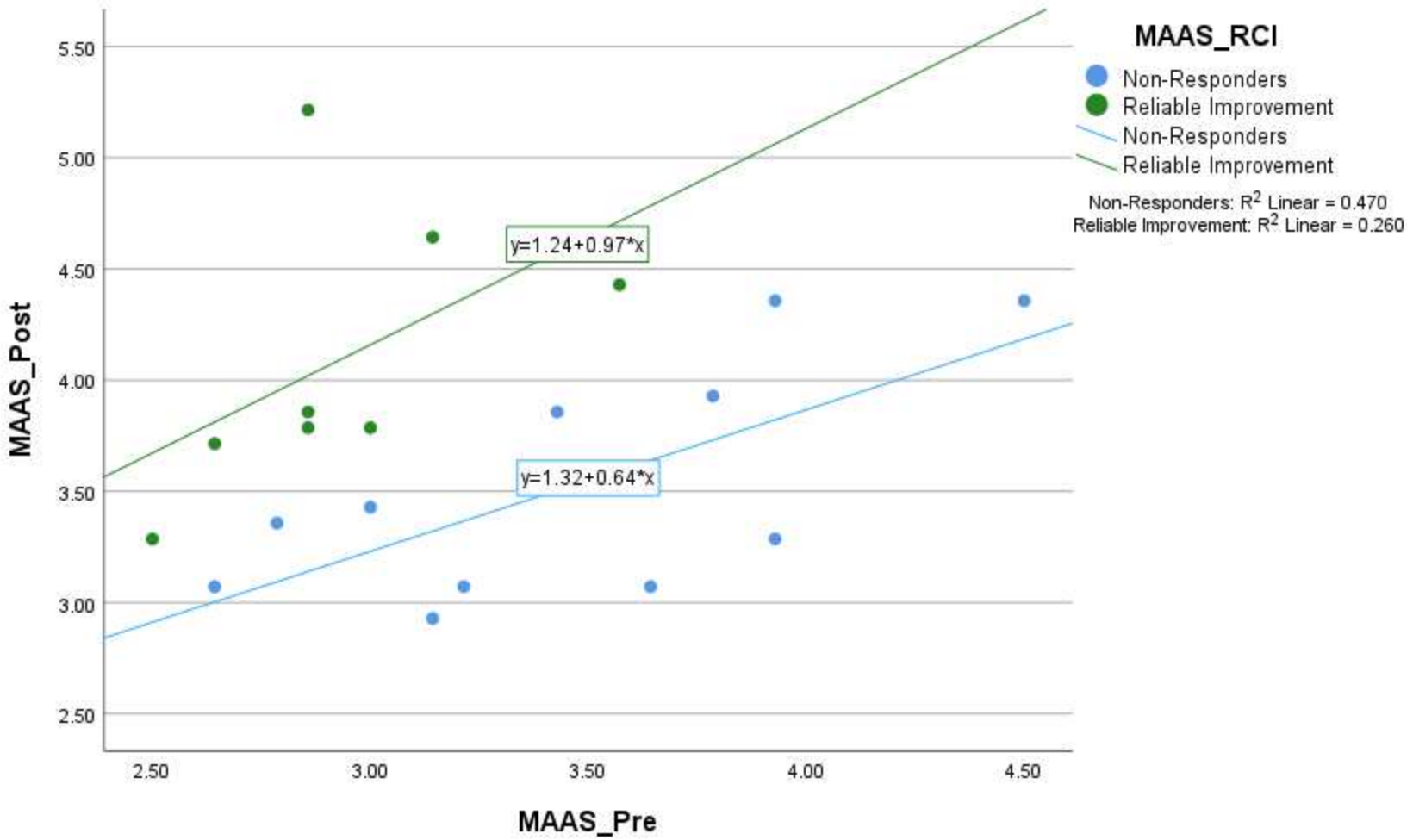


***Figure 15.*** LGBQ+ Mindfulness RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

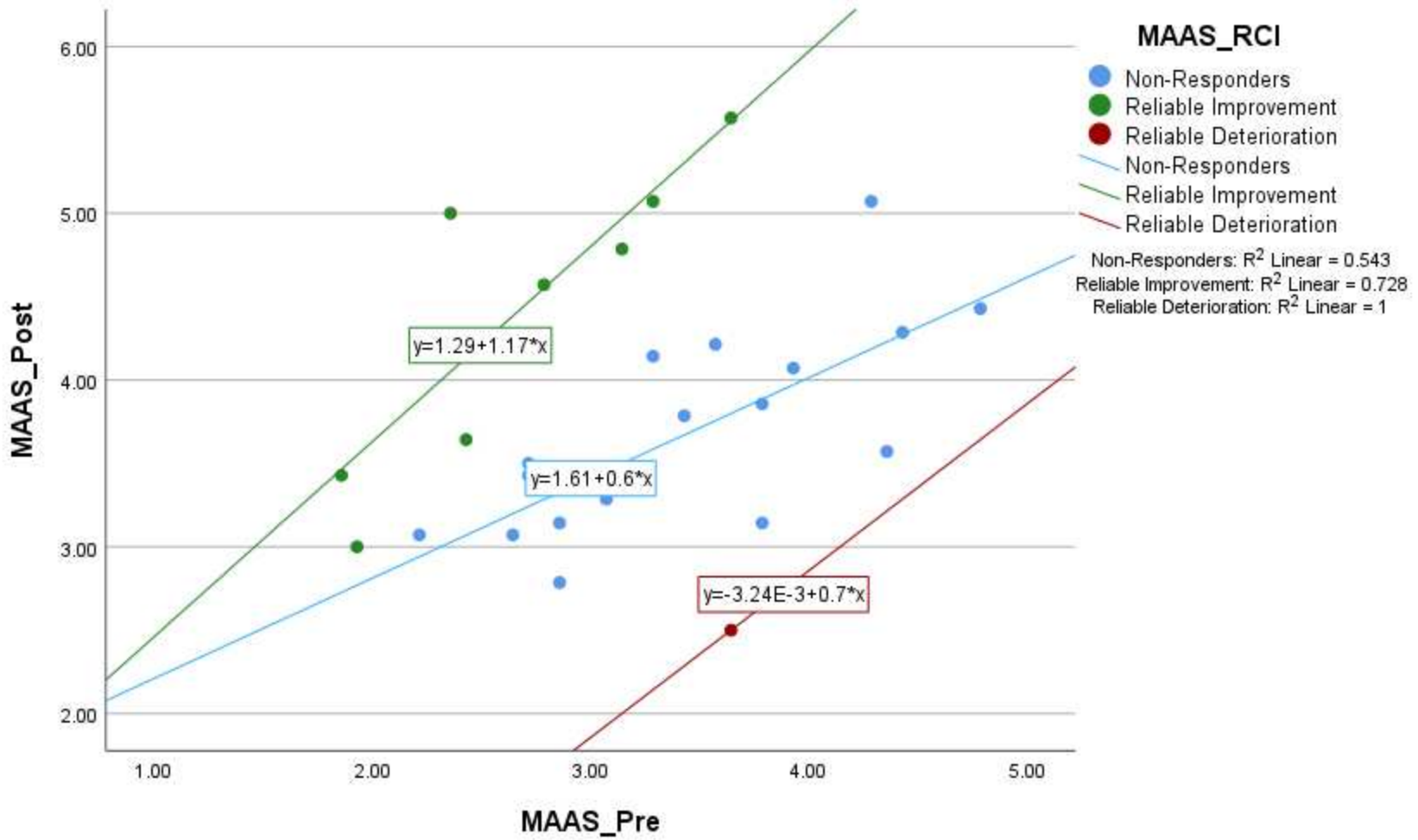


***Figure 16.*** Heterosexual Mindfulness RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

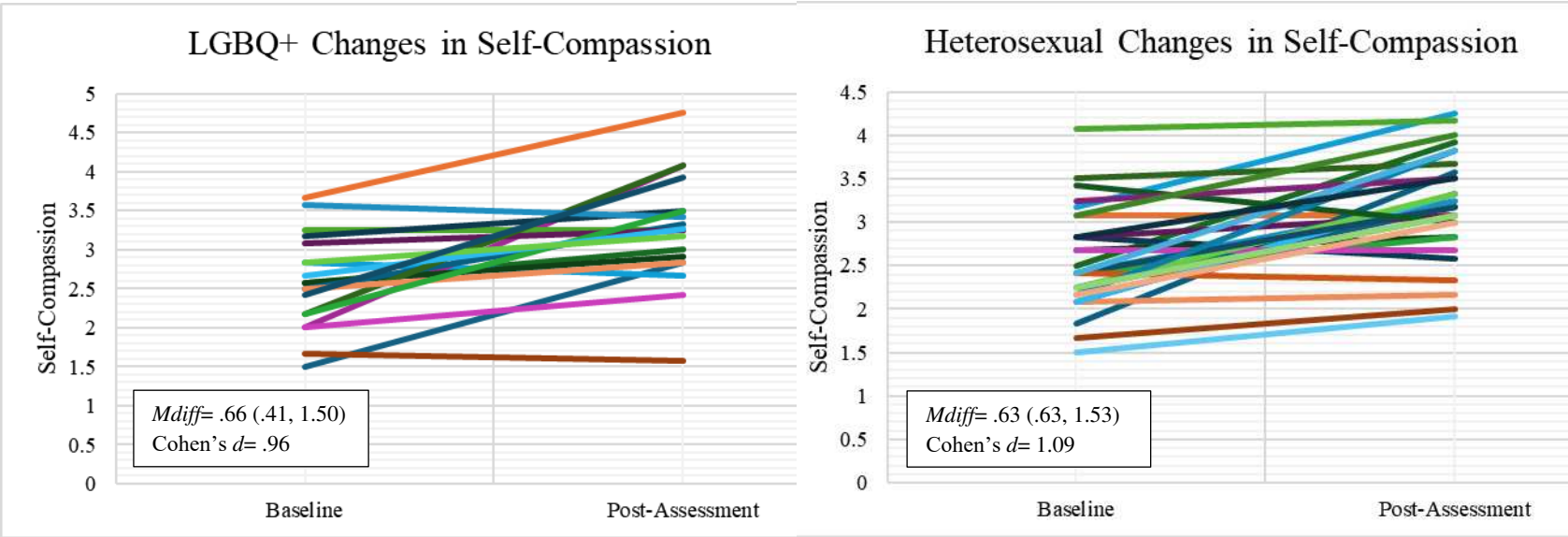


***Figure 17.*** Changes in Self-Compassion Scores based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

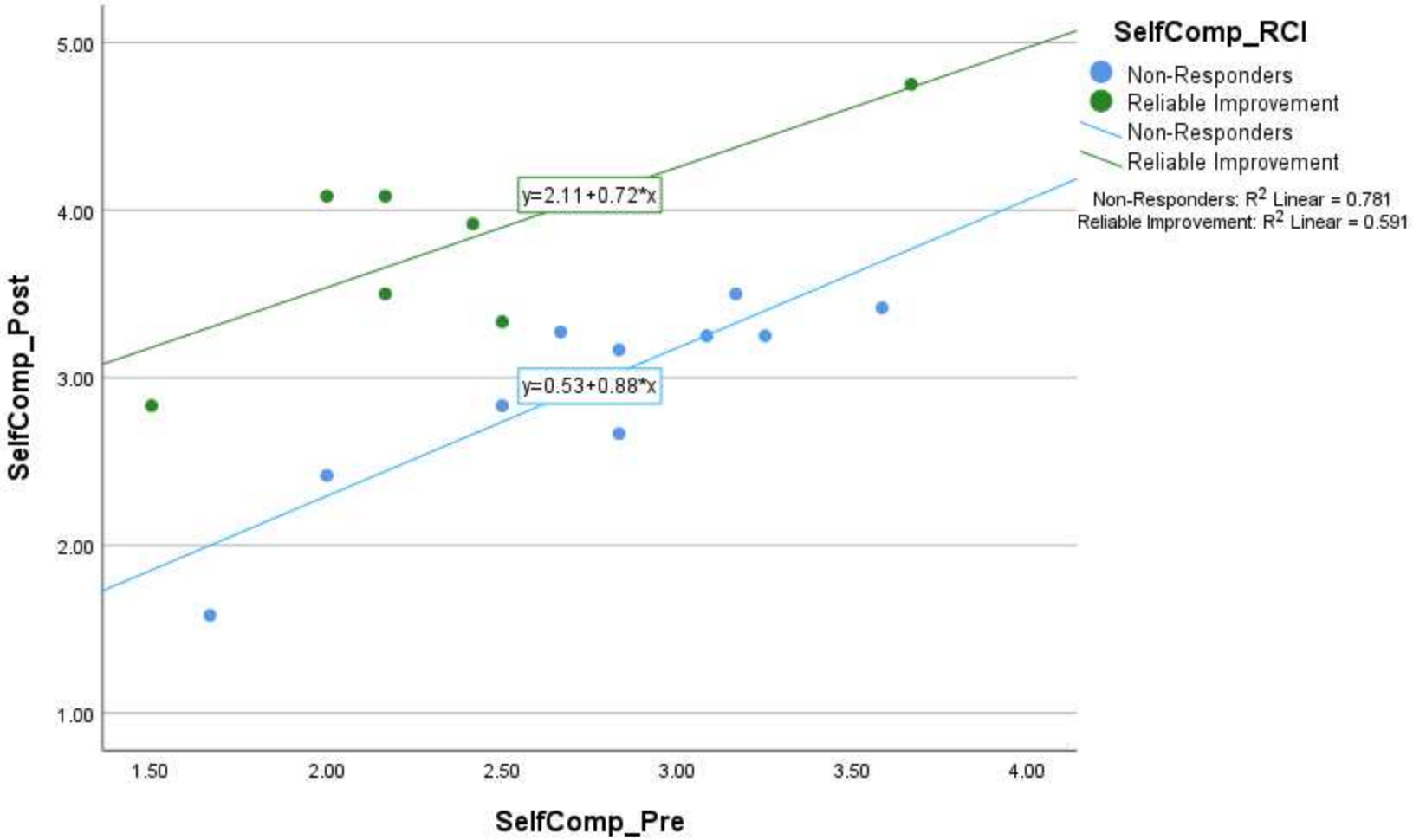


***Figure 18.*** LGBQ+ Self-Compassion RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

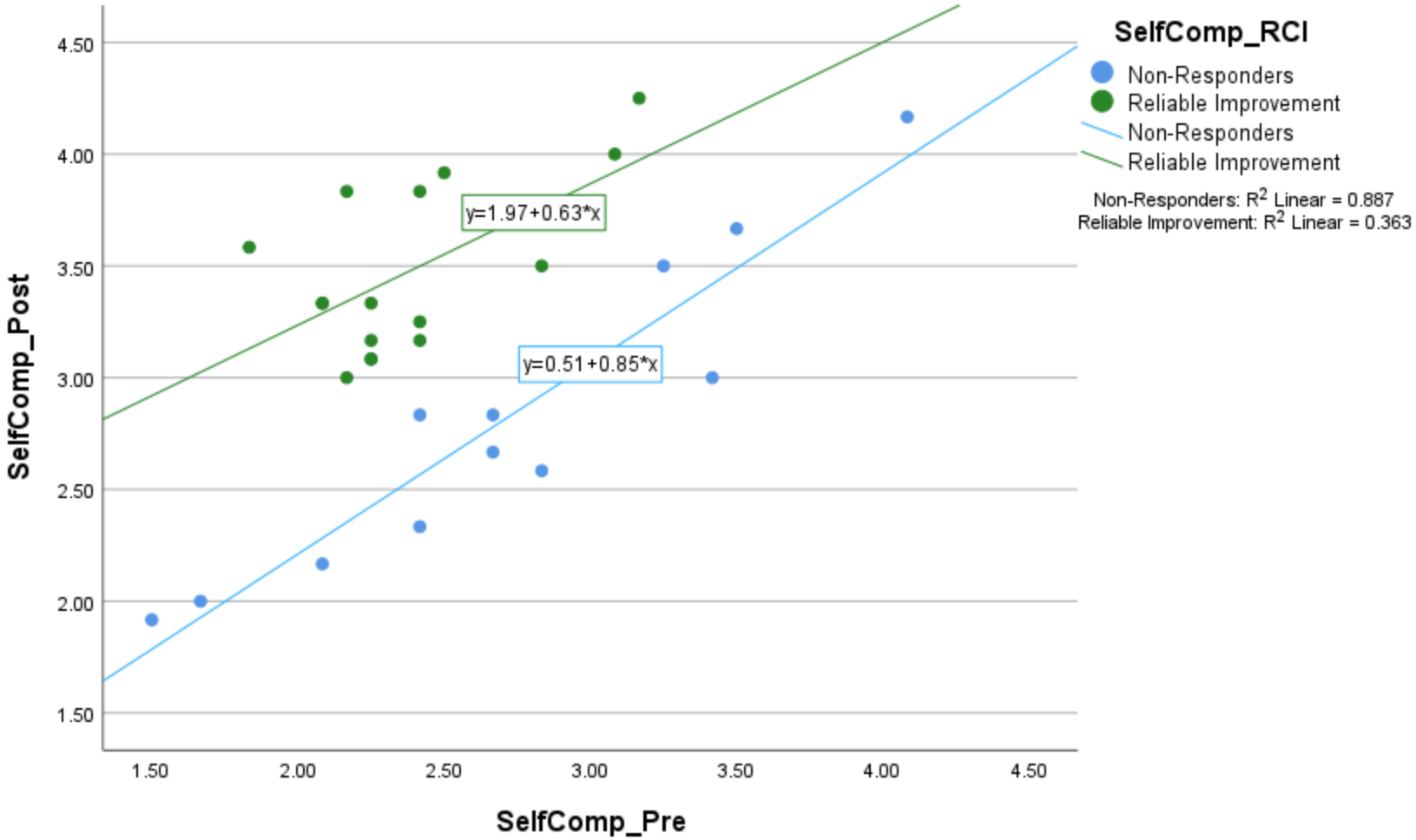


***Figure 19.*** Heterosexual Self-Compassion RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

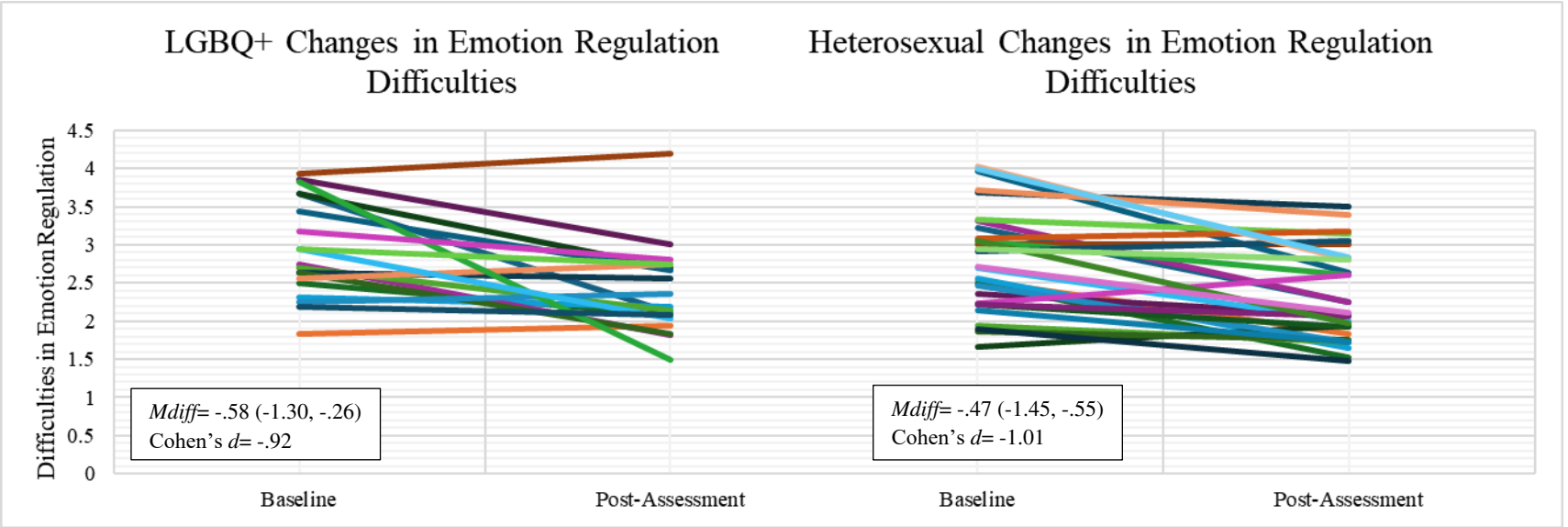


***Figure 20.*** Changes in Difficulties in Emotion Regulation Scores based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

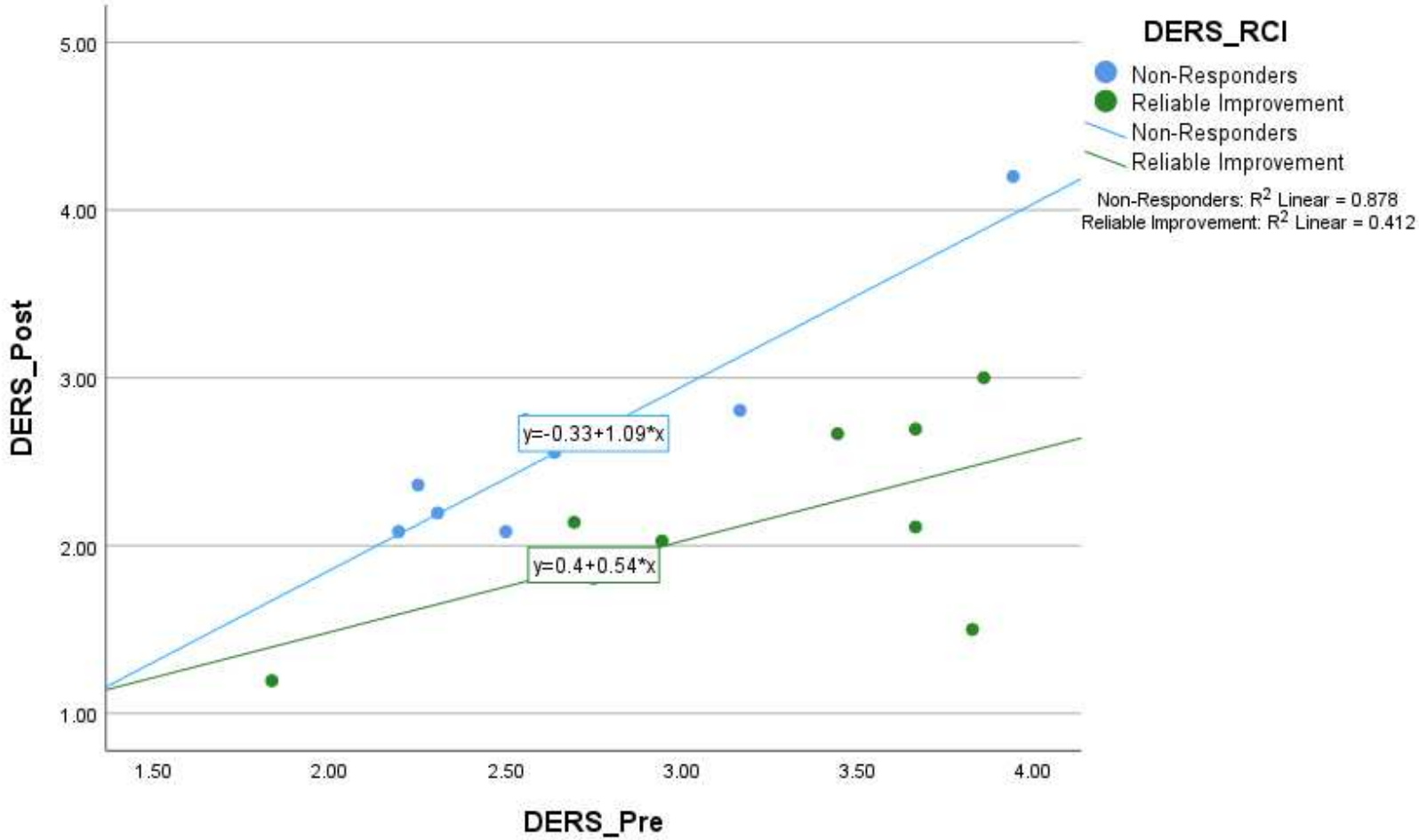


***Figure 21.*** LGBQ+ Difficulties in Emotion Regulation RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score $\geq +$ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

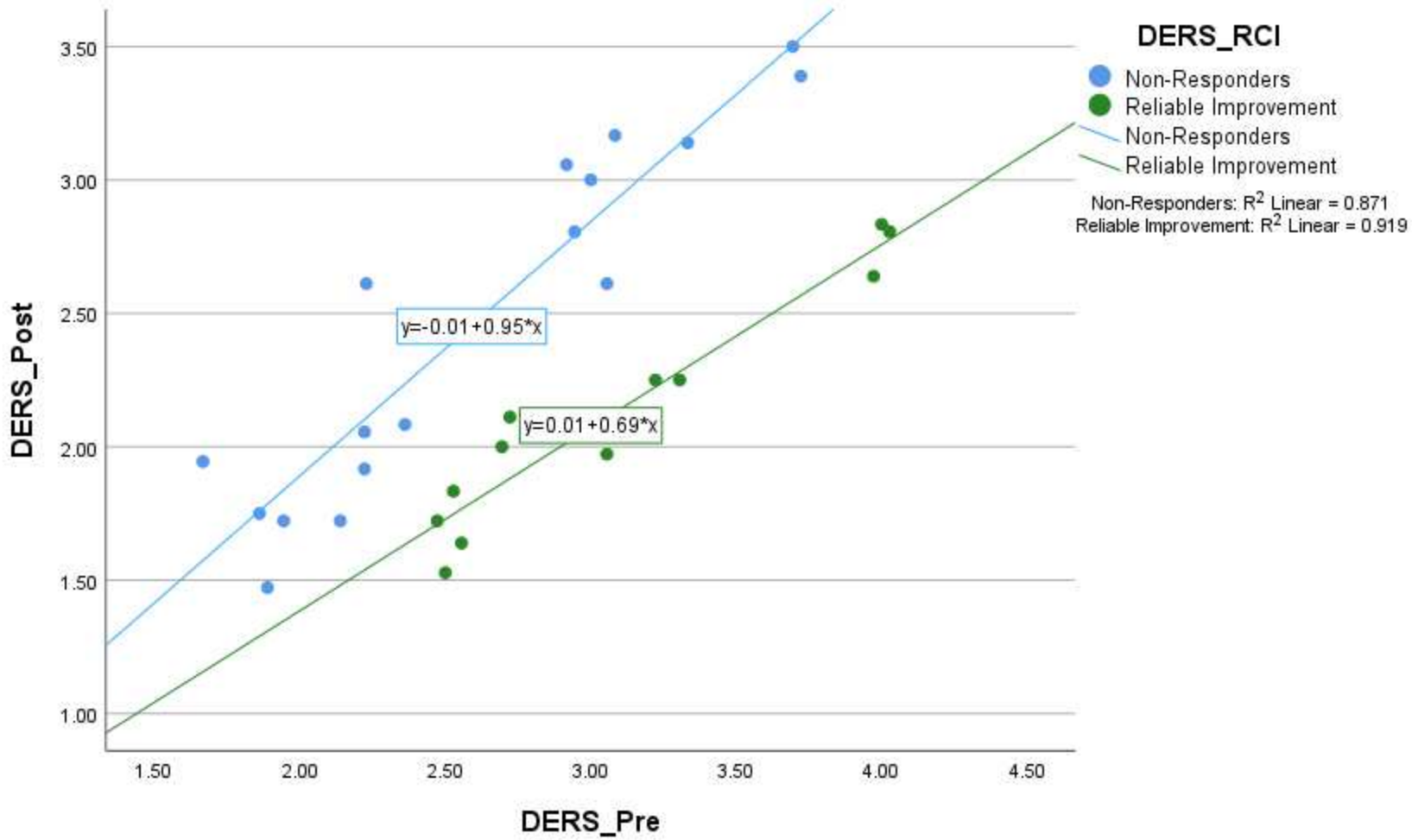


***Figure 22.*** Heterosexual Difficulties in Emotion Regulation RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

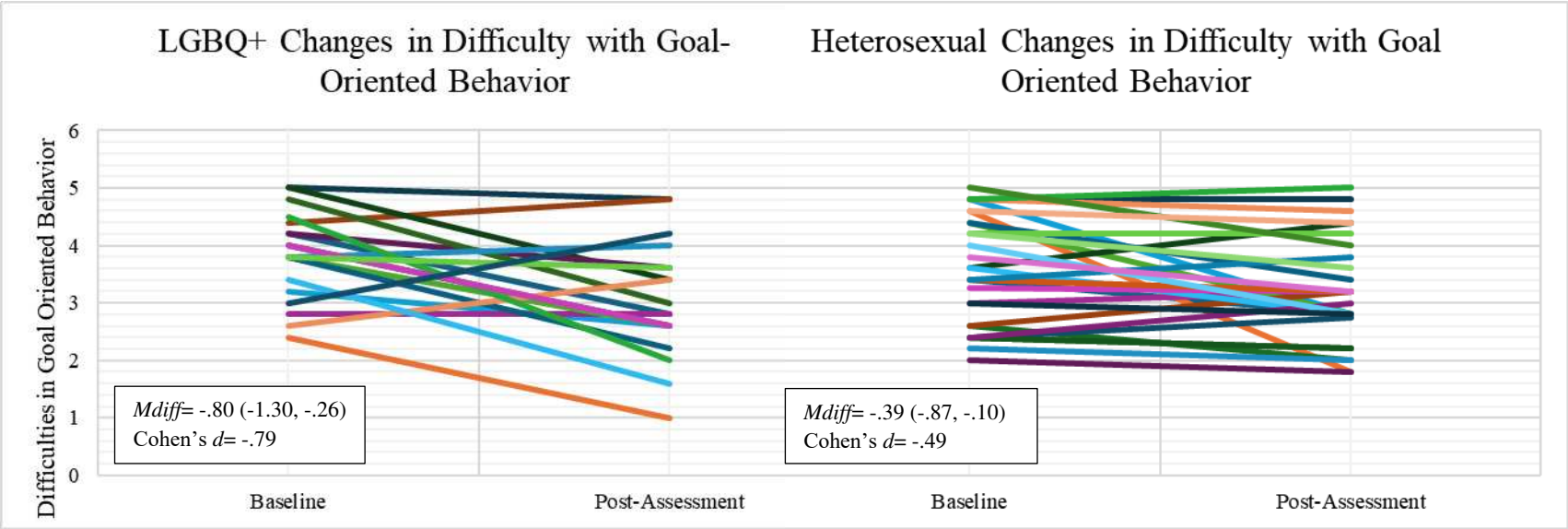


***Figure 23.*** Changes in Difficulty with Goal-Oriented Behavior Scores based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

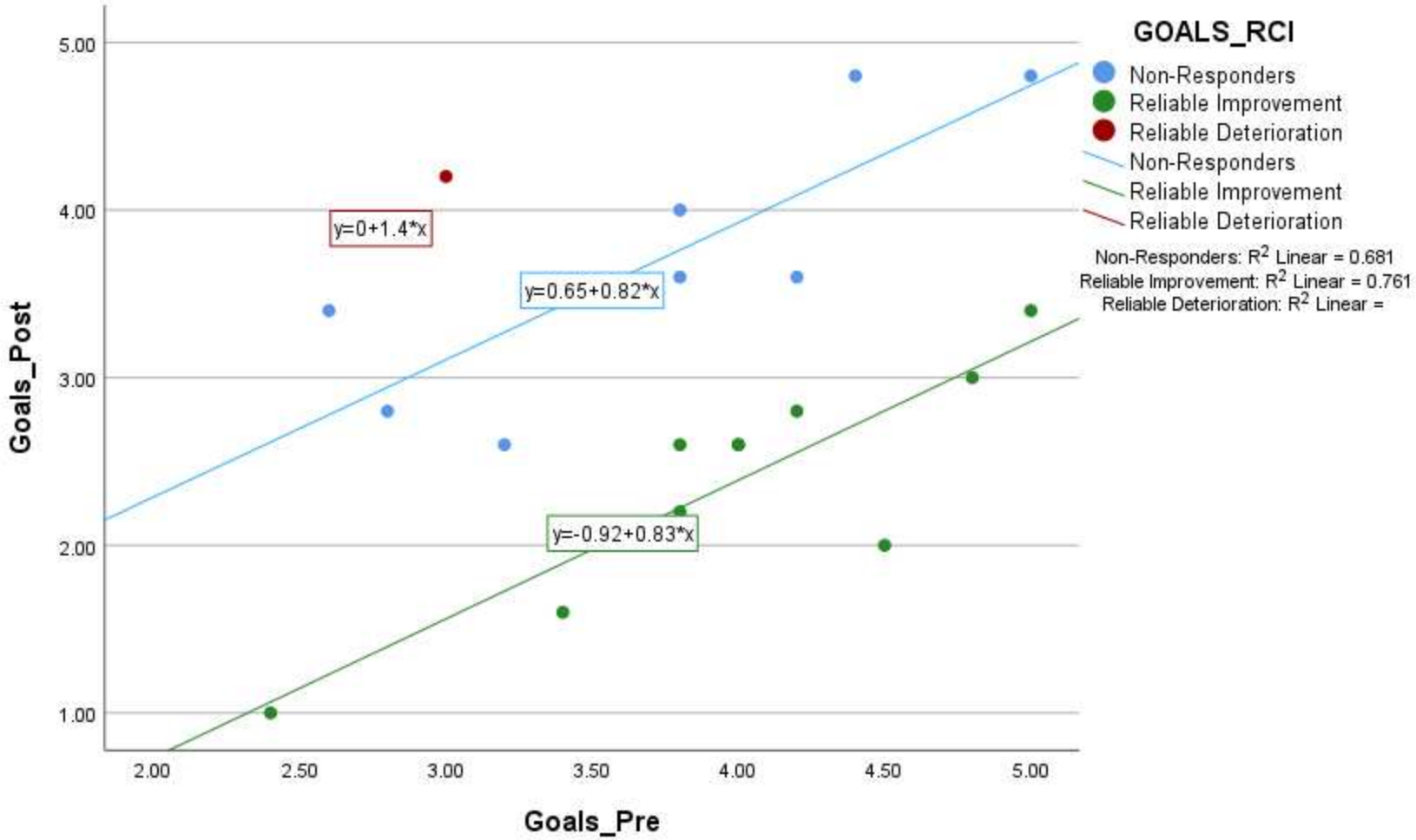


***Figure 24.*** LGBQ+ Difficulty with Goal-Oriented Behavior RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

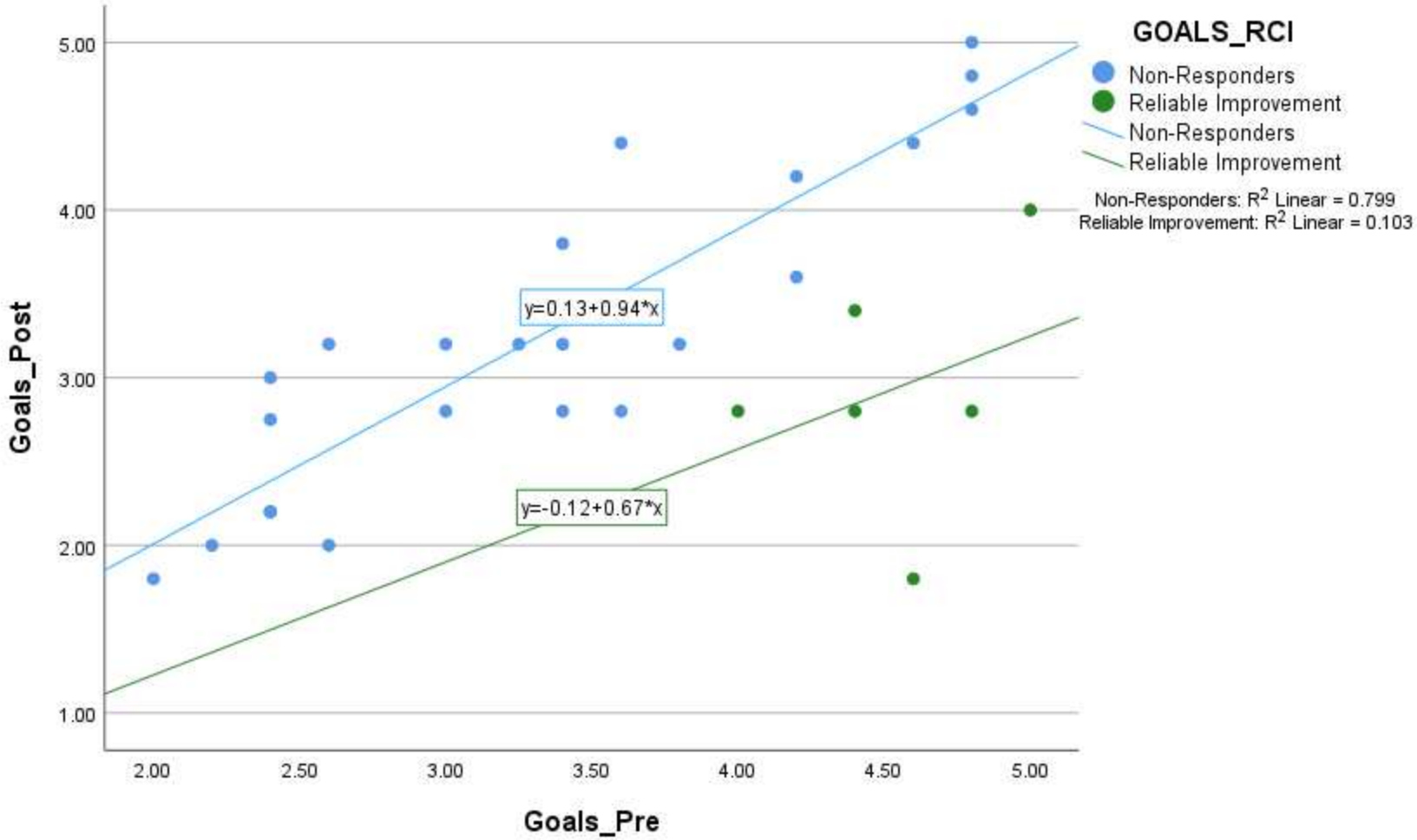


***Figure 25.*** Heterosexual Difficulty with Goal-Oriented Behavior RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score $\geq +$ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

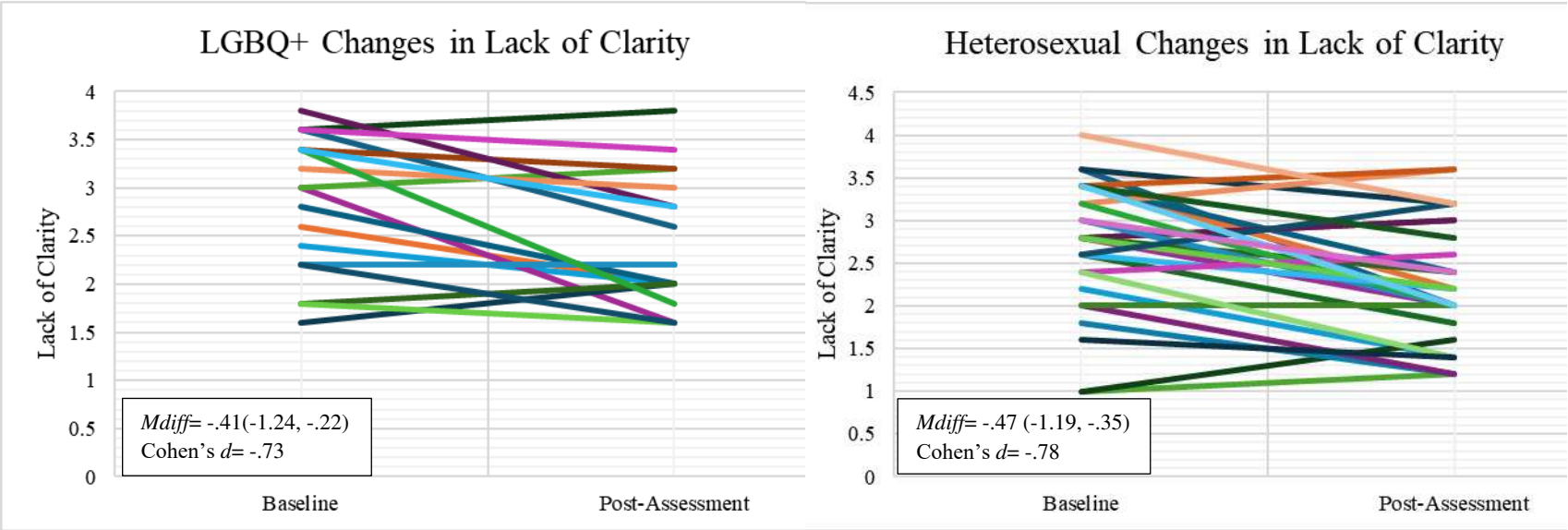


***Figure 26.*** Changes in Lack of Clarity Scores based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

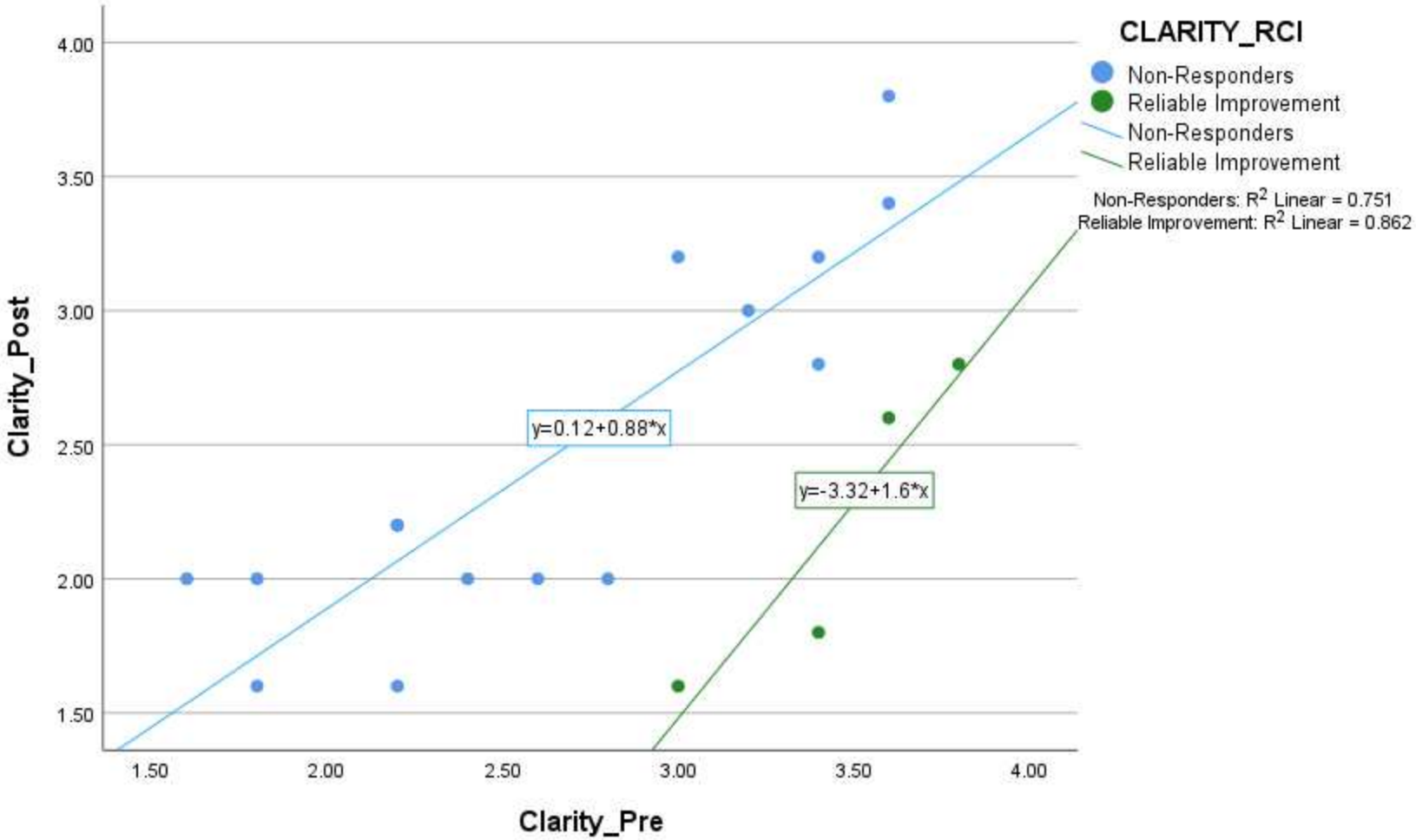


***Figure 27.***

LGBQ+ Lack of Clarity RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

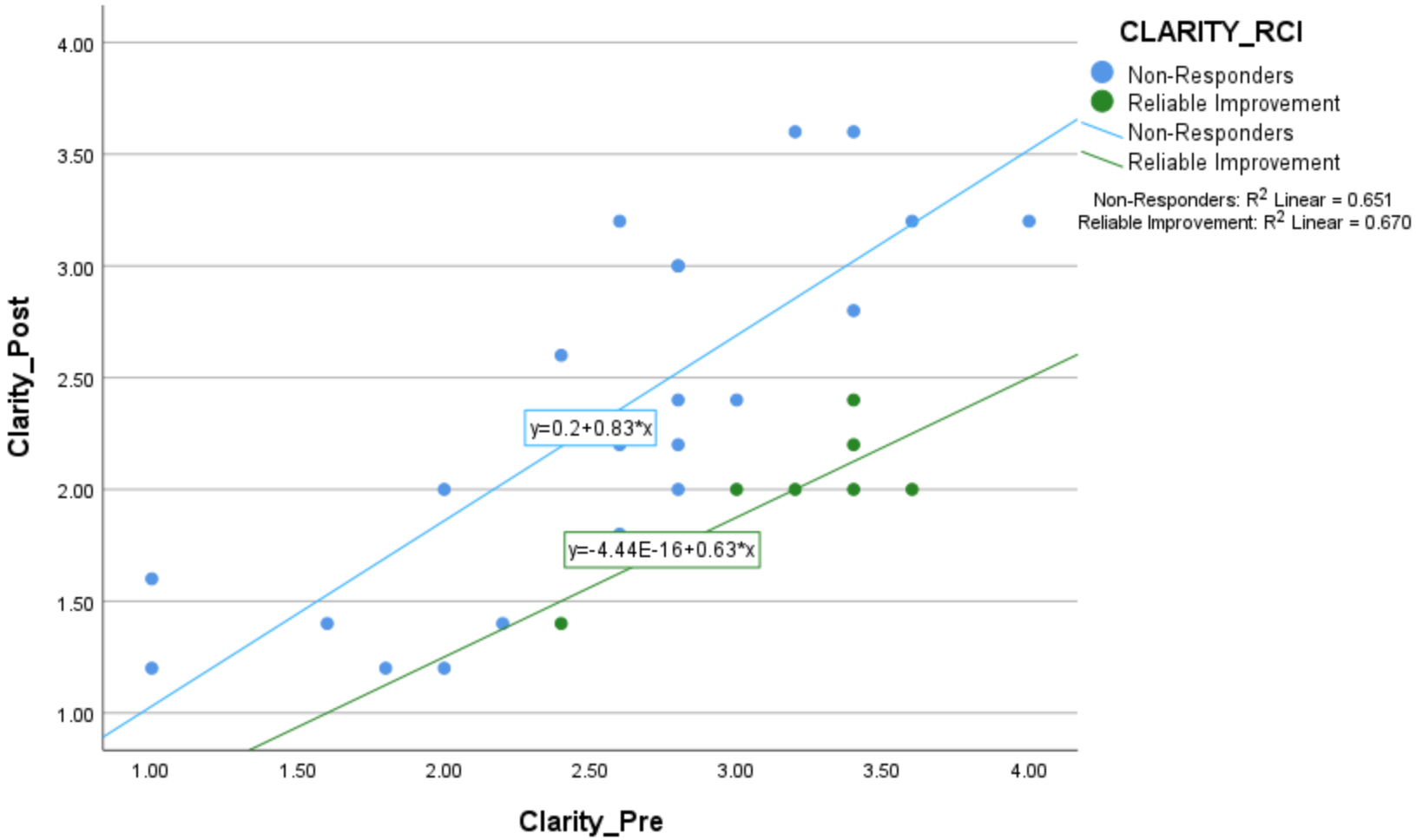


***Figure 28.*** Heterosexual Lack of Clarity RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

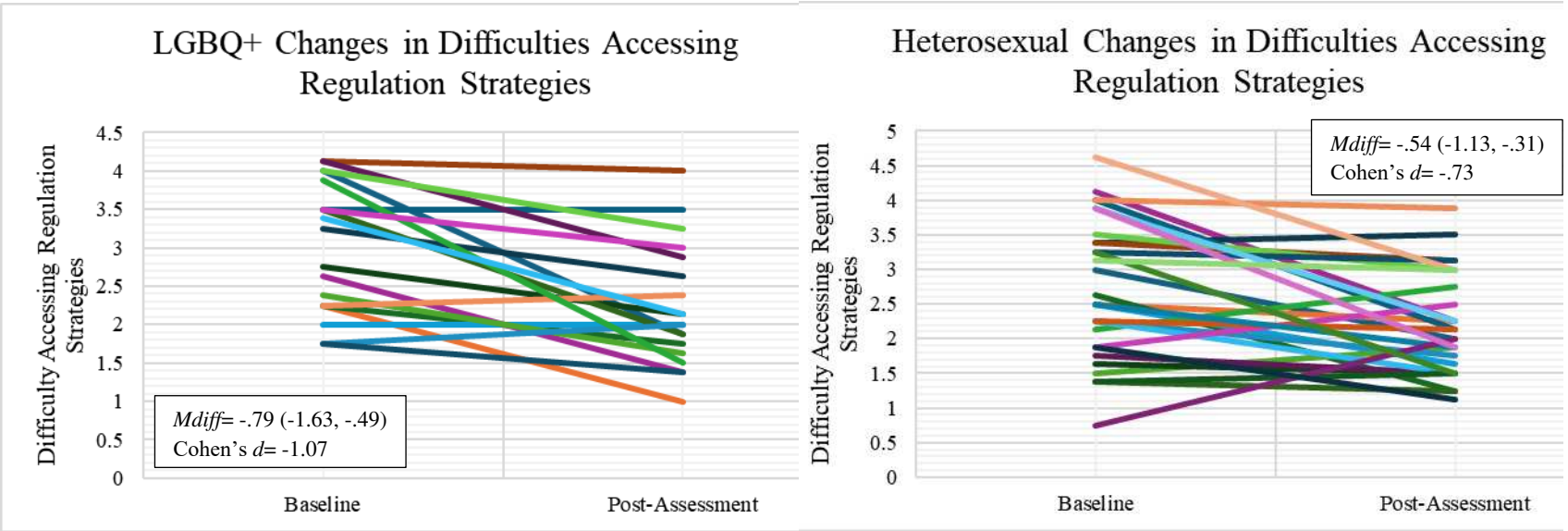


***Figure 29.*** Changes in Difficulty in Accessing Regulation Strategies Scores based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

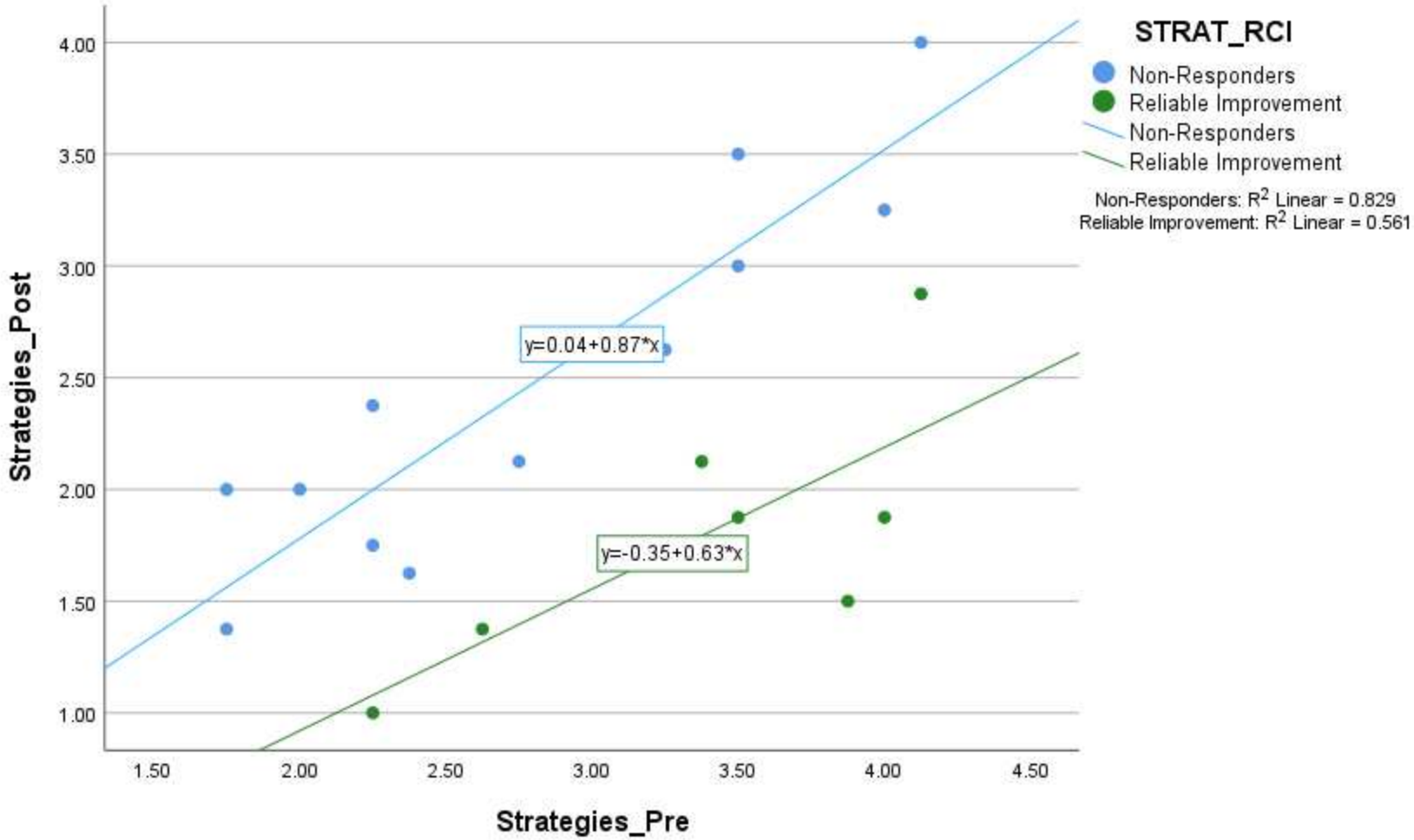


***Figure 30.*** LGBQ+ Difficulty Accessing Regulation Strategies RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score $\geq +$ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

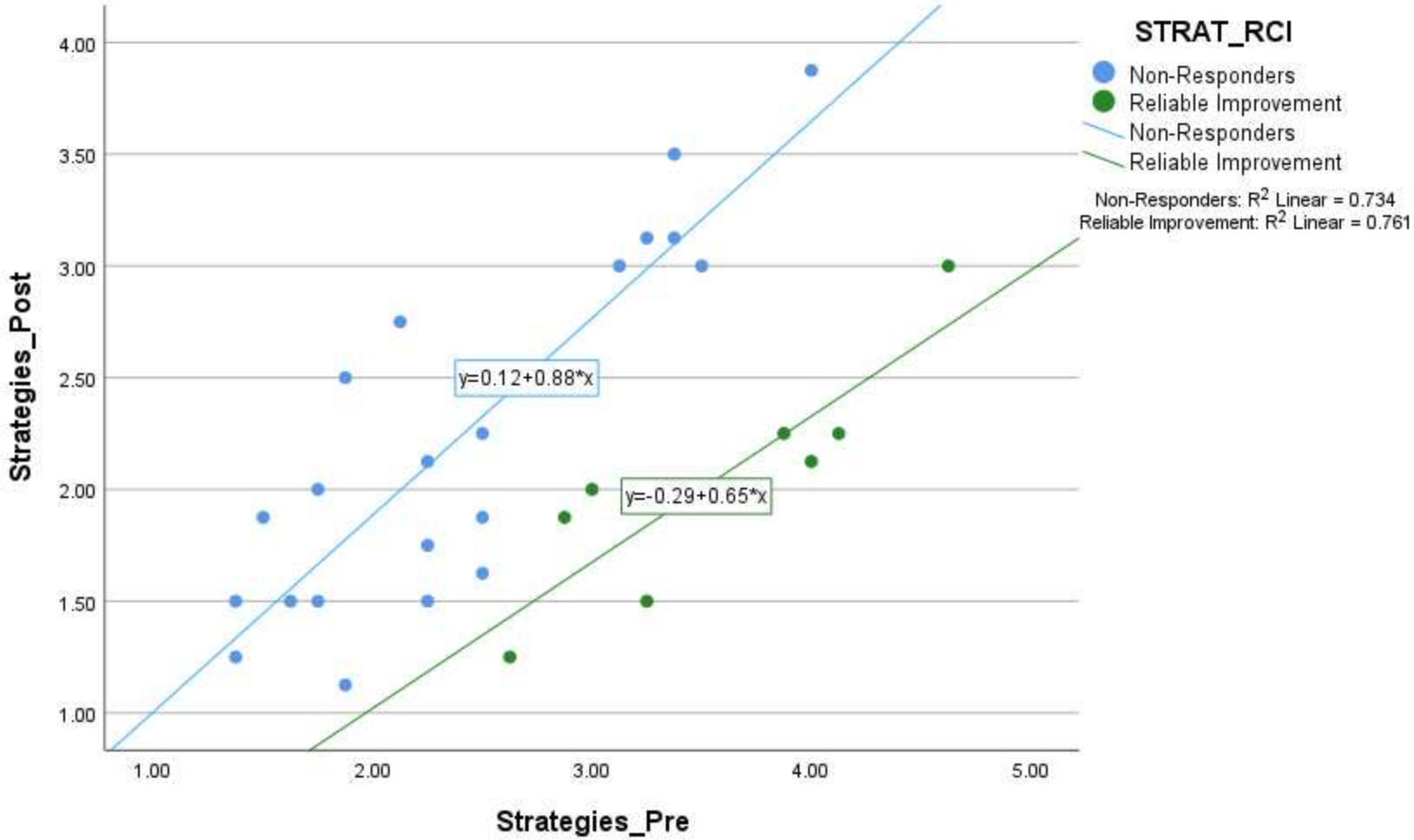


***Figure 31.*** Heterosexual Difficulty Accessing Regulation Strategies RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

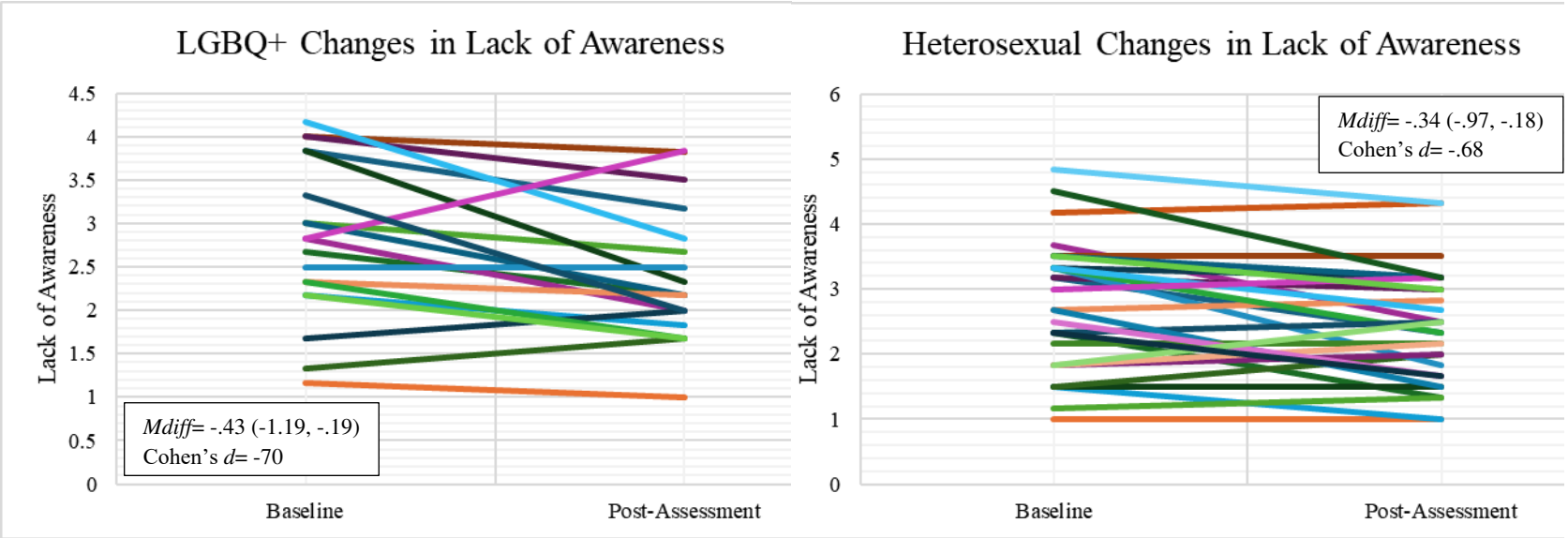


***Figure 32.*** Changes in Lack of Awareness Scores based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

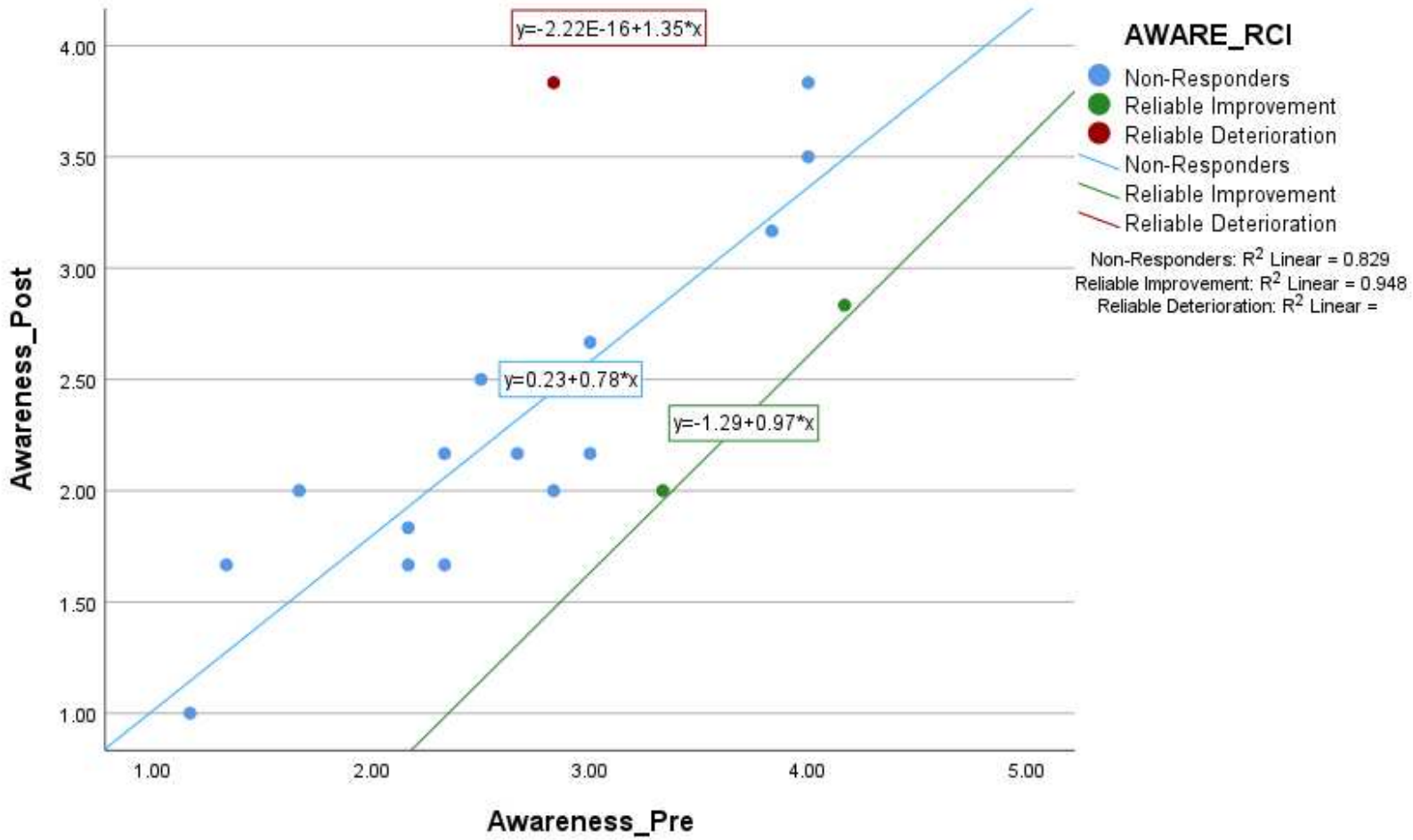


***Figure 33.*** LGBQ+ Lack of Awareness RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

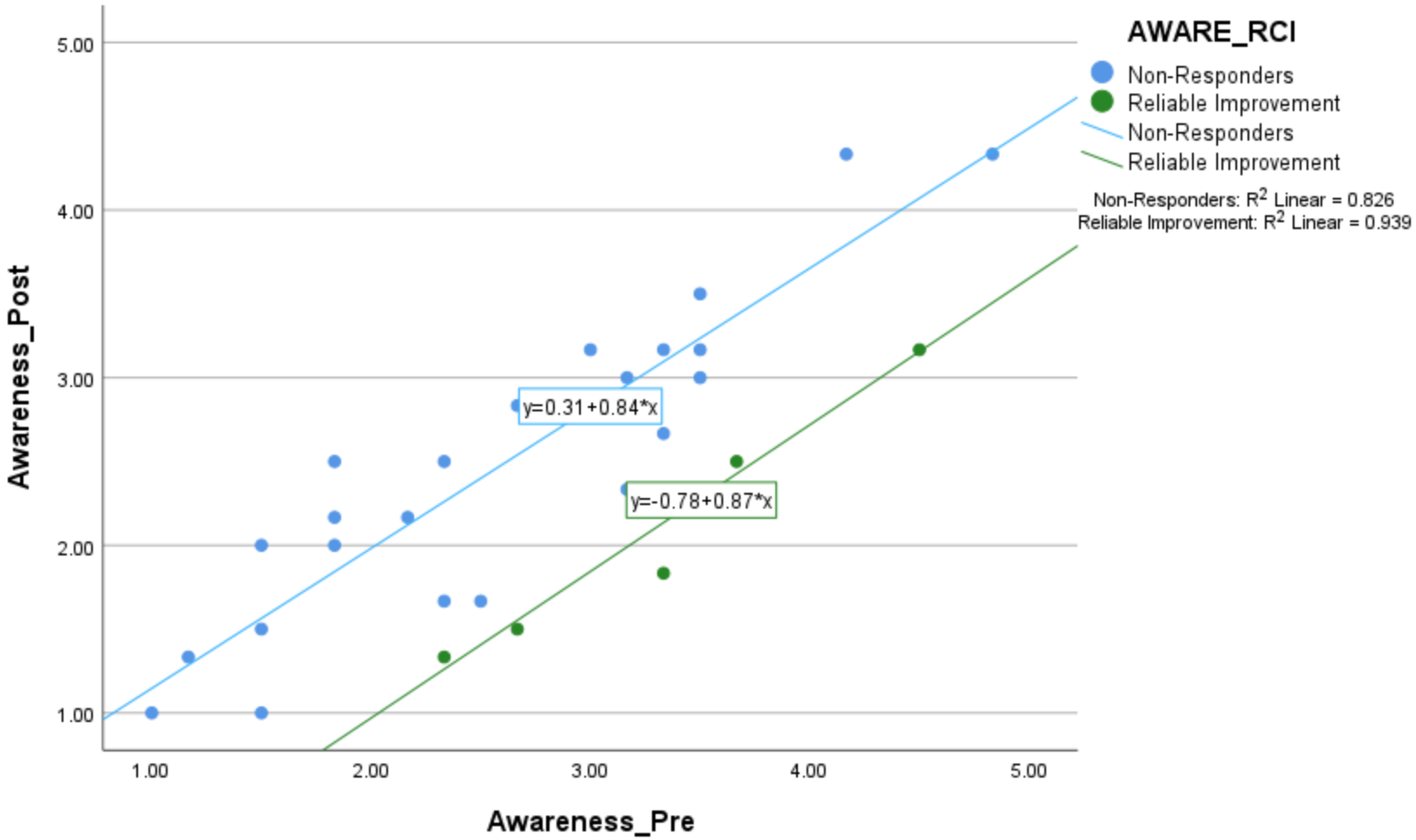


***Figure 34.*** Heterosexual Lack of Awareness RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

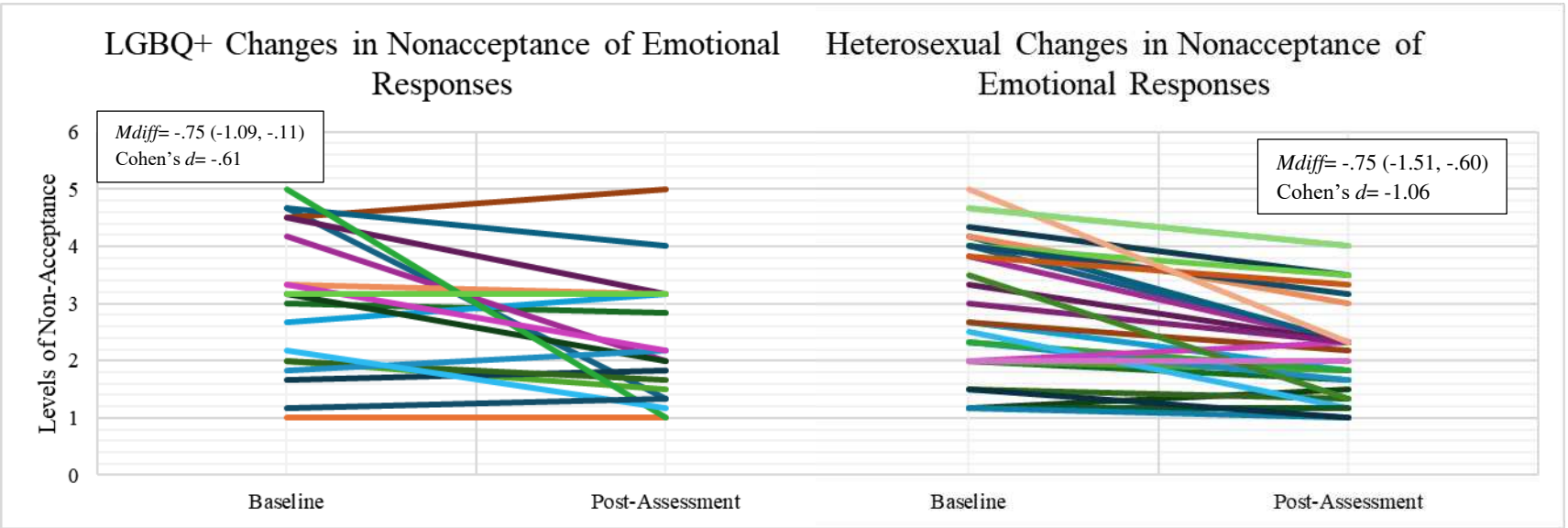


***Figure 35.*** Changes in Non-Acceptance of Emotional Responses Scores based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

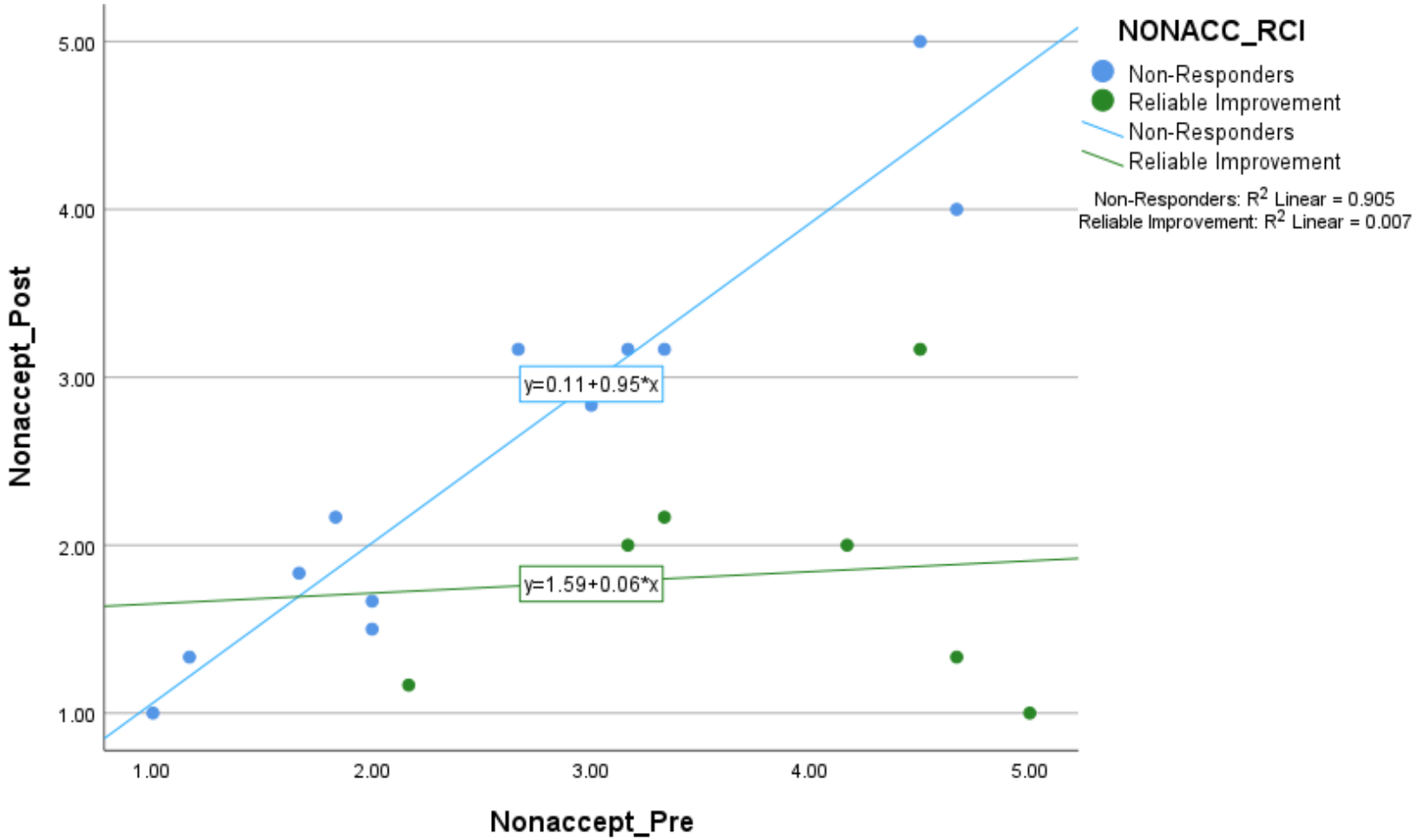


***Figure 36.*** LGBQ+ Non-Acceptance of Emotional Responses RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

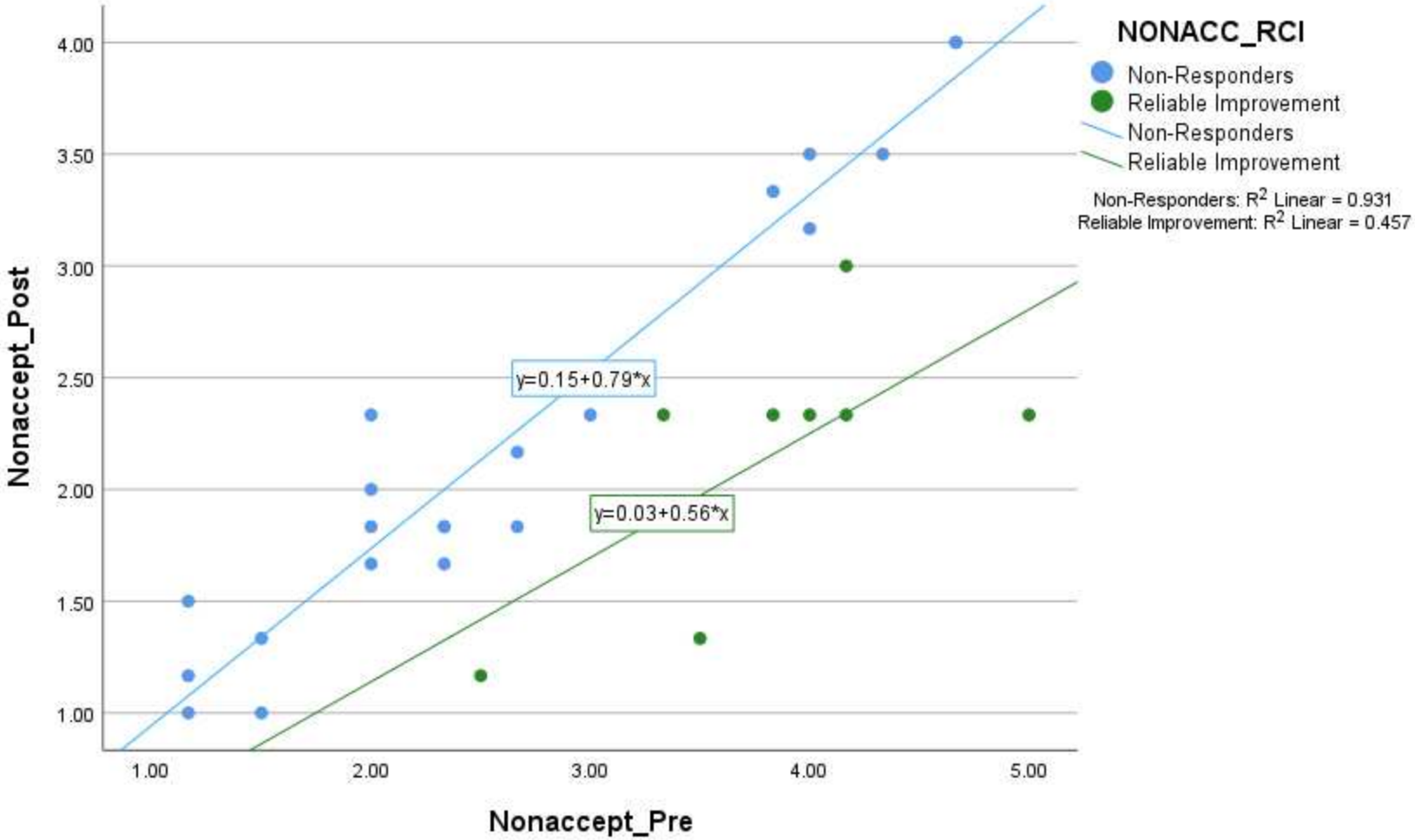


***Figure 37.*** Heterosexual Non-Acceptance of Emotional Responses RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

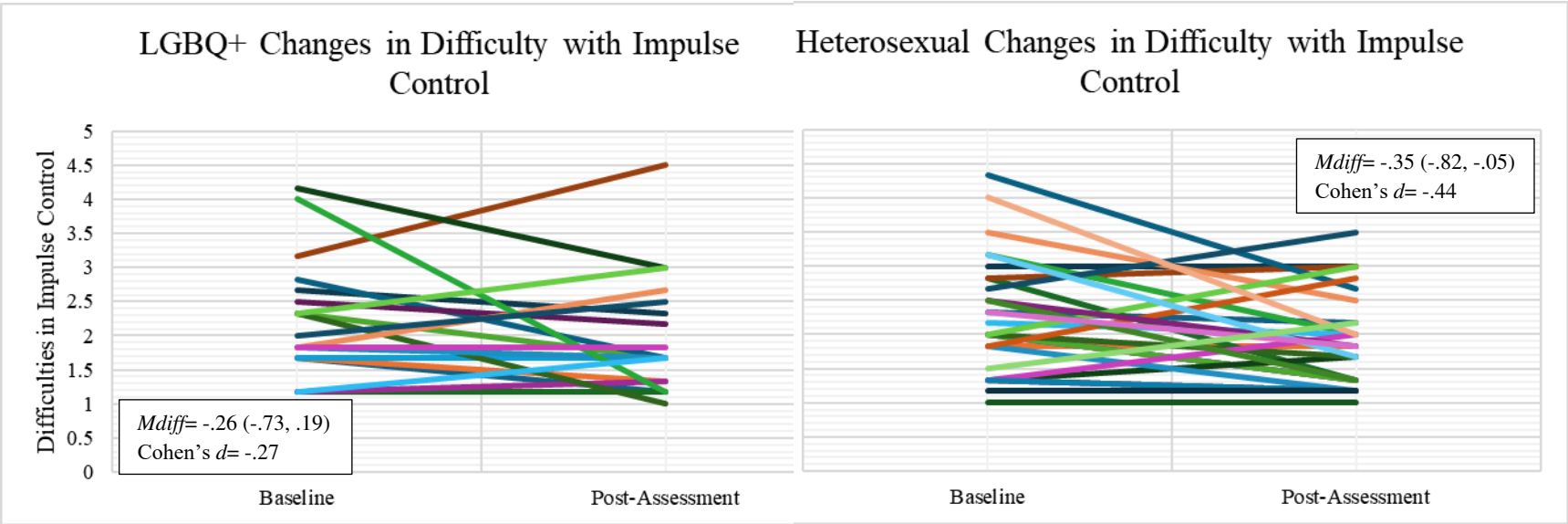


***Figure 38.*** Changes in Difficulty with Impulse Control Scores based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

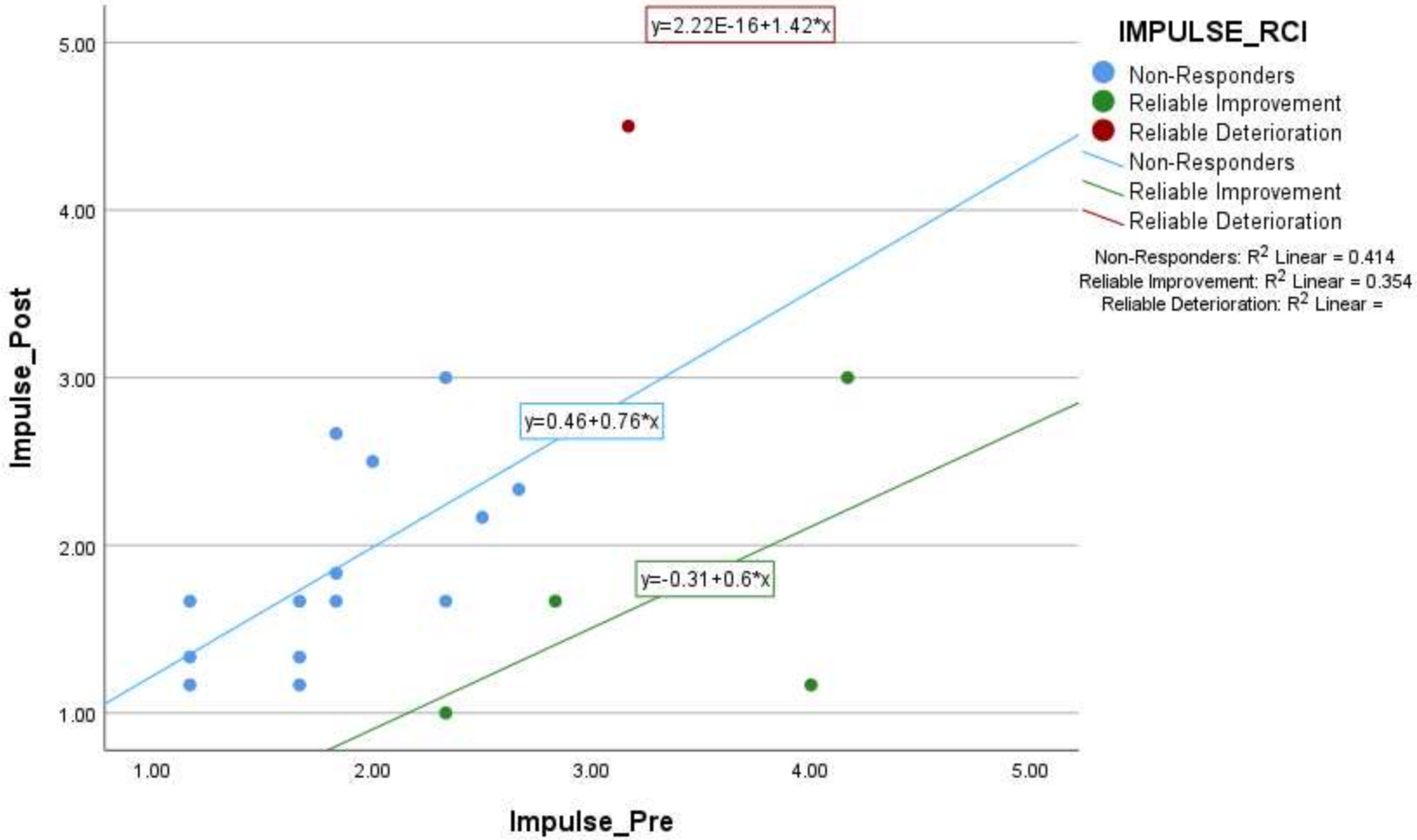


***Figure 39.*** LGBQ+ Difficulty with Impulse Control RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

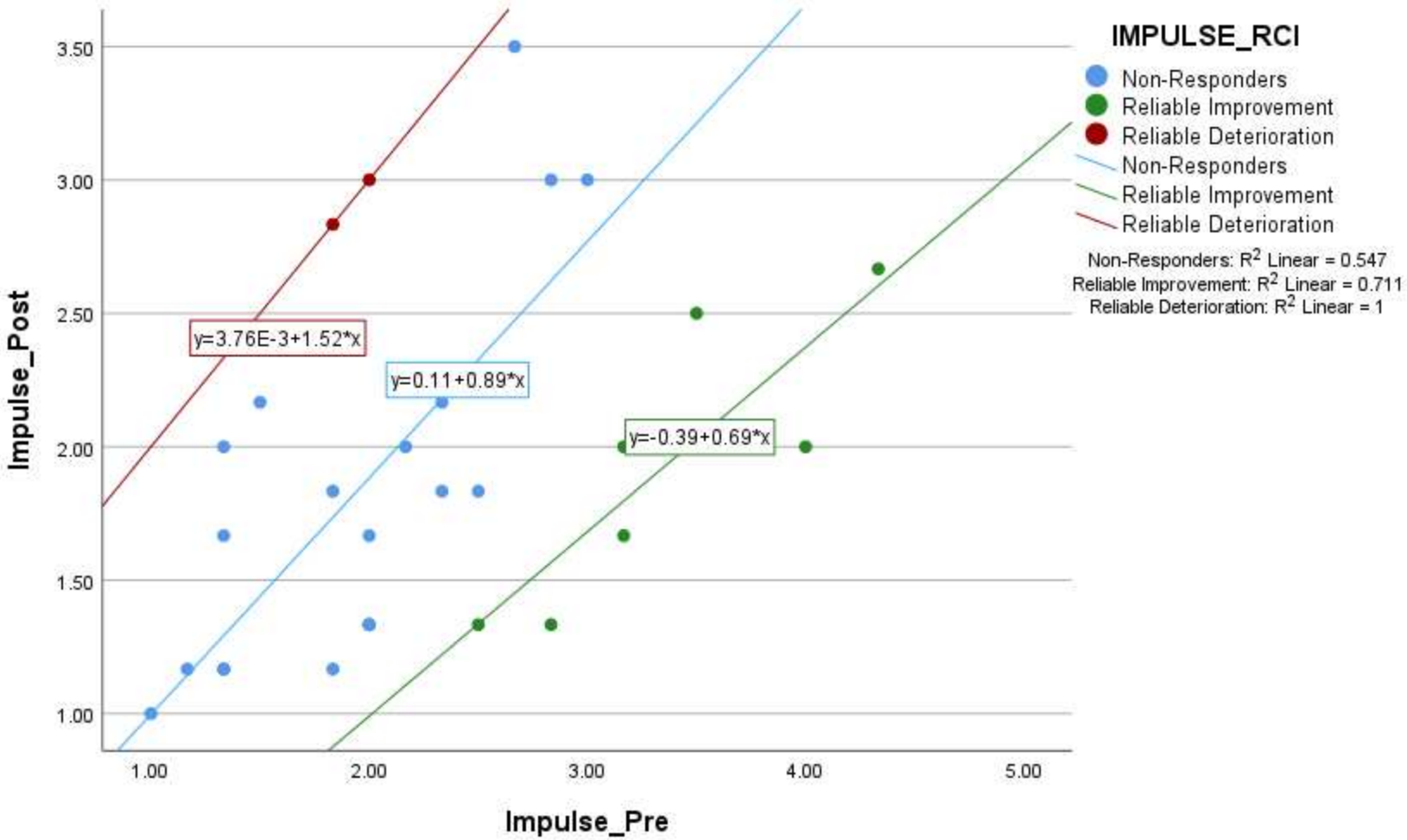


***Figure 40.*** Heterosexual Difficulty with Impulse Control RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

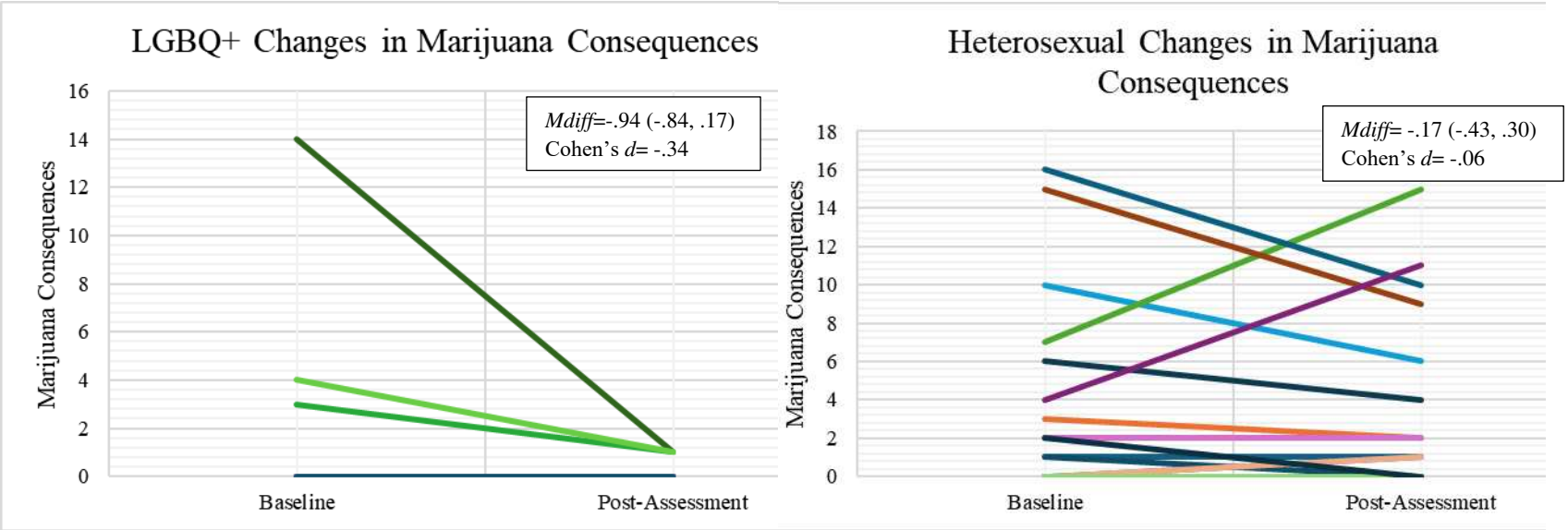


***Figure 41.*** Changes in Consequences of Marijuana Use Scores based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

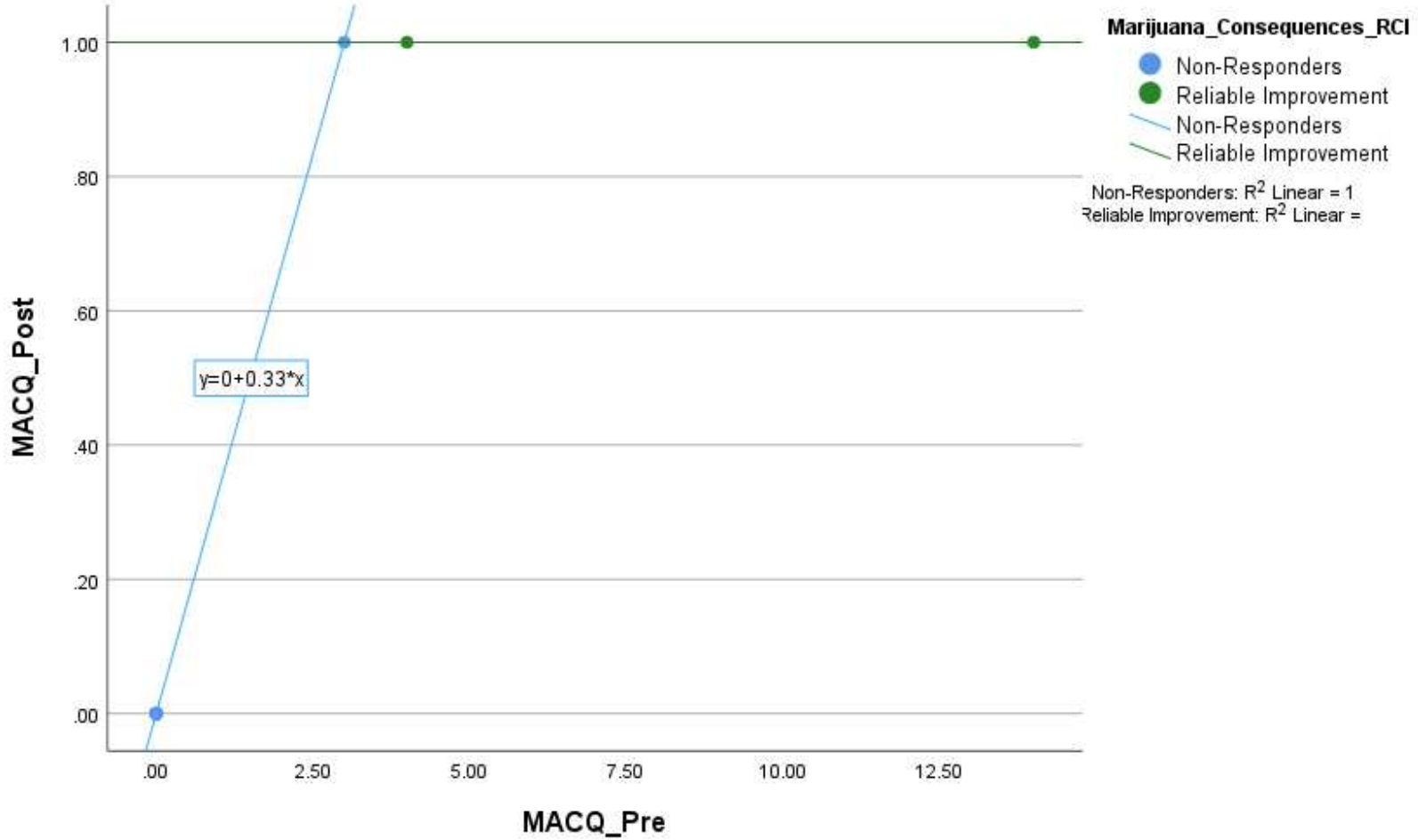


***Figure 42.*** LGBQ+ Consequences of Marijuana Use RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

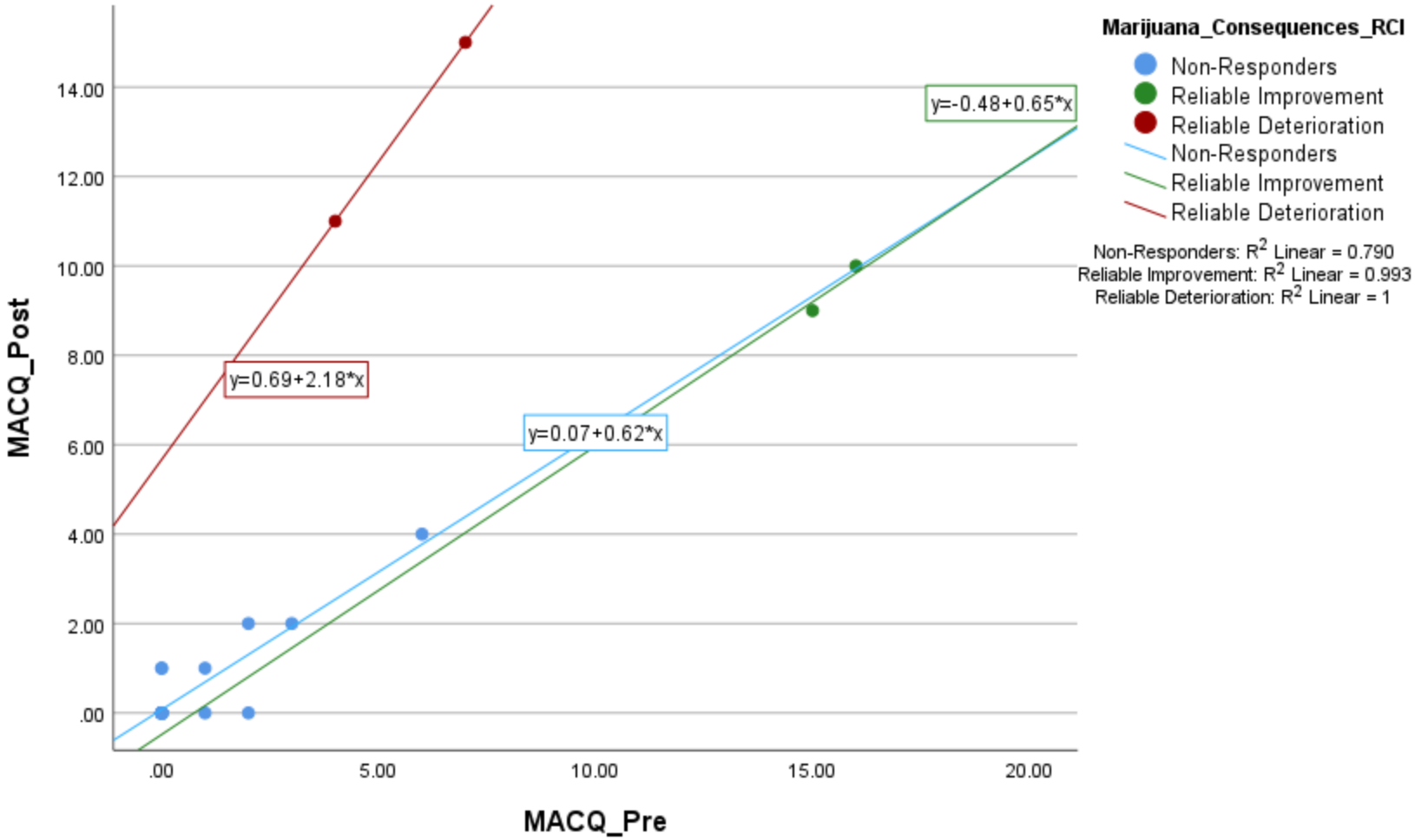


***Figure 43.*** Heterosexual Consequences of Marijuana Use RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

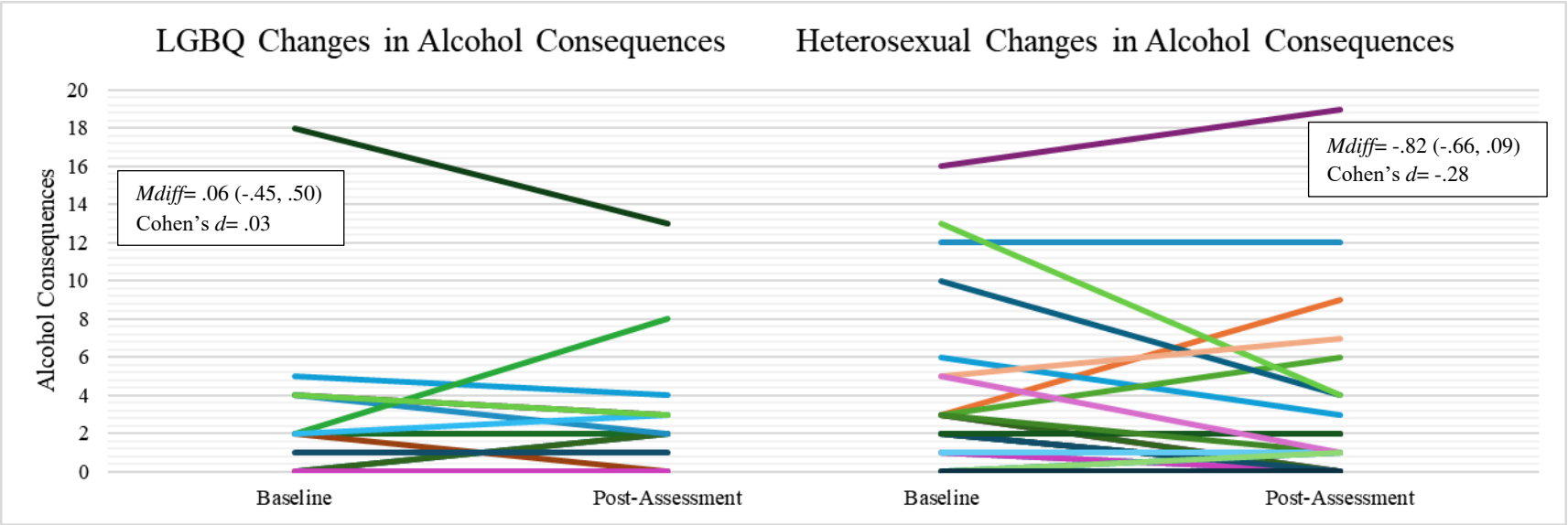


***Figure 44.*** Changes in Consequences of Alcohol Use Scores based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

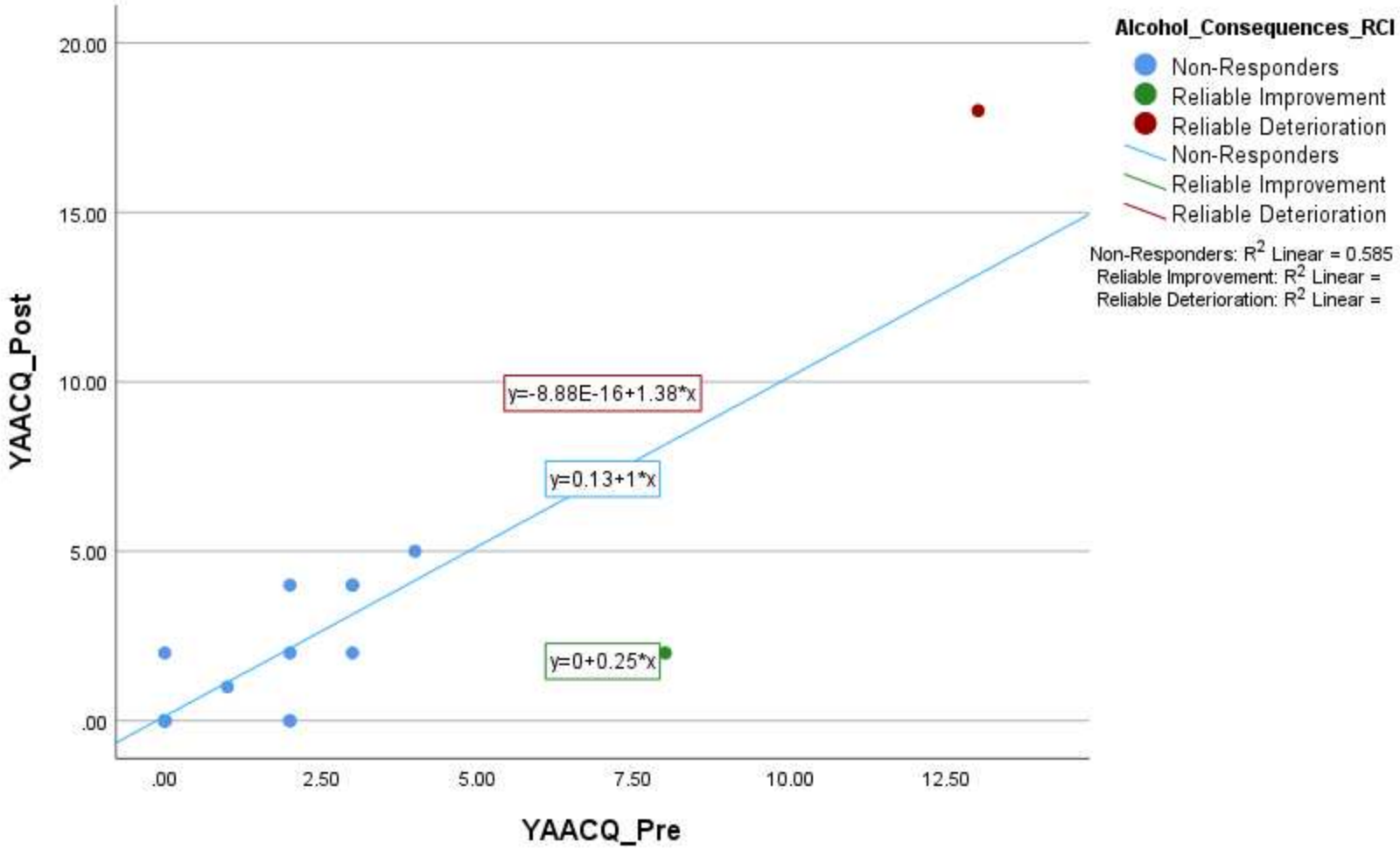


***Figure 45.*** LGBQ+ Consequences of Alcohol Use RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

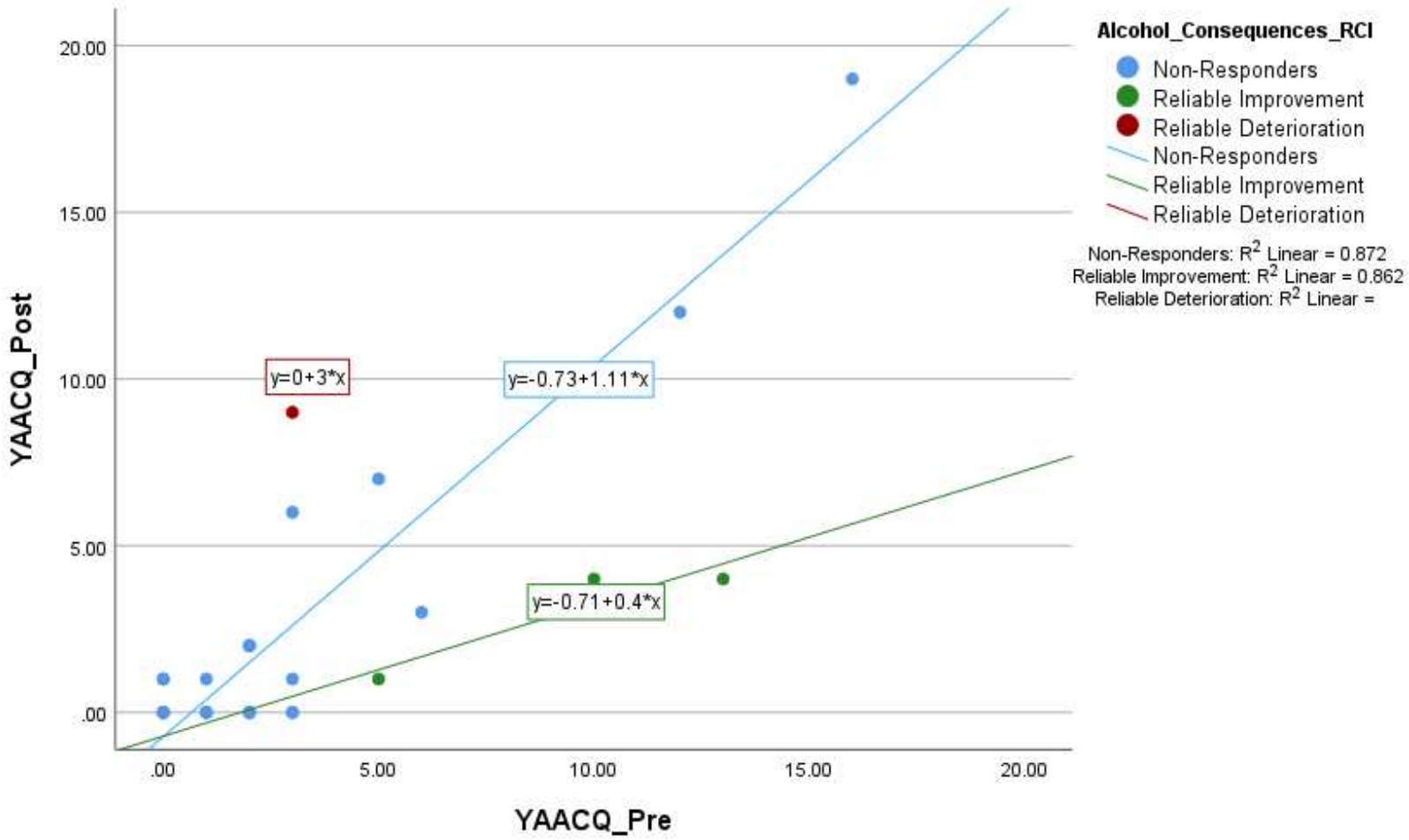


***Figure 46.*** Heterosexual Consequences of Alcohol Use RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score $\geq +$ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

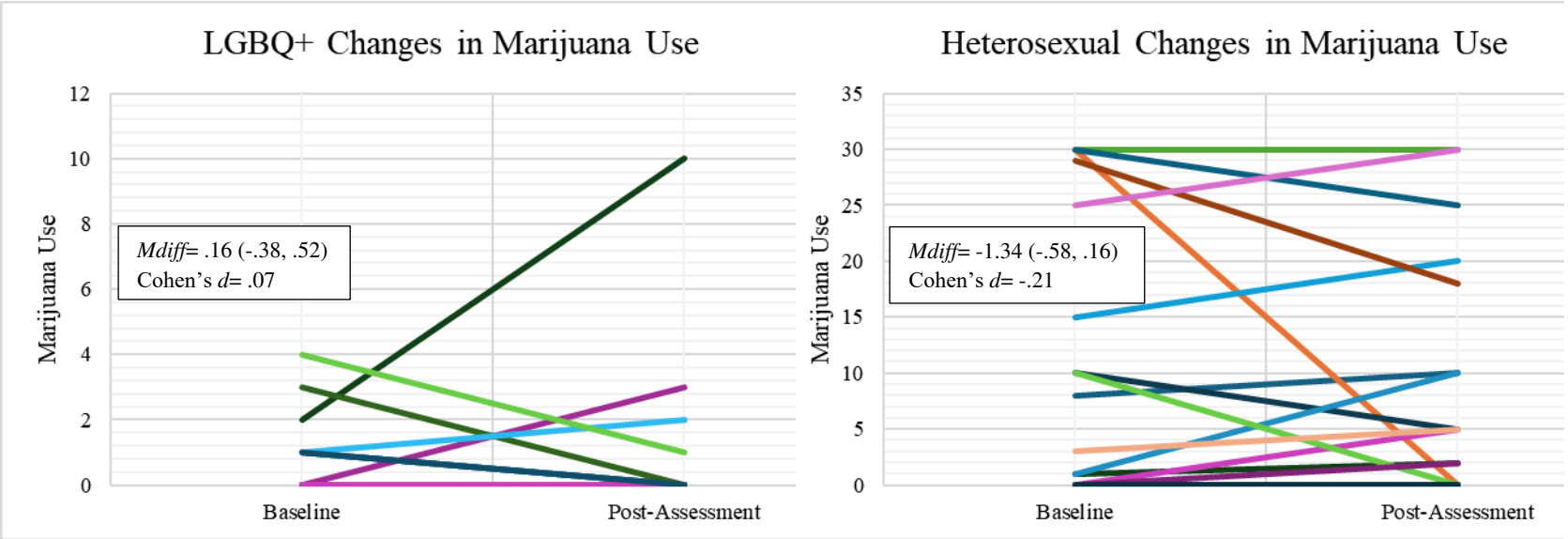


***Figure 47.*** Changes in Frequency of Marijuana Usage based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

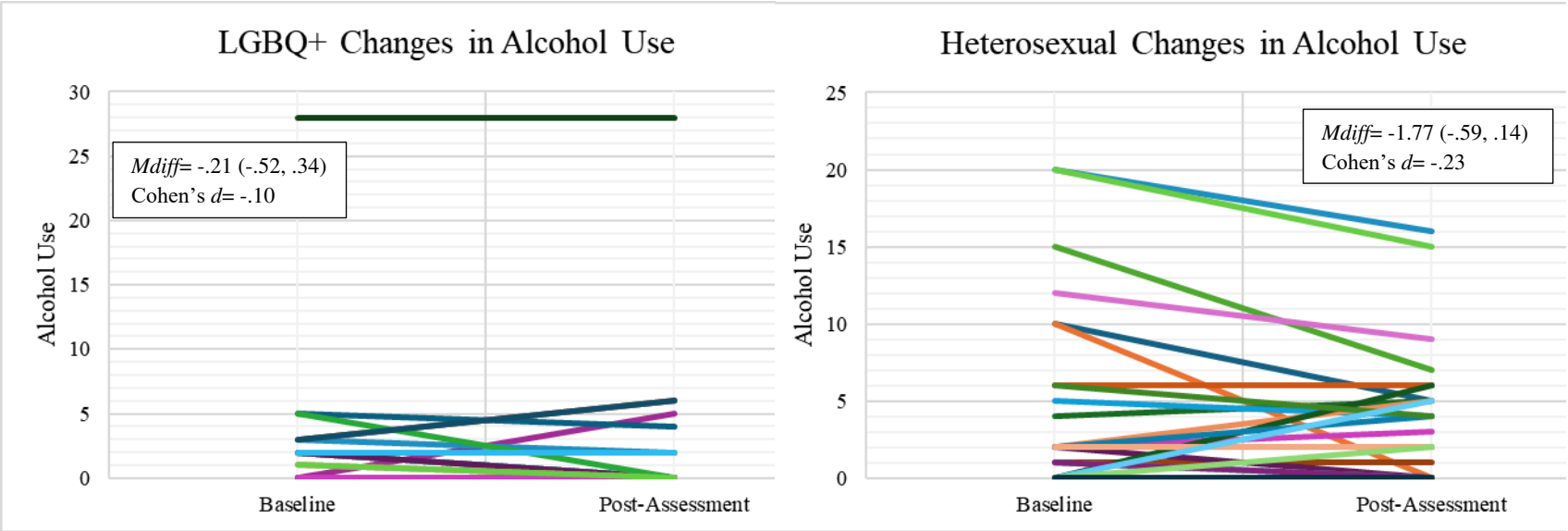


***Figure 48.*** Changes in Frequency of Alcohol Usage based on Sexual Orientation. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

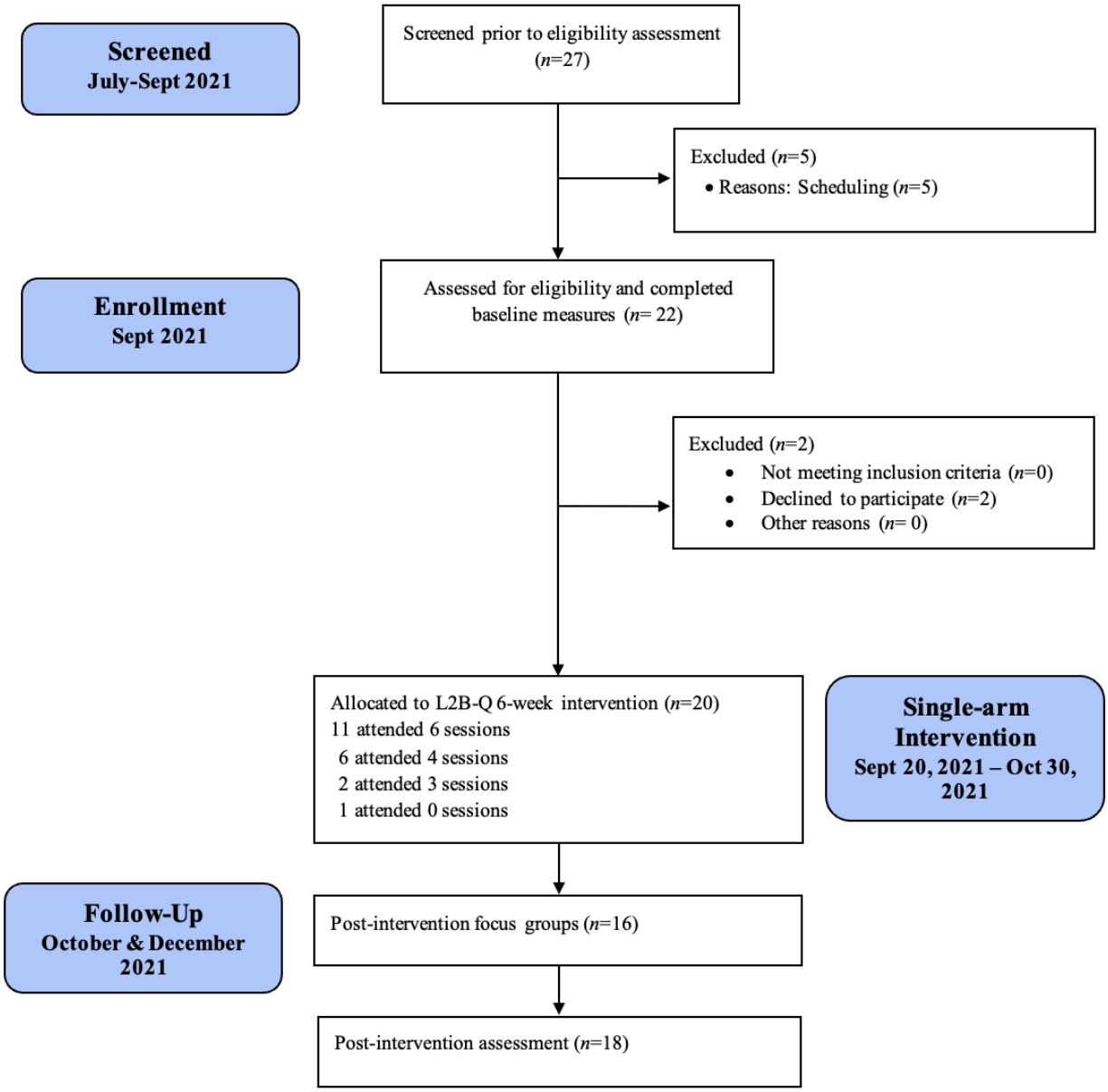


***Figure 49***. CONSORT Pilot Study Flow of L2B-Q.

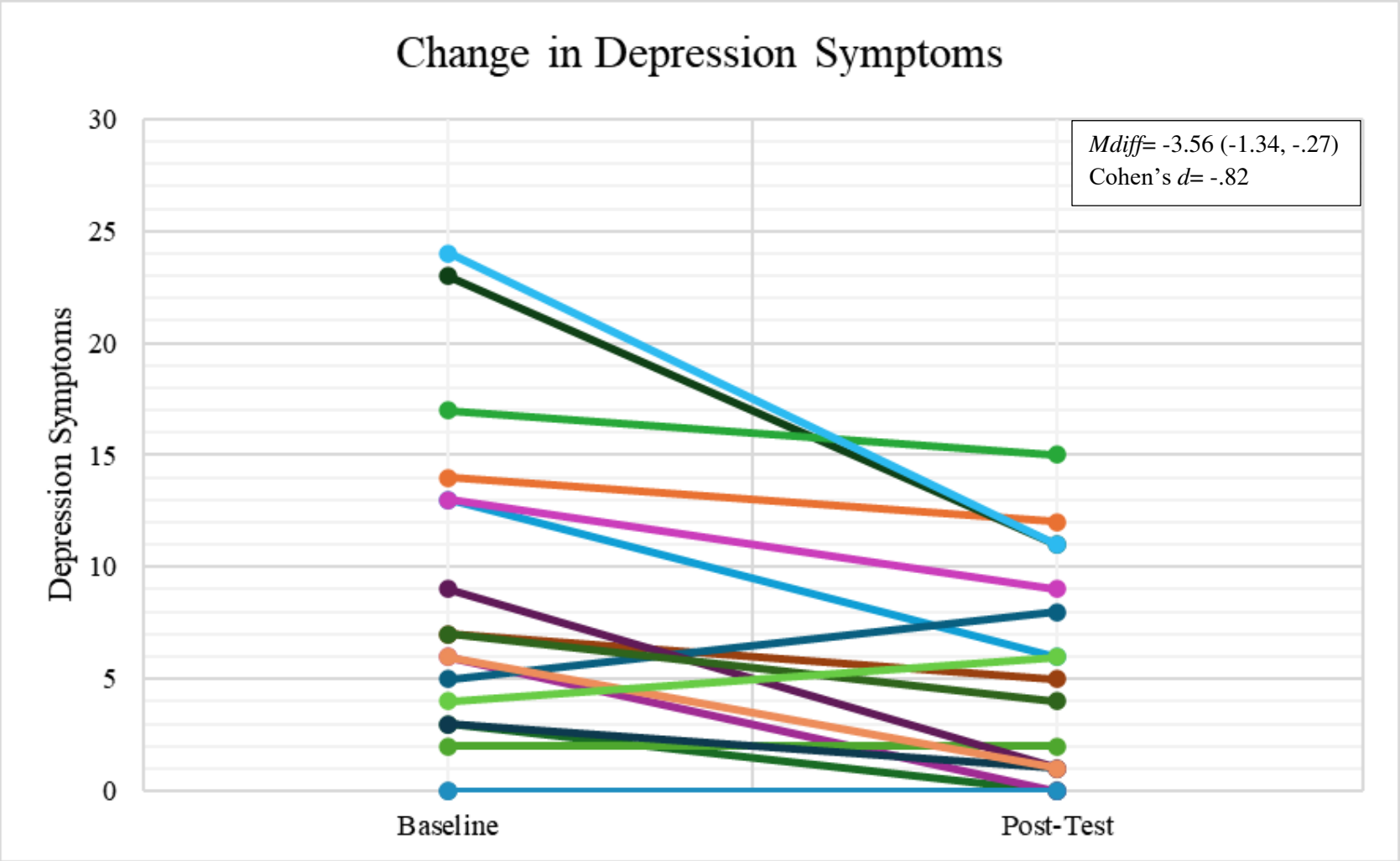


***Figure 50.*** L2B-Q Participant Changes in Depression Scores. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

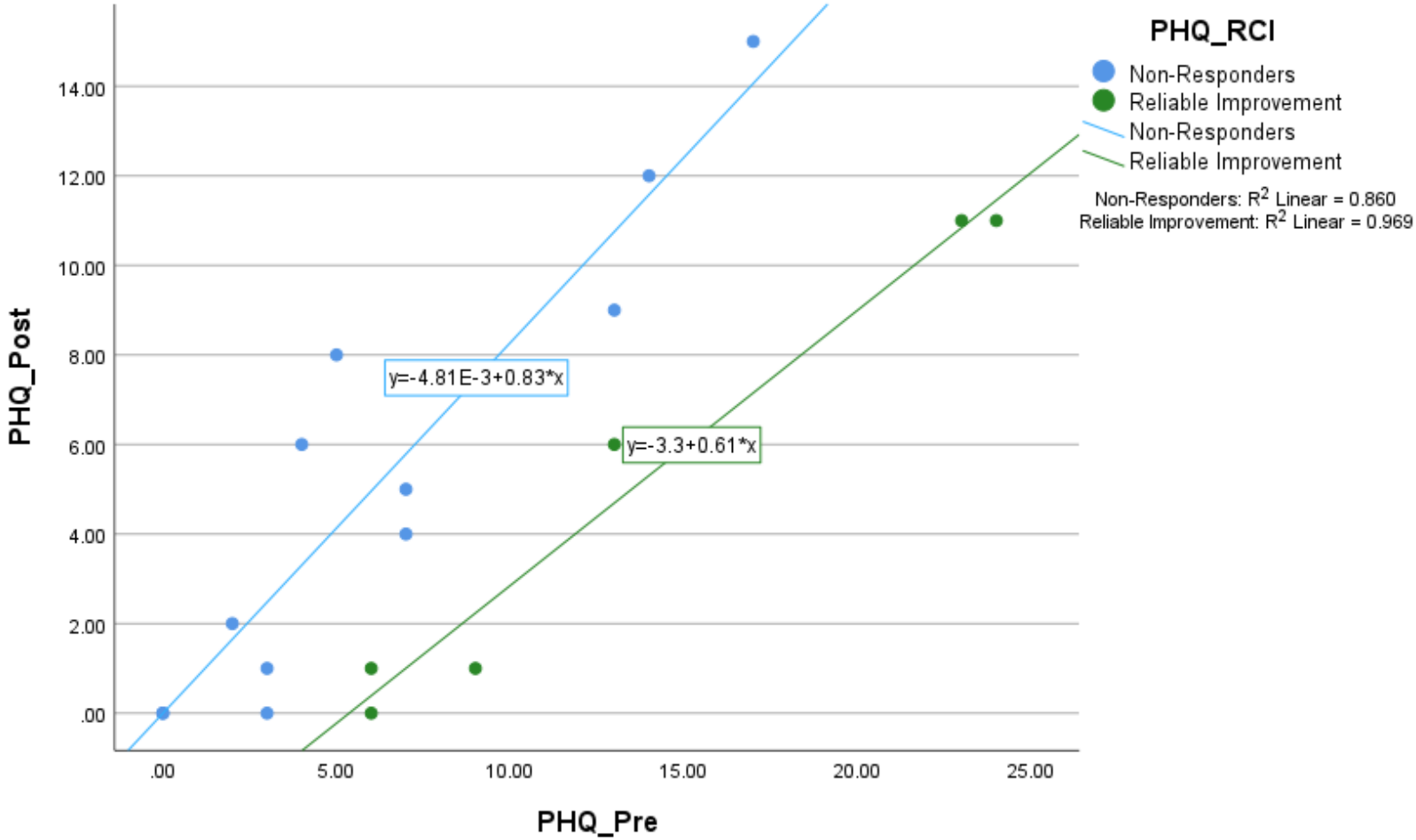


***Figure 51.*** L2B-Q Depression RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

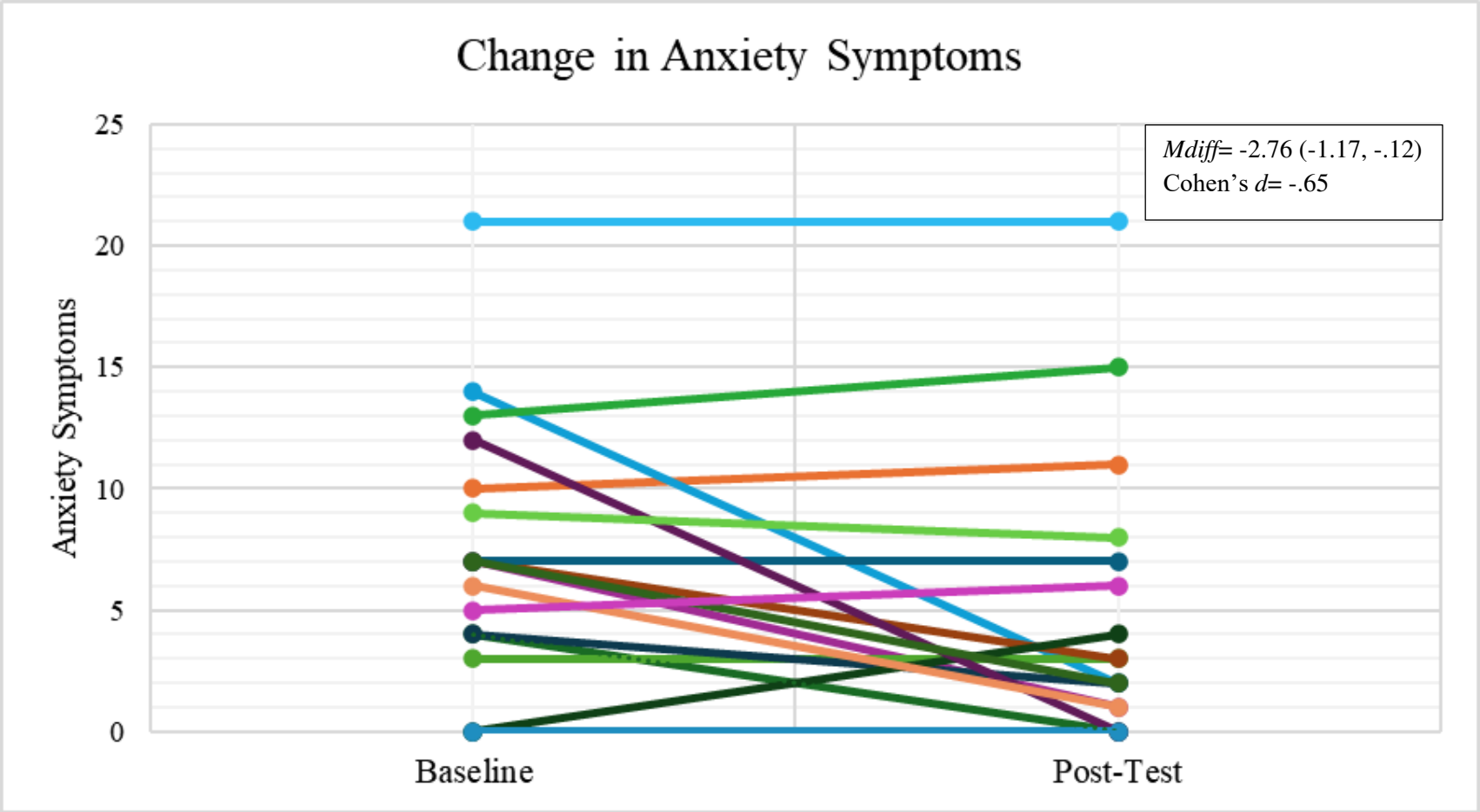


***Figure 52.*** L2B-Q Participant Changes in Anxiety Scores. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

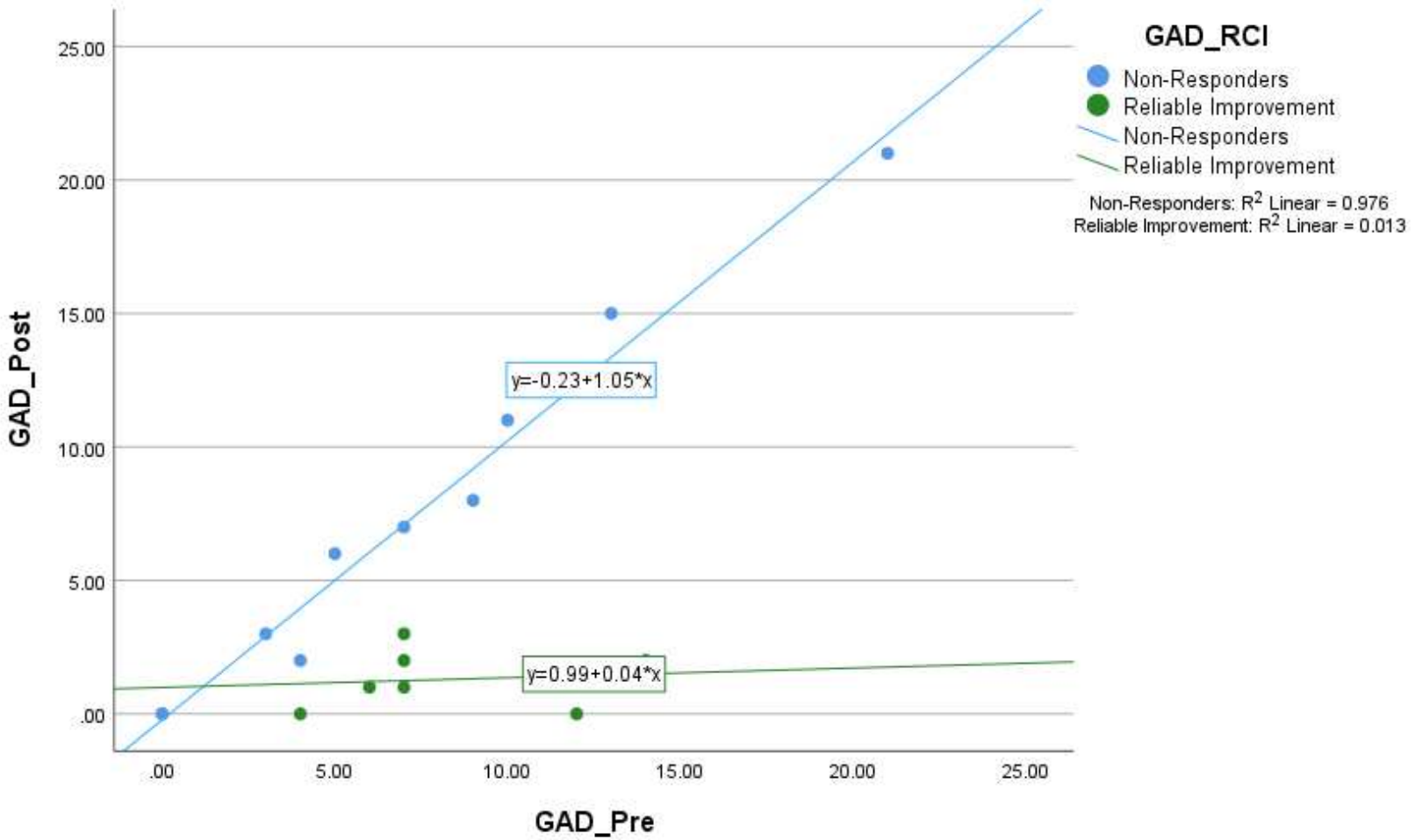


***Figure 53.*** L2B-Q Anxiety RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

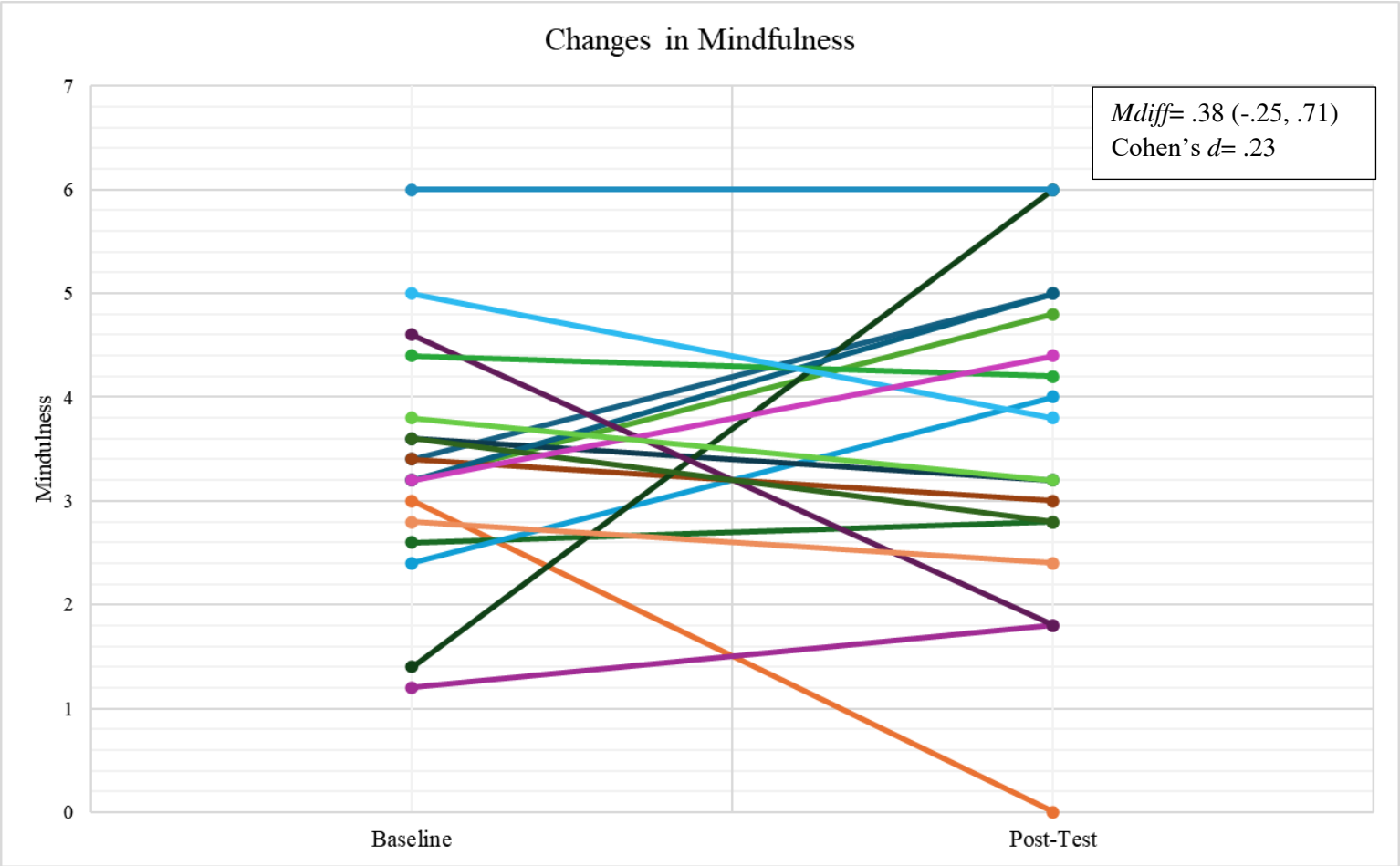


***Figure 54.*** L2B-Q Participant Changes in Mindfulness Scores. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

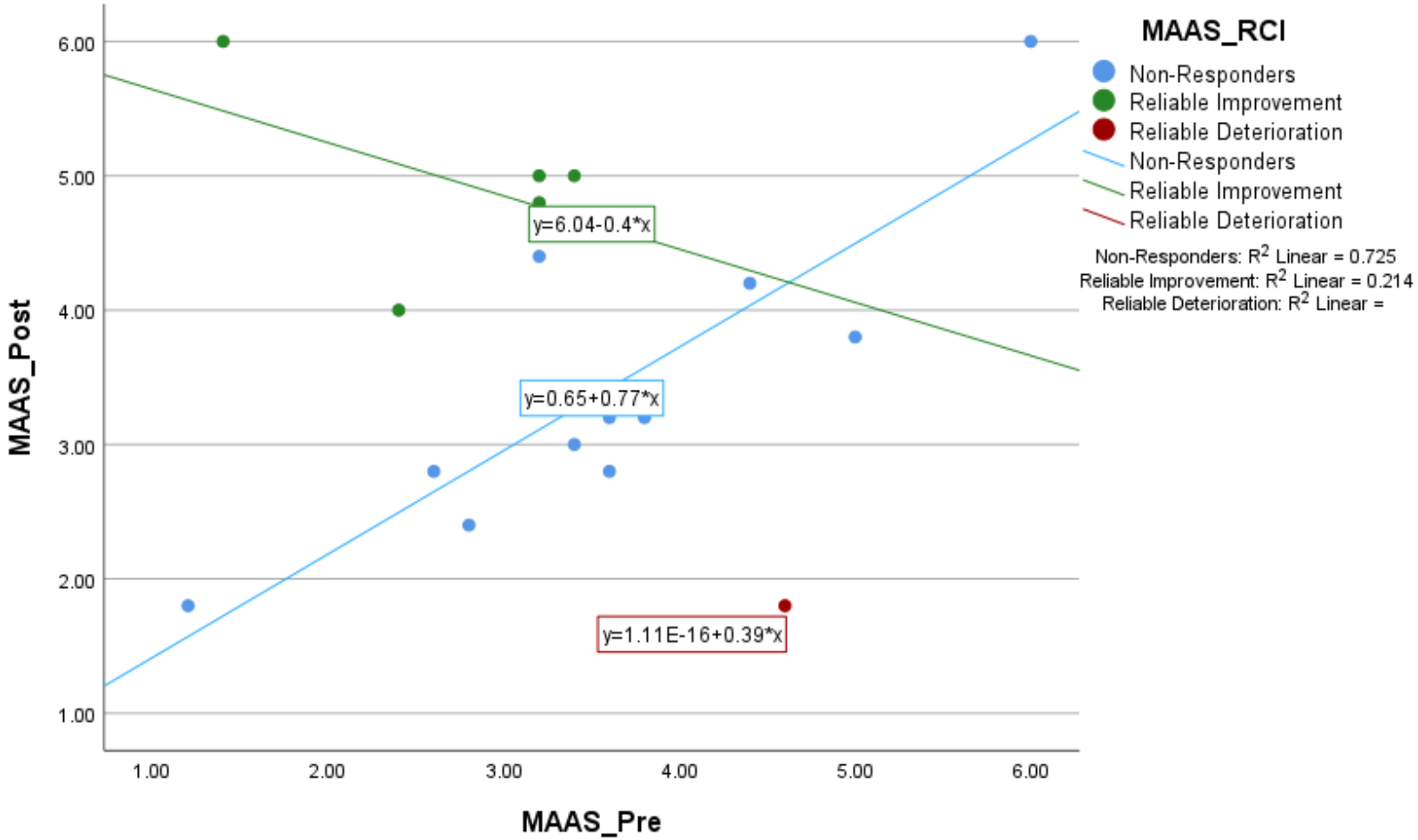


***Figure 55.*** L2B-Q Mindfulness RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

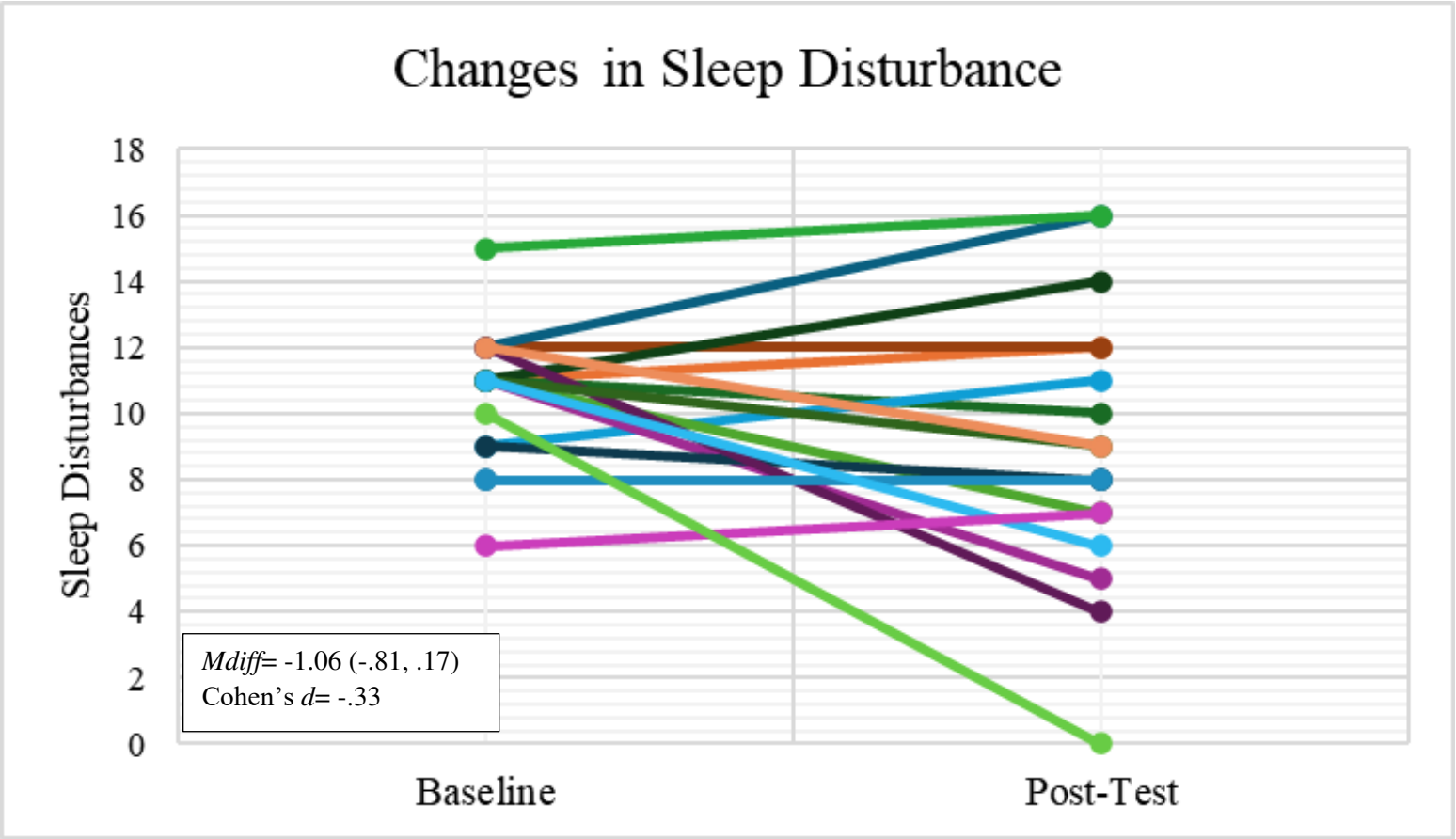


***Figure 56.*** L2B-Q Participant Changes in Sleep Scores. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

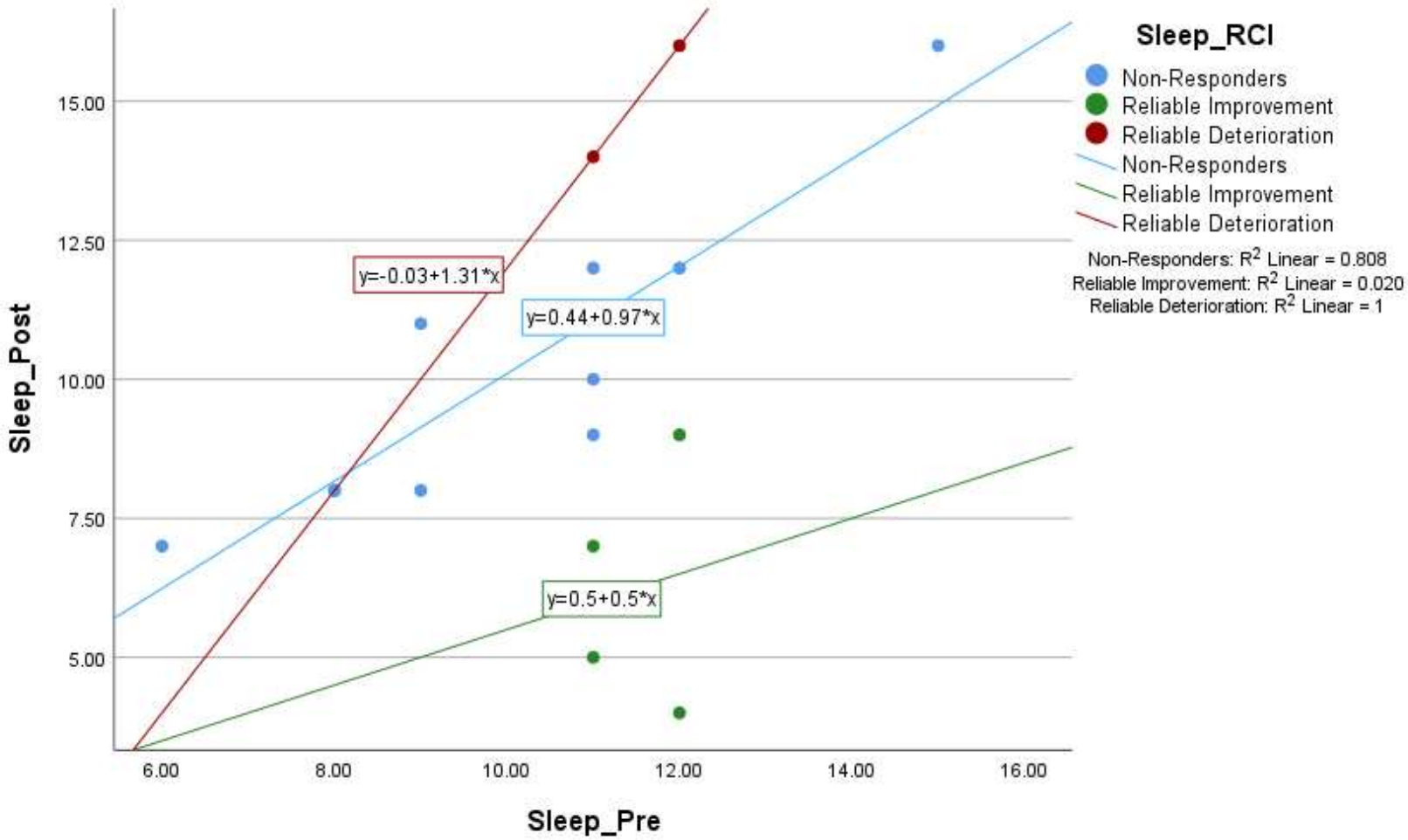


***Figure 57.*** L2B-Q Sleep RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

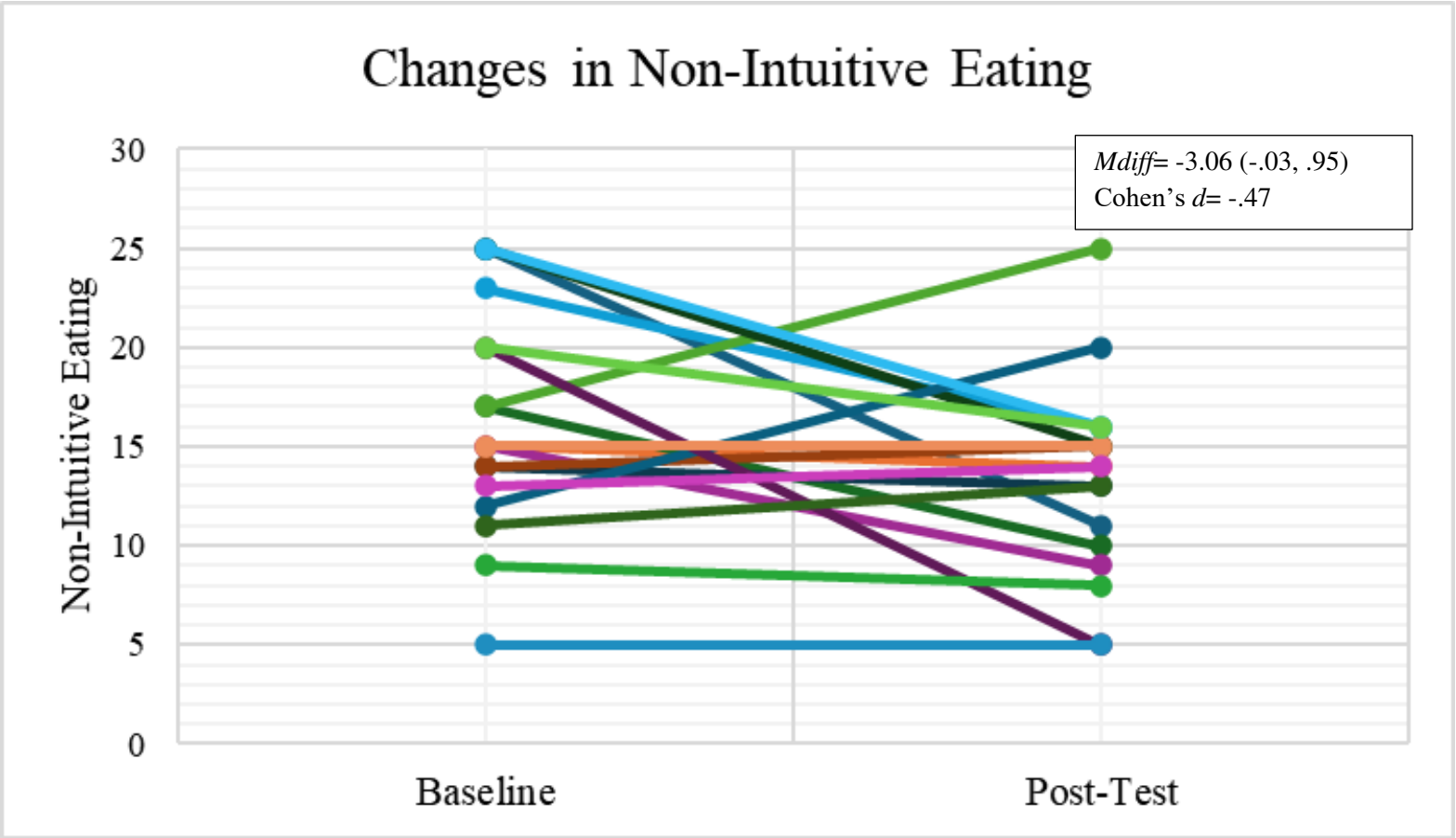


***Figure 58.*** L2B-Q Participant Changes in Intuitive Eating Scores. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

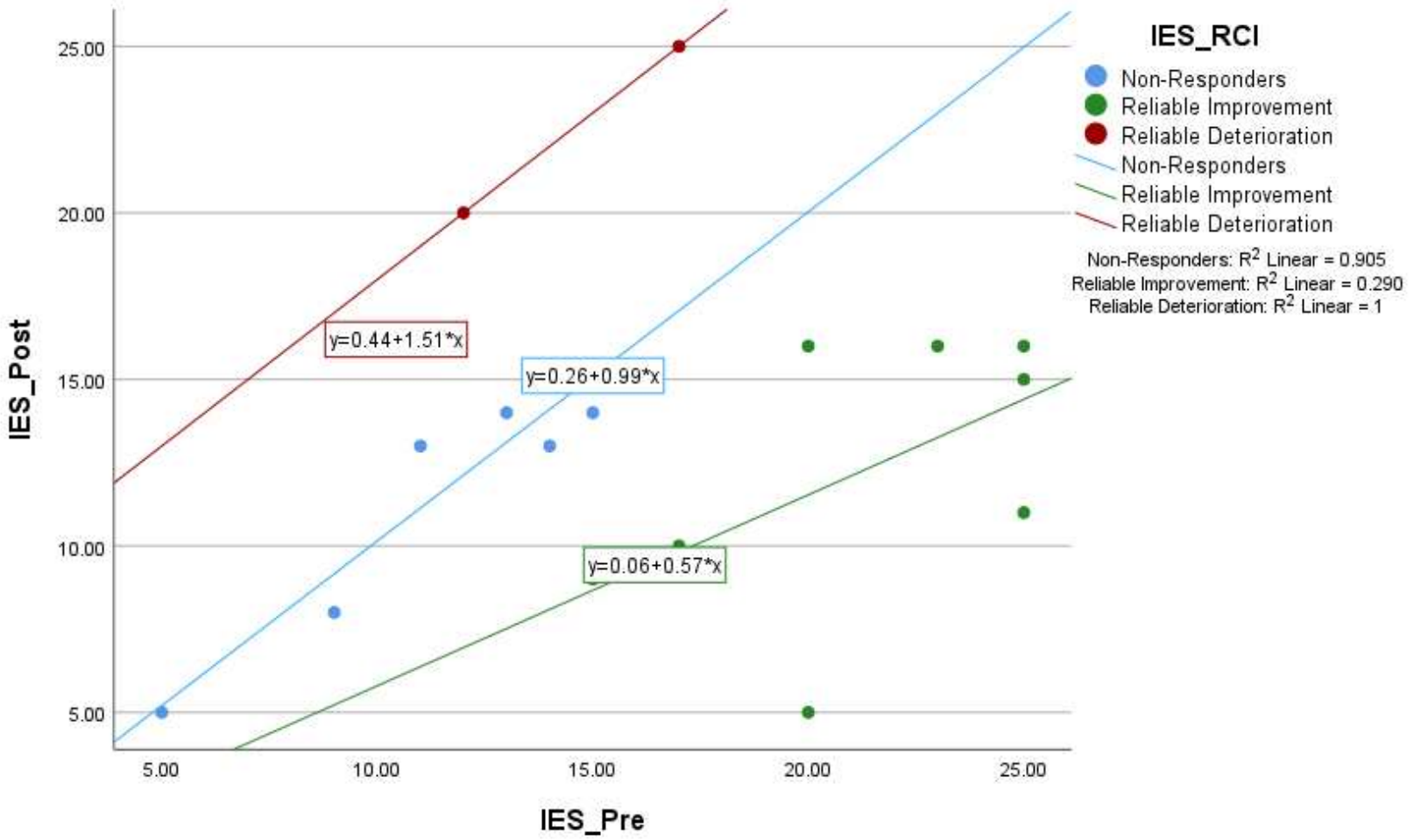


***Figure 59.*** L2B-Q Intuitive Eating RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score $\geq +$ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

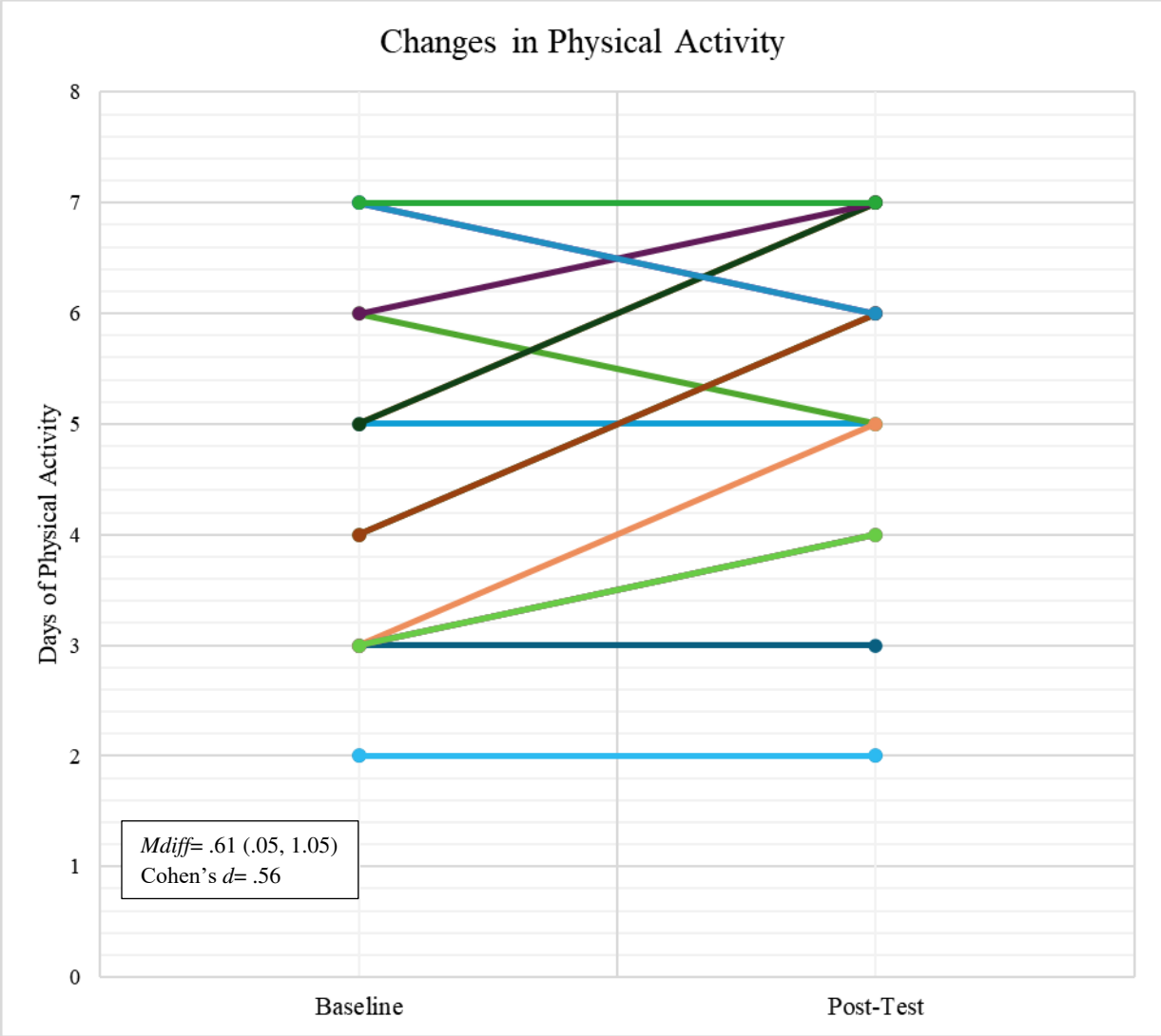


***Figure 60.*** L2B-Q Participant Changes in Physical Activity Scores. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

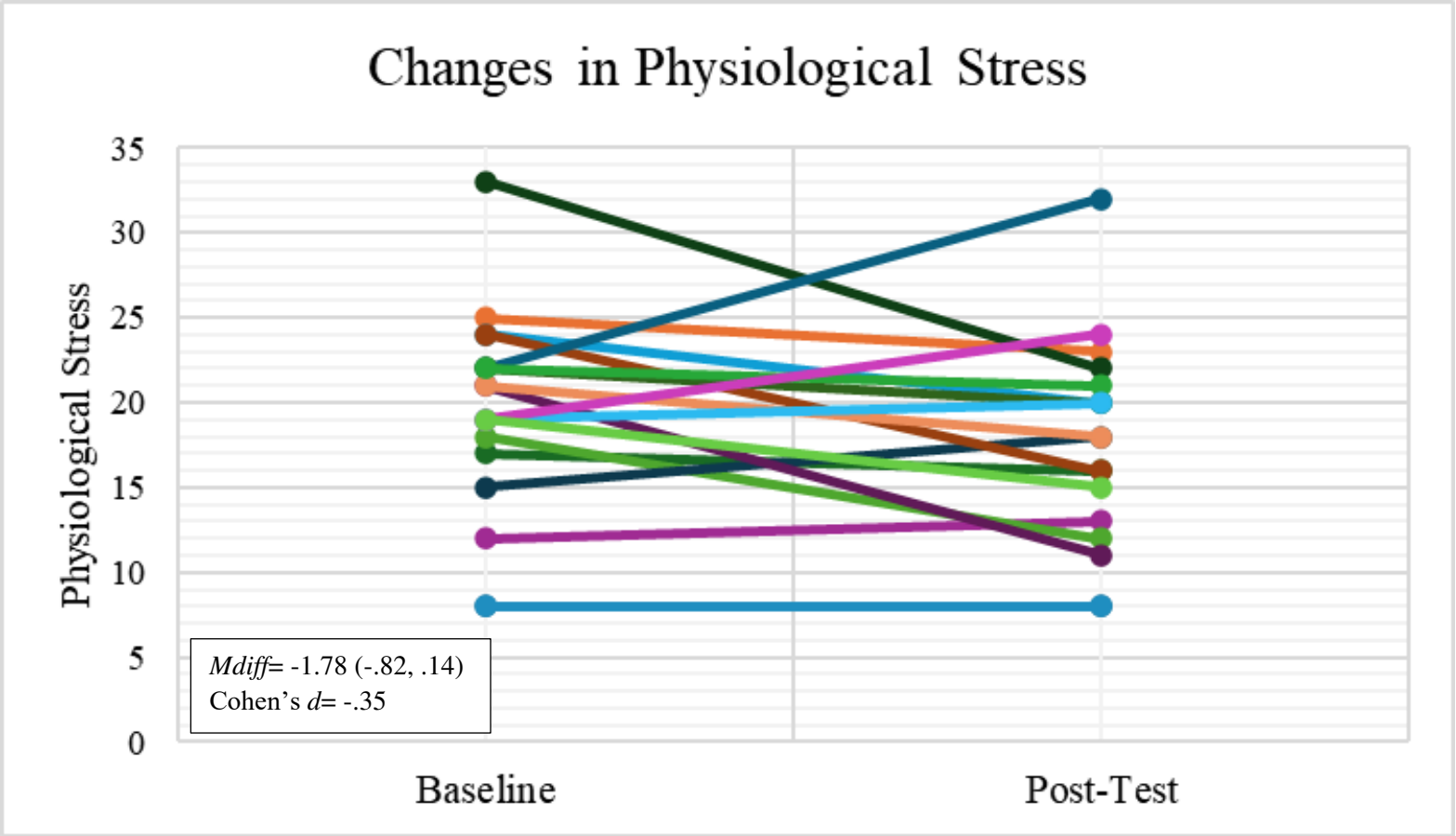


***Figure 61.*** L2B-Q Participant Changes in Physiological Stress Experiences Scores. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

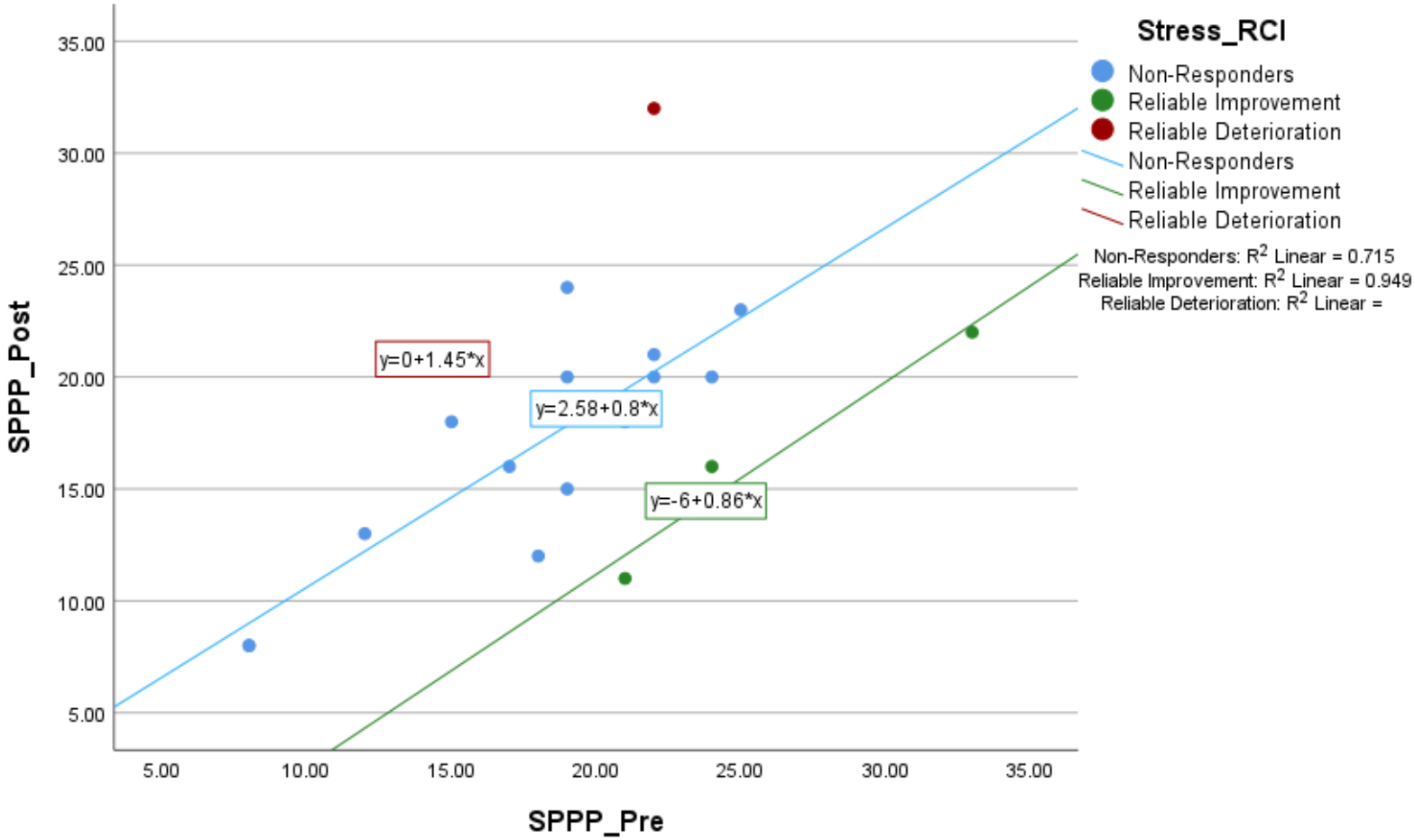


***Figure 62.*** L2B-Q Physiological Stress RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

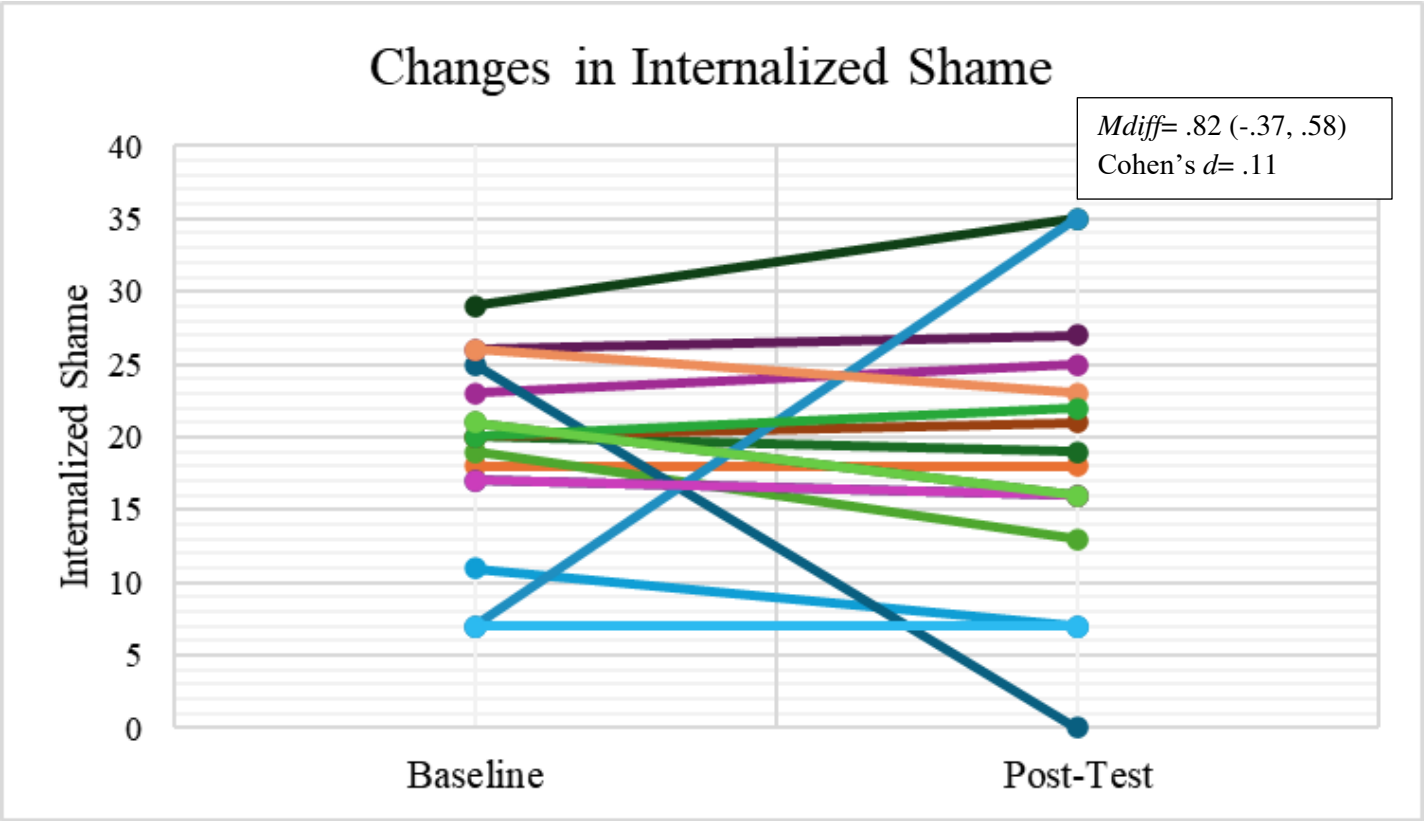


***Figure 63.*** L2B-Q Participant Changes in Internalized Shame Scores. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

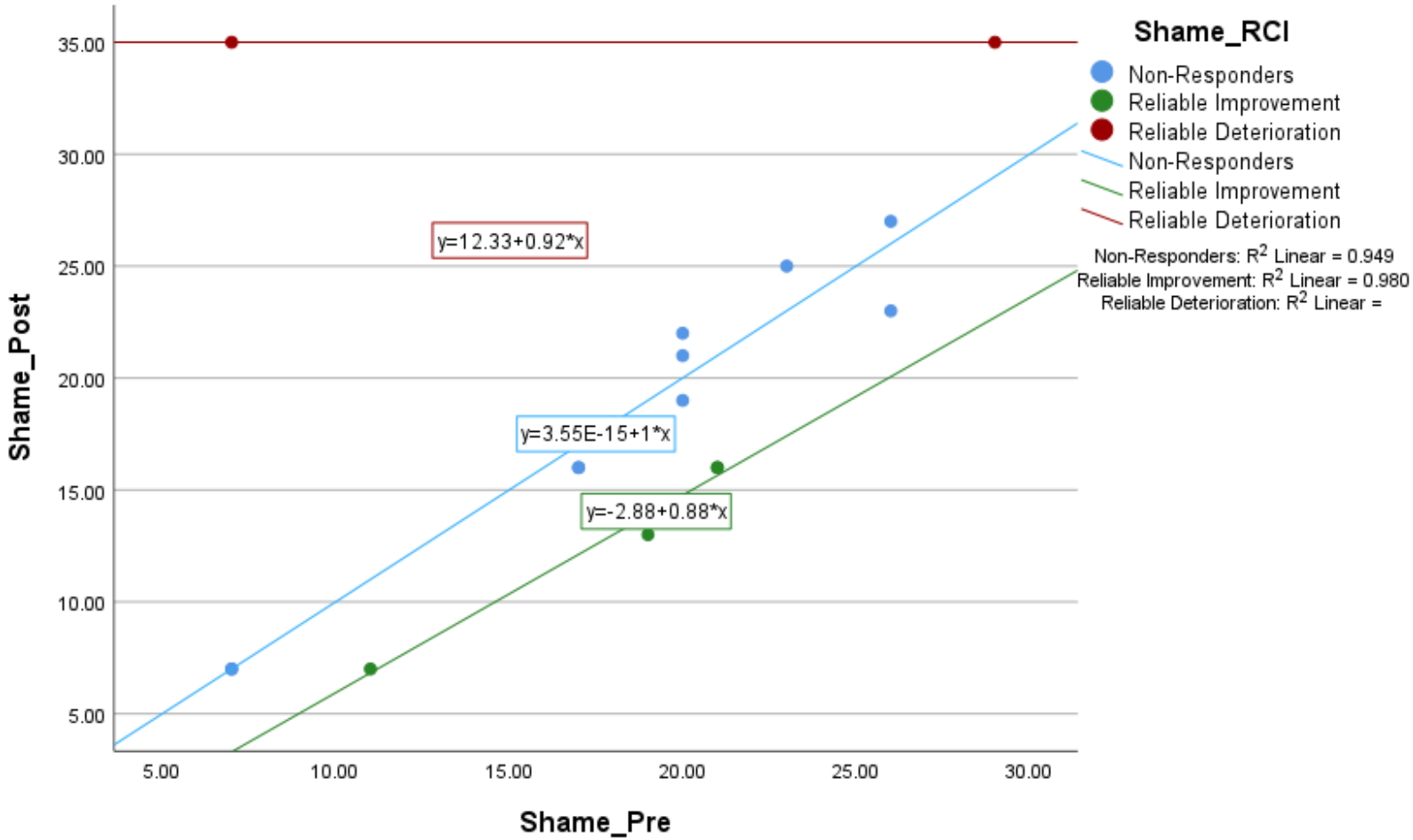


***Figure 64.*** L2B-Q Internalized Shame RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

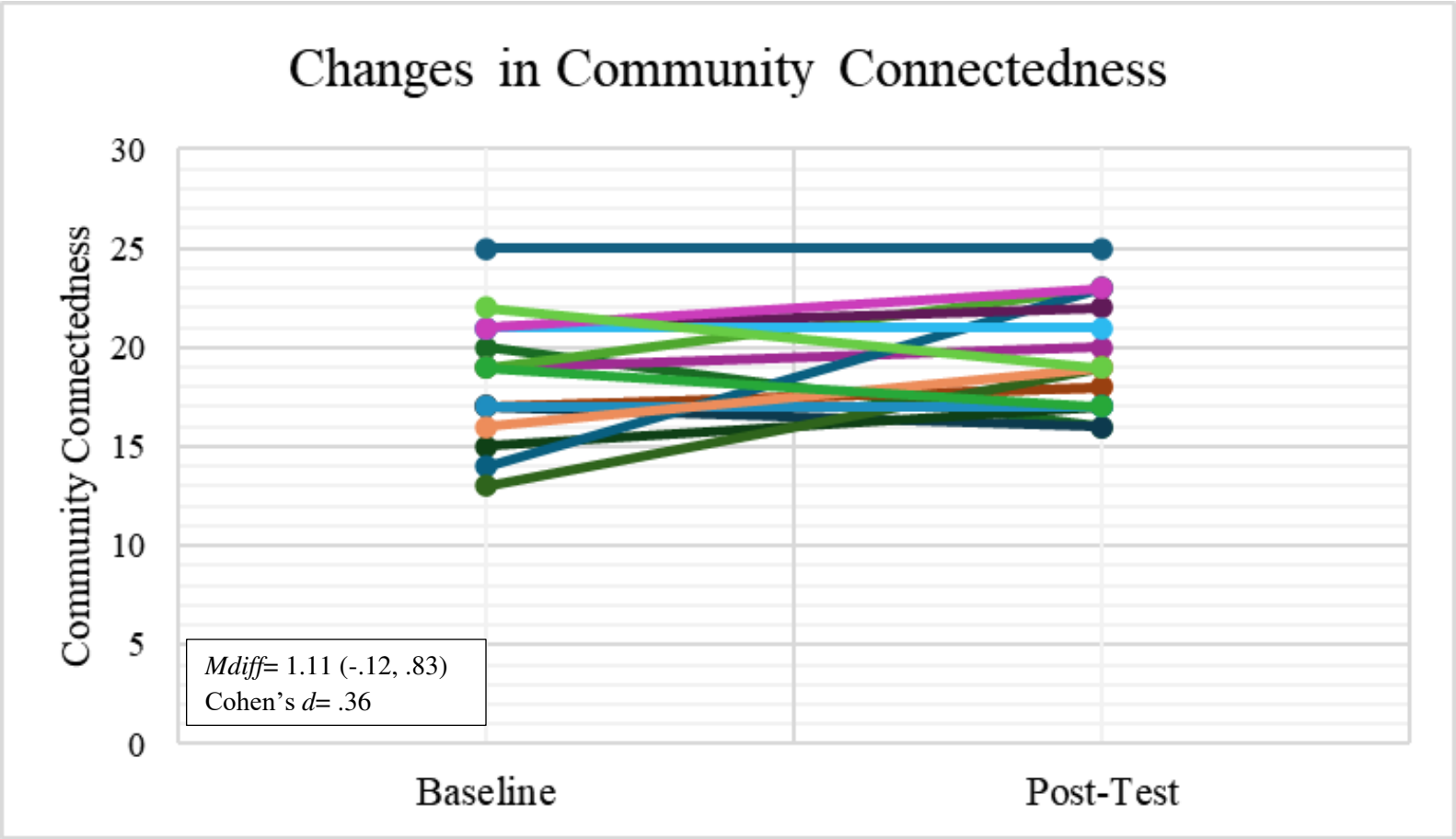


***Figure 65.*** L2B-Q Participant Changes in Community Connectedness Scores. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

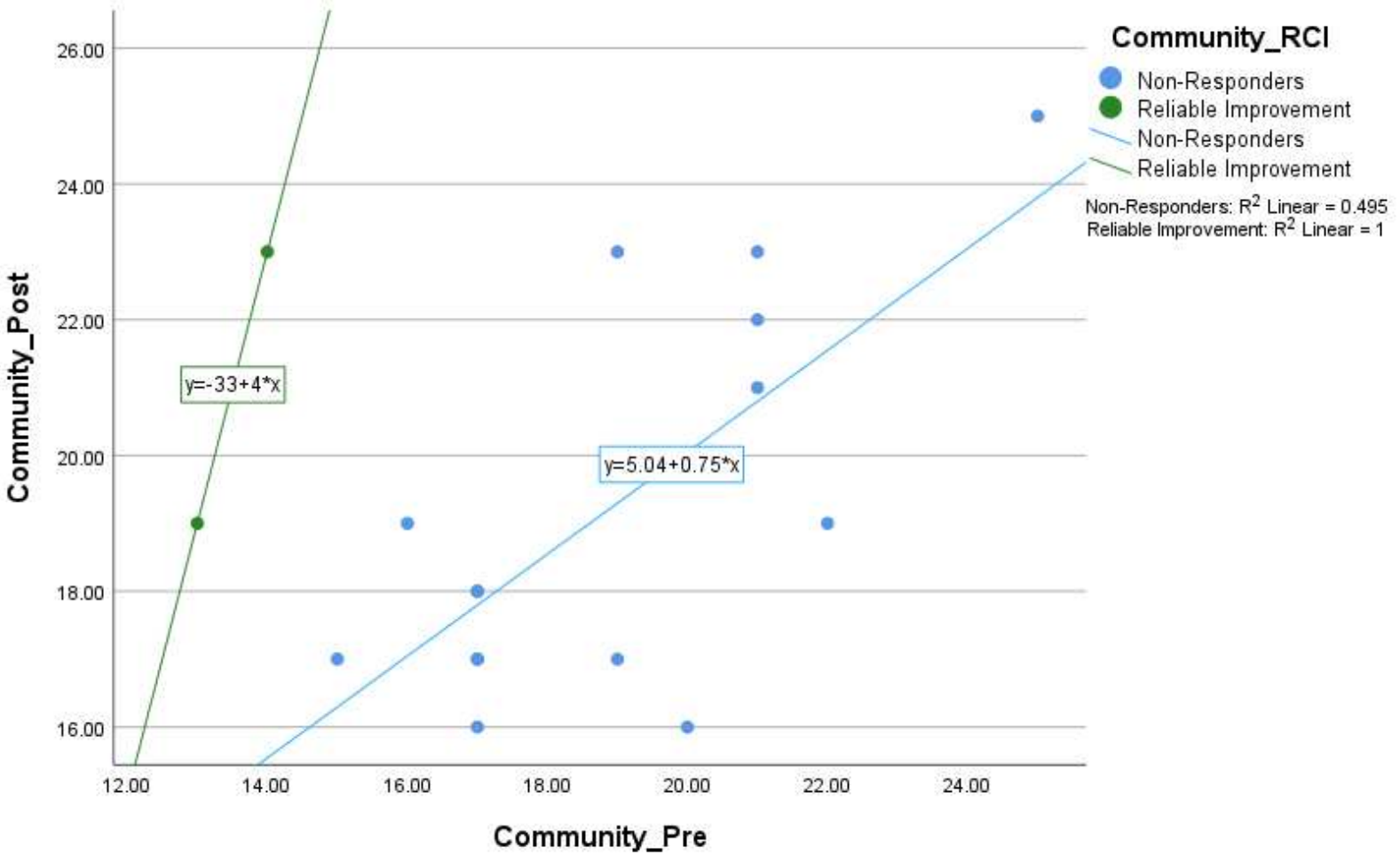


***Figure 66.*** L2B-Q Community Connectedness RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score >+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

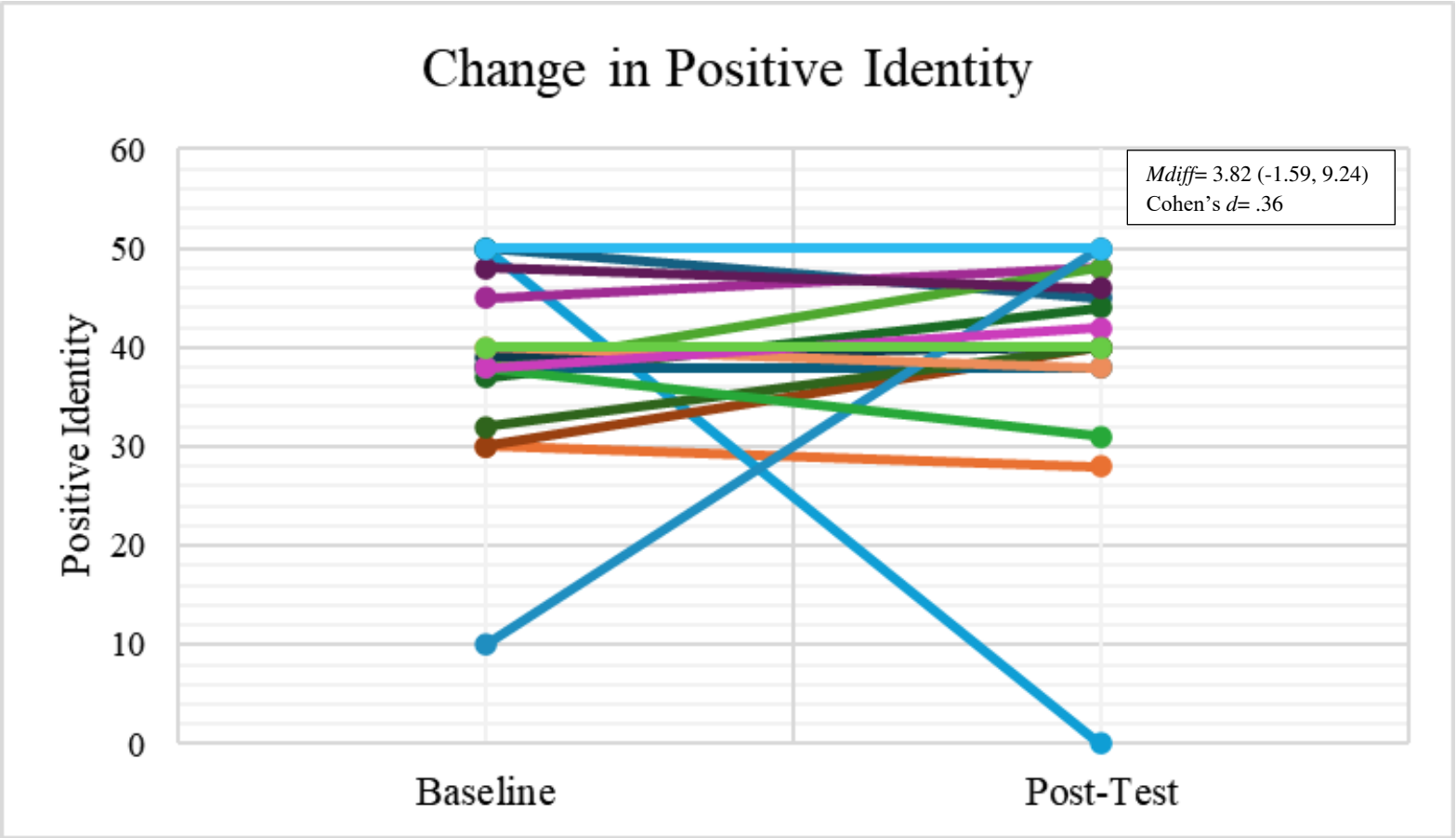


***Figure 67.*** L2B-Q Participant Changes in Positive Identity Scores. *Mdiff* refers to the change in scores from pre-test to post-test. 95% C.I. was reported.

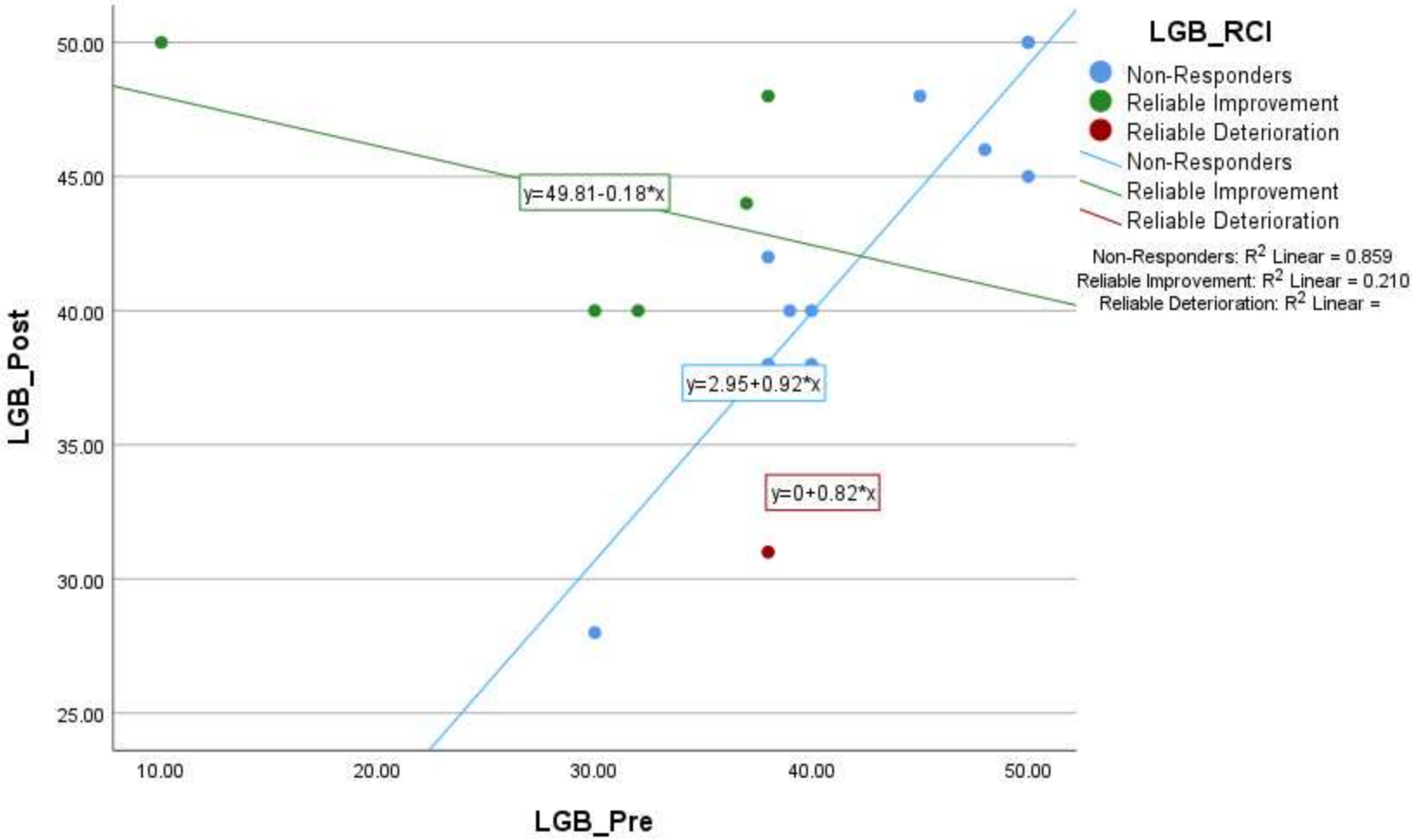


***Figure 68.*** L2B-Q Positive Identity RCI Scores. Non-Responders are participants that had an RCI score that was not indicative of clinical improvement or clinical worsening. Reliable improvement is defined by an RCI score ≥+ 1.96, or those who had clinically significant improvement. Reliable deterioration is defined as an RCI that signals a clinically worsening of symptoms.

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