Feasibility of a Virtual Mindfulness Based Intervention, for youth diagnosed with a Neurodevelopmental Disability, during the COVID-19 Pandemic

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Feasibility of a Virtual Mindfulness Based Intervention, for youth diagnosed with a Neurodevelopmental Disability, during the COVID-19 Pandemic

by

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Abstract

Background: It is well established that youth with neurodevelopmental disabilities (NDDs) experience high rates of mental health concerns (e.g., anxiety, depression, and stress), which have worsened throughout the pandemic. However, appropriate, and accessible treatments for mental health concerns for youth with disabilities are limited. Many health providers report not being adequately trained or specialized to meet the mental health needs of individuals with NDDs. Mindfulness-based interventions (MBI), offered both in person and virtually, are a promising treatment approach for youth and adults in the general population and have effectively improved symptoms of depression, anxiety, and stress. Both caregivers and autistic individuals (i.e., adults & youth) have benefited from MBI and report improvements in well-being and mindfulness skills. MBIs offered virtually have also effectively addressed mental health concerns and are feasible with autistic adults. Despite the effectiveness of MBIs in autistic adults and caregivers, it is unknown whether MBI delivered virtually, is effective in reducing the mental health concerns of neurodiverse youth. The present study addressed this gap and determined the feasibility of a virtual adapted-MBI during the COVID-19 pandemic for youth with NDDs.

Methods: Twenty-three neurodiverse youth ($M = 12.72$, $SD = 1.34$) and one of their parents participated in a six-week adapted virtual adapted-MBI. Youth and their parents attended weekly group sessions and were asked to complete questionnaires at three time points (i.e., baseline, post-intervention, and 3-month follow-up). Both parent and child completed a measure of youth mental health (Strengths and Difficulties Questionnaire; [SDQ]), and the youth also completed a self-report measure of
mindfulness skills (Child and Adolescent Mindfulness Measure; [CAMM]). All participants were asked to complete a semi-structured interview three months post-intervention, where they were asked questions related to their satisfaction with the intervention.

Feasibility was assessed using five areas of focus: demand, implementation, efficacy, practicality, and acceptability. Paired sample t-tests and reliable change indices were used to determine the efficacy of the intervention in immediate improvement of mental health concerns. Thematic analysis was used to identify significant themes from the participant interviews. Finally, repeated measure ANOVAs and reliable change indices were calculated to determine the long-term (3-month follow-up) impacts of MBI.

**Results:** Overall, the virtual adapted-MBI was in demand, successfully implemented, and generally accepted. Unexpectedly, paired sample t-tests showed no significant changes in youth mental health or mindfulness skills post-intervention (i.e., all p's <.05). The reliable change index showed clinically meaningful differences from baseline to post-intervention and baseline to follow-up time points with some youth showing improvements on mental health and mindfulness.

Two main themes emerged: 1) Finding Purpose in Mindfulness; and 2) What Works for One may not Work for All. Mindfulness was perceived as a practical skill that improved youth’s ability to cope with stress and build self-awareness. The MBI seemed to work for some, but not all. There were perceived challenges with attention and focus with the virtual format. Many participants recommended more interactive and fun activities to increase participation and engagement.
MINDFULNESS BASED INTERVENTION

**Conclusions:** Virtual MBI is a feasible intervention that can be used to help reduce mental health symptoms for some neurodiverse youth. Although there was no significant group mean differences after the six-week intervention, the reliable change index shows immediate and long-term differences for a small number of participants at the individual level. The qualitative analysis further describes areas of strengths and weaknesses of the intervention and suggests that mindfulness might be a good tool for some but not all youth with an NDD. Further work in MBI is needed to determine age-specific adaptations. who is best suited for it, and how it can be applied within a multidisciplinary approach to improve mental health in NDDs.

*Keywords:* neurodevelopmental disabilities, youth, mindfulness, virtual, feasibility, COVID-19, mental health
Preface

This thesis is an original, unpublished, independent work by H. O’Brien. The data collected and reported groups were covered by an Ethics Certificate (REB20-1270) issued by the University of Calgary Research Ethics Board for the project “A mindfulness-based intervention for individuals with neurodevelopmental disorders and their caregivers during COVID-19” on September 9, 2020.
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Table of Contents

Abstract............................................................................................................................... ii
Preface ................................................................................................................................. v
Acknowledgments ................................................................................................................ vi
Table of Contents ................................................................................................................ vii

Introduction .......................................................................................................................... 1
  Current Study ....................................................................................................................... 1
  Identify Language use ......................................................................................................... 2
  Overview of Chapters .......................................................................................................... 3

Chapter 1: Literature Review .............................................................................................. 4
  Neurodevelopmental Disabilities ......................................................................................... 4
  Mental Health ..................................................................................................................... 7
  The COVID-19 Pandemic in Neurodiverse Individuals ..................................................... 9
  Mental Health Supports & Services ................................................................................. 10
  Mindfulness-Based Intervention (MBI) ............................................................................ 12
  Accessible Interventions .................................................................................................. 17
  Study Rationale ................................................................................................................ 21

Chapter 2: Research Methodology ..................................................................................... 22
  Research Questions ........................................................................................................... 22
  Procedure .......................................................................................................................... 25
  Measures ............................................................................................................................ 27
    COVID-19 Disruptions and Difficulties ....................................................................... 27
    Youth Mental Health ...................................................................................................... 28
  Intervention Description .................................................................................................... 30
  Data Analysis ................................................................................................................... 32

Chapter 3: Results ................................................................................................................. 36
  Participants Demographic Information .......................................................................... 36
  Research Question 1: Is a virtual adapted-MBI feasible for neurodiverse youth during a pandemic, based on Bowen’s (2009) feasibility framework? ......................................................... 40
  Research Question 2: Is participating in a virtual adapted-MBI associated with long-term improvements in neurodiverse youth’s mindfulness skills and mental health? ............................................................. 55

Chapter 4: Discussion ............................................................................................................ 58
MINDFULNESS BASED INTERVENTION

Demand and Implementation .............................................................................................................59
Limited Efficacy ...............................................................................................................................62
Acceptance and Practicality .............................................................................................................65
Recommendations ............................................................................................................................68
Future Directions ..............................................................................................................................72
Implications .......................................................................................................................................73

Conclusion ........................................................................................................................................73
References ..........................................................................................................................................75

APPENDIX A: Recruitment Poster .................................................................................................126
APPENDIX B: Child’s Demographic ...............................................................................................127
APPENDIX C: Parent/Caregiver Demographic & COVID Impacts ..................................................132
APPENDIX D: Youth Measures .......................................................................................................137
APPENDIX E: Parent Measure .........................................................................................................141
APPENDIX F: Exit Interview Script ................................................................................................143
APPENDIX G: Youth Consent ..........................................................................................................145
APPENDIX H: Parent/Caregiver Consent Form .............................................................................152
APPENDIX I: Mindfulness Neurodiverse Workbook .....................................................................159

List of tables

Table 1 ...........................................................................................................................................37
Table 2 ...........................................................................................................................................38
Table 3 ...........................................................................................................................................39
Table 4 ...........................................................................................................................................39
Table 5 ...........................................................................................................................................44
Table 6 ...........................................................................................................................................46
Table 7 ...........................................................................................................................................47
Table 8 ...........................................................................................................................................56
Table 9 ...........................................................................................................................................57

List of Figures

Figure 1 ..........................................................................................................................................41
Figure 2 ..........................................................................................................................................45
Figure 3 ..........................................................................................................................................45
MINDFULNESS BASED INTERVENTION

Introduction

Current Study

Neurodevelopmental disabilities (NDDs) are lifelong conditions that impact brain development and various areas of functioning, including personal, social, academic, and occupational skills (American Psychological Association [APA], 2013). Children and youth with NDDs (e.g., autism, intellectual disability, fetal alcohol spectrum disorder, specific learning disability) experience significant mental health concerns. Additionally, most of these issues have been exacerbated by the COVID-19 pandemic. Mindfulness-based interventions (MBIs) have effectively improved anxiety and depression in neurotypical youth and adults (Zhang et al., 2021). More recently, MBIs have been adapted for autistic adults and are feasible, accepted, and effective when delivered in-person or virtually (Kiep et al., 2015; Lunsky et al., 2022), although less is known of the utility of MBIs in neurodiverse youth. Virtual interventions can be an effective and accessible way to provide services to various populations. Given the additional challenges that youth with NDDs have faced during the pandemic (e.g., loss of services & uncertainty around schedules), virtual MBIs could be a good fit. This study addressed this knowledge and clinical gap by examining the feasibility of a virtual adapted-MBI for neurodiverse youth and exploring the long-term impacts of an MBI.

The following two research questions were addressed

1) Is a virtual adapted-MBI for youth with an NDD feasible during the COVID-19 pandemic?
2) Is participating in a virtual adapted-MBI associated with long-term improvements in neurodiverse youth’s mindfulness skills and mental health?

Feasibility studies are used to establish a standard for implementing evidence-based interventions; those rigorously evaluated through research and found to be both efficacious and effective (Bowen et al., 2009). Feasibility studies can help produce findings that determine if an intervention can progress to the next evaluation step, possibly a randomized control trial (RCT) (Orsmond & Cohn., 2015).

Using Bowen’s feasibility framework (2009), feasibility in the current study was assessed using the following criterion: a) Demand: through expressed interest and enrollment statistics; b) Implementation: through group adherence, attrition rates, and program completion; c) Efficacy: through paired-sample t-tests and reliable change to determine the immediate change in mindfulness skills and mental health at post-intervention; d) Practicality: through open-ended responses in a semi-structured interview; and e) Acceptability: through both open-ended and close-ended questions regarding satisfaction of the intervention. Lastly, mental health and mindfulness skills at a 3-month follow-up were examined to explore the long-term impacts of MBI. This study can help inform if MBI is a feasible intervention for neurodiverse youth, particularly when delivered virtually during a pandemic.

**Identify Language use**

There are various ways of referring to neurodiverse individuals, and it is essential to consider the preferences across all age groups. In the past, the disability paradigm shaped how neurodiverse individuals were referred to (Patston, 2007), and person-first language (i.e., individuals with an NDD or individuals with autism) was most often used
MINDFULNESS BASED INTERVENTION

(Vivanti, 2020). However, more recently, language preference has shifted to more identity-first language (i.e., neurodiverse or autistic individuals) (Dwyer, 2022). Currently, there is yet to be a widely accepted way of referring to all neurodiverse individuals, and in particular, neurodiverse youth. As such, to respect and acknowledge both preferences, this manuscript will use both identity-first language and person-first language interchangeably.

Overview of Chapters

This study is separated into four chapters. Chapter 1 provides a detailed review of existing literature and the key concepts related to this study, including the diagnostic features and prevalence of NDDs, mental health concerns, and co-occurring conditions in this population. This chapter also discusses supports and services for neurodiverse youth and the impact that the COVID-19 pandemic had on neurodiverse youth and their families. Chapter 2 includes the research questions and outlines the methods and measures used to address these research questions. Chapter 3 presents the results of the study. Finally, Chapter 4 discusses how the results of the current study compared to previous literature, implications for practice and future research, limitations of the study, and concluding comments.
Neurodevelopmental Disabilities

Neurodevelopmental disabilities (NDDs) are lifelong conditions that impact brain development and various areas of functioning, including personal, academic, and occupational skills (American Psychological Association [APA], 2013). NDDs are highly heterogeneous and can vary in clinical presentation or abilities. NDDs include, but are not limited to, attention deficit hyperactivity disorder (ADHD), autism, fetal alcohol spectrum disorder (FASD), intellectual disability (ID), developmental coordination disorder (DCD) and specific learning disability (SLD) (APA, 2013). Many neurodiverse individuals also experience secondary conditions, including physical (e.g., asthma, epilepsy, gastrointestinal problems) (Alabaf et al., 2019) and mental health concerns (e.g., depression, anxiety) (Buck et al., 2014; Simonoff et al., 2008).

Although NDDs up until recently have been understood from a disability paradigm (i.e., the view that limitations or deficits require fixing), the last 15 years have shifted to redefine NDDs through a diversity paradigm (i.e., the idea of embracing and valuing neuro-differences) (Patston, 2007). Neurodiverse individuals have unique experiences and often interpret the world differently than neurotypical individuals; however, this isn’t a ‘deficit’ but rather a strength. Further, neurodiverse people have distinctive perspectives, learning styles, and strong problem-solving and creative thinking skills (Warren et al., 2020).

Like strengths, many neurodiverse individuals have shared challenges. For example, most individuals with NDDs experience difficulties with attention, social relationships, communication, and intolerance of uncertainty, which can often contribute
to learning and academic challenges (APA, 2013). Neurodiverse individuals also experience challenges with emotional regulation, defining emotions, and controlling impulses. Sensory challenges, also shared, can be expressed uniquely across NDDs but can include sensitivities to noise, touch, taste, and smell. Finally, general difficulties in executive functions (e.g., inhibitory control, working memory) are common in NDDs, and can impact attention and learning (Otterman et al., 2019; Ozonoff & Jensen, 1999; Zelazo & Muller, 2010).

The mentioned challenges are often associated with decreased independence, difficulty with everyday activities (Chiang & Wineman, 2014; van Heijst & Geurts, 2015), poorer quality of life (McCrimmon et al., 2014) and further mental health challenges (Parvinchi et al., 2021).

**FASD & Autism**

Two of the most common NDDs are autism and FASD. They share similarities but some differences as well. FASD is a condition caused by prenatal alcohol exposure and characterized by physical and neurodevelopmental impacts. On the other hand, autism is characterized by a multifaceted effect on neurodevelopment. Where the causes of autism are not fully known, FASD is only found in children who were exposed to alcohol prenatally (Carpita et al., 2022).

Individuals with autism and FASD share several similar characteristics, such as sensory interests, social challenges, and adaptive skills. Both populations can have challenges in reciprocal behaviour, including sharing during social play and detecting social cues (Stevens et al., 2013). Additionally, both have challenges identifying and managing emotions, often struggling to recognize the appropriateness of emotions...
MINDFULNESS BASED INTERVENTION

within social settings and to control emotions (Stevens et al., 2013). Finally, youth with autism and FASD often have executive functioning challenges and can demonstrate increased impulsivity and hyperactivity (Stevens et al., 2013).

Despite these similarities, there are some differences between youth with FASD and autism, particularly in their cognitive skills. For example, Bishop & colleagues (2007) compared the verbal and nonverbal IQ between autistic youth and youth with FASD and found that 79% of autistic children had a higher nonverbal than verbal IQ. In contrast, most children with FASD had a higher verbal than nonverbal IQ (Bishop et al., 2007). Finally, youth with FASD are often more interested in and enjoy social relationships and interactions compared to autistic youth, using more facial expressions and gestures, initiating more conversations, and showing a desire to participate in social activities (Carpita et al., 2022).

Prevalence

Worldwide, the number of individuals with NDDs has increased over the past two decades (Zablotsky et al., 2017). Roughly 5 to 20% of children and youth are diagnosed with an NDD (APA, 2013; Arim et al., 2017; Thapar et al., 2017), but these rates can vary by region (Ouellette-Kuntz et al., 2009) and type of NDD. For example, a Canadian surveillance study of autism found that 1 in 66 children and youth between the ages of 5 to 17 years were diagnosed in 2015 across seven provinces and territories. An example of regional variances is the prevalence from 1 in 126 in the Yukon to 1 in 57 in Newfoundland and Labrador, likely due to differences in healthcare access for diagnosis, education, and family and child characteristics (Zablotsky et al., 2019).
MINDFULNESS BASED INTERVENTION

In Canada, there are 1 in 42 males and 1 in 165 females diagnosed with autism; supporting the global statistic that males are disproportionately diagnosed (Canada Autism, 2018). In Canada, the most recent prevalence of FASD is 4% (Canada Fetal Alcohol Spectrum Disorder Research Network [CanFASD], 2017), and ADHD is 4 to 5% (Statistics Canada, 2017).

An NDD rarely occurs alone, and most individuals are diagnosed with more than one NDD. For example, 30 to 50% of individuals with autism have a secondary diagnosis of ADHD. Similarly, two-thirds of individuals primarily diagnosed with ADHD show features of autism (Davis & Kollins, 2012). Finally, there is a high prevalence of those with both autism and intellectual disability (ID), with approximately 31% of children with autism having ID as well (APA, 2013). These secondary diagnoses further impact the level and complexity of required services.

Mental Health

The challenges associated with NDDs (e.g., social, emotional, and cognitive challenges) heighten the risk of mental health difficulties (Augustine et al., 2022; Lai et al., 2019). For example, autistic youth report significantly higher rates of depression, anxiety, and suicidality compared to their peers without autism (Hofvander et al., 2009; Operto et al., 2021; White et al., 2018) and 30 to 60% of youth with ADHD, autism, or SLD report clinical levels of anxiety and depression (Doering et al., 2022; Gillberg et al., 2004; Totsika et al., 2011). Moreover, approximately 90% of individuals with FASD (Centers for Disease Control and Prevention [CDC], 2020) have at least one mental health concern, and nearly half with two or more (CDC, 2020; Pei et al., 2011). With that, the rates of suicide are alarmingly high in all individuals with NDDs compared to
neurotypical youth. For example, 25% of autistic youth have experienced suicide ideation (Halloran, 2022), and almost 26% of individuals with FASD have experienced suicidality in their lifetime (Flannigan et al., 2022).

**Risk Factors**

Several factors can heighten risk of mental health concerns in NDDs. First, racial inequality and gender identity of neurodiverse youth can further increase risks. For example, black, indigenous, and people of color (BIPOC) experience challenges accessing services and receiving diagnosis and treatment (Giwa-Onaimu, 2020; Jones et al., 2020). This impacts early intervention and is often associated with worse long-term outcomes, particularly mental health (Hadders-Algra, 2021). Autistic transgender youth also experience significantly greater internalizing symptoms compared to non-autistic transgender youth, and autistic females, when compared to other gender identities, are at higher risk of suicidality (Strang et al., 2021).

Lower socioeconomic status can also play a role in mental health risks. Neurodiverse individuals, particularly those who are autistic and from lower-income families, are at increased risk of experiencing trauma or adverse childhood events (e.g., physical and/or sexual abuse, & repeat bullying) (Hoover & Kaufman, 2018; Kerns et al., 2015), and these experiences are often unrecognized, undiagnosed, and consequently untreated despite their mental health impacts (Lobregt-van Buuren et al., 2021). In autistic youth, there are also links between 'social masking' or 'camouflaging' and mental health difficulties. Social masking is a way of hiding or minimizing autistic traits to fit in socially (Hull et al., 2017). Because youth with autism are often targeted (i.e., bullying, rejection, & abuse) because of their behaviours or traits, they often engage in
MINDFULNESS BASED INTERVENTION

social masking to ‘fit in’ or to limit being targeted. In turn, masking or camouflaging is associated with increases in mental health concerns (i.e., anxiety, depression, and isolation) (Cassidy et al., 2020; Hull et al., 2021). Finally, there are often social stigmas that accompany neurodiverse youth and their families. Social stigma can prevent some youth and families from seeking diagnosis and/or treatment and actively participating in their communities (Serchuk et al., 2021). Taken together, these contributing factors (i.e., masking, trauma, & stigma) can decrease quality of life and increase susceptibilities to mental health concerns.

The COVID-19 Pandemic in Neurodiverse Individuals

Neurodiverse individuals and their families have been particularly impacted by the COVID-19 pandemic (Pellicano & Stears, 2020). The pandemic was associated with disruptions in routines and services, social isolation, and mental health concerns. Individuals with an NDD, who often benefit from consistent structure, predictability, and multiple specialized services, have found it difficult to adapt (Fegert et al., 2020; Summers et al., 2020). Indeed, a longitudinal study conducted in Japan found that neurodiverse youth experienced more externalizing behaviour (e.g., aggressive behaviour) during periods of isolation and school closures compared to before the pandemic (Kawaoka et al., 2022). Additionally, in an American longitudinal study, youth diagnosed with ADHD reported an increase in depression, anxiety, and oppositionality/defiance during school closures compared to before the pandemic, although returned to pre-pandemic scores when schools were re-opened (Breaux et al., 2021).
MINDFULNESS BASED INTERVENTION

Caregivers of neurodiverse youth also reported an overall general worsening of social and emotional symptoms in their child (e.g., easily distracted, angry, & crying) during the pandemic compared to caregivers of neurotypical youth (Asbury et al., 2021; Cost et al., 2022; Masi et al., 2021). Caregivers of individuals with autism reported that the impact on their child (i.e., emotion dysregulation & high anxiety), along with the loss of structure and routine, contributed to increased familial stress (Amorim et al., 2020; Kalb et al., 2021). For example, Friesen & colleagues (2022) found that the physical distancing restrictions due to the pandemic significantly impacted the mental health and stress of caregivers of autistic children and youth. Similarly, families of youth with FASD expressed concerns during the pandemic for their child’s well-being due to increased disruptions to care and reduced or inaccessible support, and these disruptions led to an increase in mental health concerns (i.e., anxiety & depression) in children and youth with FASD (Champagne et al., 2021).

Mental Health Supports & Services

The mental health of neurodiverse youth is a concern, and more targeted, effective interventions are warranted. Well before the pandemic, mental health conditions had been increasing, and during the pandemic, child emergency department visits for mental health further increased substantially (Leff et al., 2021). Despite the high rates of mental health in youth, specifically neurodiverse individuals, specialized services are not easily accessible or individualized, and often can come at a relatively high cost and with extensive wait times for families (Ono et al., 2019).

Researchers have worked to adapt evidence-based psychotherapeutic interventions, such as cognitive behaviour therapy (CBT), to meet the unique needs of
MINDFULNESS BASED INTERVENTION

neurodiverse children and youth (Blake et al., 2017; Cachia et al., 2016a). These adapted interventions are often tailored to specific characteristics of neurodiverse individuals and incorporate modifications to improve intervention fit, increase engagement, and provide a generalization of skills (Dyson et al., 2019). Recently, acceptance and commitment therapy (ACT), dialectical behaviour therapy (DBT), and cognitive behaviour therapy (CBT) have been adapted to fit neurodiverse populations and tested for feasibility and effectiveness with both youth and adults. Both DBT and ACT has shown to be feasible and effective for autistic youth, improving mental health concerns (i.e., emotion regulation & stress) (Bemmouna et al., 2022; Byrne & O’Mahoney, 2020; Hartmann et al., 2012; Pahnke, 2022). CBT has also been adapted for autistic youth and their families and includes successful programs for relaxation, social skills, and anxiety (Berlanda & McMorris, 2021; Chalfant et al., 2007; Sze & Wood, 2007; White et al., 2010).

Despite the effectiveness of these programs, there is often a focus on individuals with low support needs, and those with autism, not other NDDs. A virtual adapted-MBI can add to these programs for neurodiverse youth, limit barriers, and improve mental health concerns even with more complex populations with high support needs.
Mindfulness-Based Intervention (MBI)

Mindfulness can be a skill that is taught or trained, and it can also be a trait with individuals having a disposition to be (more or less) mindful (Tang, 2017). MBI involves teaching through meditation techniques that aim to increase mindfulness skills. MBIs can include various programs, including mindfulness-based stress reduction (MBSR), mindfulness-based cognitive therapy (MBCT), and mindfulness-based training (MBT). Whereas MBSR and MBCT actively teach mindfulness meditation, MBCT also incorporates cognitive behaviour therapy (CBT) techniques as part of treatment (Creswell, 2017). MBSR, developed by Kabat-Zinn in 1979, is the most common MBI and has been used with various youth and adult groups, including individuals with somatic conditions, chronic pain, and mental health concerns, and non-clinical populations like students and prison inmates. MBI is generally acknowledged and useful for improving physical, mental, and social health (Burke, 2010; Zhang et al., 2021) in various populations.

Mindfulness in Adults

With adults in the general population MBIs have grown in popularity and have been used in-person, virtually, and through an app (e.g., Calm). MBI has been used to control and manage stress in populations of healthy adults in the workplace (Goh et al., 2015) and post-secondary institutions (Beiter et al., 2015), showing effectiveness in improving stress for extended periods (Serretti, 2009). For example, when healthy adult MBI participants were compared to controls they had reductions in perceived stress and improvements in well-being and mindfulness skills, and these benefits were sustained for several months (Shapiro et al., 2015).
MBIs have also been successful in reducing symptom severity in adults with mental health concerns (i.e., anxiety, depression, aggression, psychological distress, & post-traumatic symptoms) (Hofmann et al., 2010; Keng et al., 2011; Ma et al., 2018) and physical illnesses (i.e., cancer & diabetes) (Koncz et al., 2020; Spek et al., 2013).

In the past decade MBI has been implemented with neurodiverse adults, with most research focusing on the feasibility and effectiveness of in-person adapted-MBI in autistic adults. These MBIs have high levels of satisfaction and acceptance from neurodiverse adults and show improvements in quality of life and mental health (Beck et al., 2020; Conner et al., 2018). For example, Sizoo & Kulper (2017) compared the effectiveness of MBSR to CBT in autistic adults with co-occurring depression and anxiety. There was equal effectiveness in reducing depression, anxiety, and autism symptomatology post-intervention. Also, Kiep & colleagues (2015) implemented and evaluated a nine-week adapted-MBI for autistic adults and found that participants reported improvements in anxiety, depression, sleep problems and psychosomatic health, with sustained improvements at the two-month follow-up.

The supported impact of MBI on autistic adults seems to have similar longevity to healthy adult populations, and learned mindfulness skills benefit adults after the intervention is completed (i.e., at follow-up).

Mindfulness in Youth

More recently, MBIs used with adults have been adapted and evaluated for use with youth (Renshaw & Cook, 2017). Learning mindfulness skills can appeal to children and youth because it allows them to build autonomy and self-management techniques (Malboeuf-Hurtubise et al., 2019). MBIs, such as MBSR and MBCT, have been adapted
MINDFULNESS BASED INTERVENTION

to be developmentally appropriate for child and youth populations by decreasing session length and using developmentally appropriate language (Perrier et al., 2020; Zoogman et al., 2014) and have shown similar benefits to the original (i.e., un-adapted) MBI. For example, when MBCT was adapted for children (MBCT-C), it improved overall emotional regulation in neurotypical children ages 9 to 13 (Semple et al., 2010).

MBIs have also been applied within the school setting (Zenner et al., 2014), showing improvements in cognitive performance, resilience to stress, and emotional and psychological quality of life in students without mental health or developmental concerns (Bazzano et al., 2018; Zenner et al., 2014). For example, The Inner Kids program was developed for children from pre-kindergarten to grade twelve to teach mindfulness skills (Galla et al., 2016) and has improved self-regulation (Flook et al., 2010). Another example, Learning to BREATHE, was developed for youth ages 9 to 14 years and improved their anxiety, reactivity, and ability to recognize and label their feelings (Broderick & Metz, 2009).

MBI research with youth in clinical settings has also been well-accepted and shows effectiveness in improving mental health concerns, including anxiety, trauma, and depression (Kostova et al., 2019). A meta-analysis of youth ages 5 to 18 with an anxiety disorder showed reduced anxiety symptoms after an MBI (Borquist-Conlon et al., 2017). Additionally, MBI has been implemented in youth with trauma in high schools and has shown improvement in PTSD symptoms, including depersonalization (Michal et al., 2007).

Findings have been maintained from healthy and autistic adults, to youth in clinical settings, in that it has both direct (i.e., post-intervention) and long-term (i.e.,
MINDFULNESS BASED INTERVENTION

follow-up) improvements. Specifically, after a five-week MBI for adolescents from community mental health clinics with a primary psychiatric diagnosis (unspecified), there was a significant improvement in mental health functioning and mindfulness skills following the MBI. These improvements were further strengthened at a 3-month follow-up (Tan & Martin, 2015).

Mindfulness in Neurodiverse Youth

The literature base regarding the impact of MBI on youth with NDDs is growing. It has been implemented in youth with autism, SLD, and ADHD (Eichenstein, 2016; Singh et al., 2020). In a systematic review, Cachia & colleagues (2016a) evaluated in-person MBI delivered to youth with autism, improving quality of life, emotional and behavioural problems (i.e., CBCL: Total Problems), and reduced anxiety and rumination (Hartley et al., 2019; Hourston & Atchley, 2017). MBIs have also been shown to be effective for youth with specific learning disabilities (SLD), improving anxiety, attention, and social skills. For example, an in-person program that combined mindfulness practices, CBT, behaviour modification, and mixed martial arts with males diagnosed with SLD and either co-occurring anxiety or ADHD showed improvements in elevated anxiety and externalizing behaviour (i.e., conduct & oppositional defiance) (Haydickey et al., 2012).

In another study, youth with severe SLDs and borderline ID took part in an eight-week adapted-MBI (Malboeuf-Hurtubise et al., 2019), and were compared to children who participated in a social skills group (i.e., no mindfulness practices). There was no difference in anxiety symptoms, yet mindfulness skills improved at post-intervention and follow-up for those in the MBI group (Malboeuf-Hurtubise et al., 2019).
Finally, there have been programs designed specifically for neurodiverse individuals. For example, MYmind is a nine-week program for autistic youth aged 8 to 19, and their parents. It has been shown to be effective in improving social communication, emotional and behavioural functioning (Ridderinkhof et al., 2018), quality of life (de Bruin et al., 2015), autistic symptoms, and emotion regulation (Salem-Guirgis et al., 2019). MYmind has also been implemented in person with youth with ADHD and their parents, with youth showing improvements in ADHD symptoms, anxiety, and mindful awareness (Van de Weijer-Bergsma et al., 2012; Van der Oord et al., 2012).

Unfortunately, most of the literature on mindfulness and neurodiverse youth has failed to consider individuals with FASD. To my knowledge, no study has examined the effectiveness of mindfulness-based intervention with youth with FASD. While not MBI, one study did investigate youth with FASD’s response to stress and physiological regulation in FASD (respiratory sinus arrhythmia; RSA) while participating in a mindfulness task (Reid et al., 2019). They included both neurotypical children and those with FASD. Mindfulness changes were not measured; only RSA was measured at baseline, during, and following the brief mindfulness exercise (i.e., body scan; a focus on breathing and bringing attention to different parts of the body). A mindfulness compliance checklist was also used to determine if both neurotypical children and those with FASD could follow the task instructions. These authors showed that youth with FASD were able to participate and remain engaged in a mindfulness task, and it was effective in changing an individual’s resting level of RSA (Reid et al., 2019).
Finally, The Parents Under Pressure Program was developed for families of FASD, and incorporates aspects of MBI. Specifically, this program focuses on improving self-regulation for parents of youth with FASD and uses mindfulness-based strategies to improve the quality of the parent-child relationship. When examining the efficacy, Baker (2013) found that this program, is a feasible intervention for families of youth with FASD (Baker, 2013), yet further research on the effectiveness of MBI in FASD populations, particularly youth, is needed.

**Long-term Development of Mindfulness Skills**

Finally, there is evidence to support the longevity of MBI and learning mindfulness skills. This was shown across healthy and autistic adults and now samples of youth. For example, youth with ADHD who improved in attention and impulsivity after MBI had enhanced improvements at follow-up (Van de Weijer-Bergsma et al., 2012). Also, youth with mental health concerns (e.g., anxiety, depression) reported a decrease in their concerns, which was further enhanced at a 3-month follow-up (Tan & Martin, 2015). Finally, in autistic youth, there were fewer immediate changes after MBI in comparison to adults (de Bruin et al., 2015; Hwang et al., 2015; Ridderinkhof et al., 2018), yet autistic youth tended to experience greater long-term (vs short-term) improvements from MBI (Hartley et al., 2019; Klingbeil et al., 2017). This supports the rationale to explore the long-term impacts of MBI in neurodiverse youth in the current study.

**Accessible Interventions**

Families of neurodiverse youth often struggle to know how and where to access support, and barriers often further limit accessibility. These include social and economic
factors (e.g., lack of insurance, living in remote areas, long waitlists or low referral rates, social stigma, & transportation difficulties), as well as child or family-specific barriers (e.g., lack of tailored interventions, challenges bringing children with functional or behavioural limitations to various settings, & levels of parental stress and burden (Almogbel et al., 2017; Weisenmuller & Hilton, 2021).

Due to the physical distancing restrictions implemented to stop the spread of COVID-19, many neurodiverse children and youth had significant disruptions in their services and support. There were 77.9% of families with a neurodiverse child who experienced a decrease in services, with 30-50% losing all therapy and educational services and 32-56% experiencing a change in service modality (i.e., virtual) (Jeste et al., 2020). To meet the needs of these families, many support and services were adapted to virtual delivery during the pandemic; however, many families still received limited services, or their support was cut off entirely (Zhang et al., 2022).

Therefore, the constraints of the pandemic seem to have had a disproportionate impact on neurodiverse individuals and their families (Dekker et al., 2022; Pellicano et al., 2022), with the disruption of services, changes in child and family routines, increased isolation and heightened familial and social stress (Corbett et al., 2021; Masi et al., 2021).

Virtual Interventions

Internet usage is widespread and accessible by most, with 94% of Canadian families having access to the Internet (Statistics Canada, 2019). Considering that the pandemic has impacted availability to in-person services, virtual interventions may be a suitable option for intervention delivery. Technology provides an advantage to delivering
MINDFULNESS BASED INTERVENTION

interventions without needing to be in-person (Hollis et al., 2017), and can aid in improving gaps in accessibility, flexibility, and privacy (Murray, 2012). They can also address barriers to transportation, social anxiety, and physical limitations, particularly in individuals with disabilities (Bunyi et al., 2021).

Evidence supports the effectiveness of virtual interventions for a range of physical, mental, and behavioural outcomes in both children and adults (Barak & Grohol, 2011; Cushing & Steele, 2010). They are found to be adaptable and often shown equal effectiveness as in-person interventions (Gentry et al., 2019), particularly in addressing general mental health concerns (Langarizadeh et al., 2017) and specific clinical diagnoses of depression, anxiety, adjustment disorder, substance use in adults, and eating disorders in adolescents (Varker et al., 2019). While still in its infancy, there is evidence to suggest that virtual interventions are also effective for neurodiverse youth. Khan & colleagues (2019) reviewed the effectiveness of RCTs for virtual interventions delivered to neurodiverse children and youth. They examined ten trials and found that six were delivered online (versus an app) and were effective in improving condition-specific outcomes or reducing co-occurring psychological symptoms. The programs included a virtual intervention for mathematical skill development in SLDs (de Castro et al., 2014), a gaming intervention for the treatment of ADHD (Bul et al., 2016), two behaviour therapies for Tic disorders (Himle et al., 2012; Ricketts et al., 2016), a CBT for children with high functioning autism and anxiety, and an online gaming intervention for emotional learning in autistic children (Fridenson-Hayo et al., 2017).
MINDFULNESS BASED INTERVENTION

MBI Delivered Virtually

With the effectiveness of virtual interventions, there is growing interest in the effectiveness of MBI being delivered virtually to family caregivers of people with NDDs, as well as to neurodiverse individuals. For example, Lunsky & colleagues (2021) recently implemented a six-week virtual MBI for parents of autistic youth and adults, finding it to be both feasible and accepted, and effective in improving mindfulness skills, stress, and depressed mood for parents at all time points (baseline, post-intervention, and 3-month follow-up). Parents reported overall satisfaction with the MBI, along with certain virtual challenges adapting to virtual format and its technology (Lunsky et al., 2021). There has been an effort to establish the effectiveness of virtual MBI with caregivers of other NDDS.

Flynn & colleagues (2020) implemented a virtual MBI, with family caregivers of children and adults with ID. Their qualitative analysis revealed feasibility and acceptability for the program, yet small, non-significant improvements in psychological distress, and health-related quality of life.

Finally, Lunsky & colleagues (2022) have continued work in this area, developing a six-week virtual MBI group for autistic adults. They used an adapted-MBI, informed by autistic advisors, and evaluated feasibility. Results showed that the virtual adapted-MBI was both feasible and accepted, and effective in reducing distress and improving mindfulness skills among autistic adults (Lunsky et al., 2022). The current study aims to build off this study by evaluating the impact of MBI among neurodiverse youth during the COVID-19 pandemic.
Study Rationale

Neurodiverse youth can experience significant mental health issues, which have been further exacerbated by COVID (Pellicano et al., 2022). While adapted mental health programs (e.g., CBT) can be effective in reducing mental health symptoms, such as anxiety and depression in neurodiverse individuals (Chalfant et al., 2007; Sze & Wood, 2007; White et al., 2010), there are significant barriers in accessing these supports and services, especially during the pandemic when there are substantial disruptions to services (Friesen et al., 2022). In-person MBI is a promising intervention, with evidence supporting its effectiveness in reducing mental health concerns and improving well-being among neurodiverse adults, youth, and their caregivers (de Bruin et al., 2015; Ridderinkhof et al., 2018, 2019, 2022). When delivered virtually to caregivers of individuals with autism and to autistic adults, MBI has shown promising results (e.g., improved anxiety, depression, & stress), yet there is limited understanding of virtual MBI delivered to neurodiverse youth, particularly during a pandemic. As such, this study aims to address this gap by examining the feasibility of a virtual adapted-MBI for neurodiverse youth during the pandemic.
Chapter 2: Research Methodology

Research Questions

This thesis examined the feasibility of a virtual adapted-MBI during the COVID-19 pandemic for youth with NDDs and was evaluated using Bowen’s conceptualization of feasibility (2009). This framework outlines eight key areas that should be the focus of establishing feasibility in research studies before being tested for efficacy. If these areas of focus can be established, there is reason to accept an intervention approach and see it as worth testing. Lunsky & colleagues (2022) used this framework to establish the feasibility of a virtual adapted-MBI in autistic adults.

To address the aforementioned study objective, two research questions were addressed:

1) Is a virtual adapted-MBI for youth with an NDD feasible during the COVID-19 pandemic? Consistent with Bowen’s (2009) conceptualization, feasibility will be assessed in five areas.

   a. *Demand.* To what extent is the virtual adapted-MBI likely to be used, and how much interest is likely to exist in a sample of neurodiverse youth? It is expected that there will be *demand* for the MBI (measured in terms of the number of people interested and enrolled) as it is free, accessible, virtually delivered, and offered to youth during a pandemic when access to services were disrupted.

   b. *Implementation.* To what extent can the virtual adapted-MBI be successfully *implemented* to neurodiverse participants? The *implementation* of the group is anticipated to be successful (determined
MINDFULNESS BASED INTERVENTION

through adherence, attrition rates, and program completion), as the MBI has been adapted for people with disabilities (Lunsky et al., 2022), although attrition is expected, particularly during COVID-19.

c. **Limited Efficacy.** Is participating in the virtual adapted-MBI associated with improvements in neurodiverse youth’s mindfulness (Child and Adolescent Mindfulness; CAMM) and mental health (Strengths and Difficulties Questionnaire; SDQ) from baseline to post-intervention? Consistent with previous literature (Lunsky et al., 2022; Spek et al., 2013; Semple et al., 2018), it is hypothesized that after participating in the virtual adapted-MBI, neurodiverse youth will show significant improvements in mindfulness skills and mental health from baseline to post-intervention. Specifically, youth and caregivers will report reductions in mental health symptoms (SDQ), and youth will indicate increase in mindfulness skills (CAMM).

d. **Practicality.** To what extent can the virtual adapted-MBI be carried out as intended with participants, using the current resources, and will it have impact on participants? The MBI is expected to be *practical* (measured through open-ended responses in semi-structured interview) through use of efficient virtual platform (i.e., Zoom), and technical supports, and will be beneficial for participants in and outside program sessions.

e. **Acceptability.** To what extent is the virtual adapted-MBI seen as satisfactory and acceptable (measured through open and close-ended responses in semi-structured interview) in a sample of neurodiverse youth.
during a pandemic? Consistent with previous literature (Lunsky et al., 2022), it is hypothesized that MBI will be accepted, as indicated by satisfaction ratings from participants and responses to the open-ended interview questions.

2. Through exploratory analysis, is participating in the virtual adapted-MBI associated with long-term improvements in youth mindfulness skills (CAMM) and mental health (SDQ)? Consistent with previous literature (Ridderinkhof et al., 2018; Tan & Martin, 2015; Van de Weijer et al., 2012), improvements will be maintained or enhanced from post-intervention to follow-up.
MINDFULNESS BASED INTERVENTION

Procedure

Research Design

A mixed method design was used for this project, which incorporated both quantitative and qualitative data collection and analysis. Whereas qualitative research was used to determine the practicality and acceptability, quantitative research was used to establish efficacy. Using a mixed methods design it allowed research questions to be studied comprehensively from different perspectives and integrated evidence from both quantitative and qualitative findings. Additionally, when interpreting findings from both quantitative and qualitative results, the strengths of one method can complement the limitations of another (Regnault et al., 2018).

Recruitment

Participants were recruited through various strategies. First, the ENHANCE Lab participant database was used to connect with families who had previously participated in the lab’s research and had consented to be contacted for future potential studies. These potential participants were contacted through email to see if they were interested and then screened over the phone for eligibility. Second, participants were recruited through advertisements posted on social media sites (i.e., ENHANCE Lab website, Facebook, Instagram, & Twitter) and through posters sent to community agencies in Calgary. Any individuals who were interested in the program were able to contact the team directly (i.e., via phone or email) or by submitting their contact information into an online form (i.e., Qualtrics).
MINDFULNESS BASED INTERVENTION

Participants

The present study is part of a larger study (REB20-1270) examining the effectiveness of mindfulness for neurodiverse youth and adults across Canada (PI: C.A McMorris). The larger study involves providing virtual adapted-MBI for two groups: 1) neurodiverse youth; and 2) Special Olympics Athletes. The present study will only present findings from the neurodiverse groups. All facilitators involved in this group, are involved in the larger study, and its’ ongoing data collection.

To participate in the neurodiverse groups youth had to: 1) be between the ages of 11-18 years; 2) be diagnosed with an NDD or identify as neurodiverse; 3) have access to a computer with a working webcam, microphone, and internet connection anywhere in Canada; 4) be able to communicate verbally in English; and 5) have a parent or caregiver willing to participate and commit to attending each weekly session.

Pre-screening & Enrollment

Interested participants completed a brief pre-screening questionnaire to confirm eligibility criteria, followed by their commitment to attend the intervention sessions. After participants were screened by ENHANCE lab research coordinator, they were invited to participate in the study and the group, given additional options for upcoming group dates and times, and then given the appropriate consent forms to be read, signed, and sent back. Parents then completed consent forms, and the youth completed assent. Next, parents completed demographic information. Participants then were assigned to the upcoming group and completed questionnaires at three separate time points: pre-intervention (baseline); post-intervention following the final session (six weeks after baseline), and approximately three months after baseline (longer-term...
MINDFULNESS BASED INTERVENTION

follow-up). The exit interviews were scheduled with families and completed approximately one month after the intervention was completed. The completion of measures at each time point took each participant approximately 1 hour to complete, and the exit interview took approximately 15-20 minutes. The participating caregivers received links to complete questionnaires on the University of Calgary’s survey platform (powered by Qualtrics), and youth had the option to complete measures in an interview format over the phone with a member of the research team or with their parent (i.e., using Qualtrics). Of note, caregivers completed a variety of measures (e.g., The Perceived Stress Scale; PSS-10 [Lee, 2012]; The Brief Resilient Coping Scale; BRCS; [Sinclair & Wallston, 2004]); however, these are not included in this thesis. Participants were compensated for their time and received a gift card in the amount of $40 at both Time 1 and Time 3.

Measures

Demographic Information

Parents were asked to provide demographic information about the child (e.g., primary, and secondary diagnosis, gender, ethnicity, diagnoses, services), the family (e.g., number of people living in the household), and the participating caregiver/parent (e.g., gender, age, marital status).

COVID-19 Disruptions and Difficulties

As this study was conducted during the COVID-19 pandemic, determining pandemic impacts and disruptions to the current sample was important. The caregivers were asked to provide Likert-scale ratings (0 = not at all to 4 = extremely) of the degree
to how a statement applied to their family (e.g., “Did you or your family experience financial hardship?”, “Did you fear for your own or your family’s health and safety?”. “Did your family have trouble getting food or water?”). Caregivers were also asked to select services their child was accessing prior to the pandemic from a list (e.g., therapies, counselling, social skills training), and to specify whether there had been a change in the child’s access to these services or programs due to the physical restrictions implemented during the COVID-19 pandemic. These responses were used to determine impacts and service disruptions/losses.

**Youth Mental Health**

Both youth and their participating parent completed the *Strengths and Difficulties Questionnaire* ([SDQ]; Goodman, 1997). The SDQ is a useful brief measure of mental health symptoms in children and adolescents. The SDQ is comprised of 25 items measuring five domains: prosocial behaviour, emotional symptoms, conduct problems, hyperactivity, and peer problems. Respondents rate statements (e.g., “often has temper tantrums or a hot temper”) as either not true, somewhat true, or certainly true. A total difficulties score is generated by summing the four problem domains, with total difficulties scores ranging from 0 to 40. A total SDQ score is Normal (0-15), Borderline (16-19) or Abnormal/Clinical (20-40). The total score was used in the analysis for both baseline and post-intervention time points.

The SDQ has been useful in screening children with autism, ADHD, and other NDDs, and often show borderline to clinical scores (Salayev & Sanne, 2016; Russell et al., 2013). In previous studies, the reliability of the SDQ had an acceptable level of internal consistency ($\alpha = 0.73$) and retest reliability ($r = 0.62$) (Goodman, 2001) and
remained comparable in youth with autism. In this study, the SDQ was acceptable for self-report at baseline and post-intervention (i.e., $\alpha = 0.62$, $\alpha = 0.75$) and parent report at baseline but questionable for parent report post-intervention (i.e., $\alpha = 0.62$, $\alpha = 0.38$).

**Youth Mindfulness**

*The Child Acceptance and Mindfulness Measure* (CAMM; Greco et al., 2009) was used to determine youth mindfulness skills at baseline, post-intervention, and 3-month follow-up. The CAMM is a 10-item self-reported measure of mindfulness in children and adolescents. It measures aspects of mindfulness, including acting with awareness (i.e., the opposite of automatic responding) and accepting without judgment (i.e., a person’s ability to experience the present moment without evaluating it). The CAMM conceptualizes mindfulness as a trait and produces a single total score. The scale items are rated on a 5-point Likert scale (0 = false to 4 = always true). Examples of items on the CAMM include, “I notice small changes in my body, like when my breathing slows down or speeds up,” and “I get upset with myself for having feelings that don’t make sense.” The lowest total score is zero and the highest total score is 40; the higher the score, the more the individual’s willingness for mindfulness. Total scores on the CAMM were used in the current analysis.

In previous studies, the reliability of the CAMM has had acceptable internal consistency in autistic children and adolescents ($\alpha = 0.80$ [Roubarani et al., 2020]; $\alpha = 0.87$, [Salem-Guirgis et al., 2019]). The internal consistency for this study at baseline and post-intervention was acceptable ($\alpha = 0.75$, $\alpha = 0.87$).
Exit Interview

Participant perceptions of the intervention’s benefits, challenges, and impacts were captured through a post-intervention semi-structured interview which consisted of 10 questions. The first six questions in the interview were based on the exit interview used in a similar study (Beck et al., 2020) and included questions such as “What impact did this group have on you?”; “What did you learn about yourself as a result of this group?” Next, participants were asked to rate overall satisfaction with the group and satisfaction with group facilitation and organization on a scale from 1 (very dissatisfied) to 5 (very satisfied). The final item asked if participants had any comments about the group.

The interviews were conducted by graduate students who were not involved in implementing the intervention. To ensure interviewer neutrality and to prevent participant hesitancy from sharing honest feedback (i.e., positive or negative) about the program, an external interviewer was important. The interviewers used a semi-structured guideline, and had proper training in skills required for prompting, clarifying, and summarizing participant responses. Interviews were then transcribed verbatim from the audio recording by an individual external to the study. The interviews were conducted with both the youth and caregivers together, both providing responses.

Intervention Description

The intervention delivered in the current study was based on a mindfulness program adapted for autistic adults, developed by Dr. Yona Lunsky & colleagues in 2018 (Lunsky et al., 2022). This six-week program was based on mindfulness-based stress reduction (MBSR) (Kabat-Zinn, 2003), and was adapted to be more accessible
for autistic adults in collaboration with autistic adult advisors. Specific adaptations included making the language less abstract and more concrete, shortening the sessions and the guided meditation practices in and outside sessions, and reducing the total number of sessions from eight to six. Each weekly session was one hour long and focused on a different mindfulness skill through one or more exercises. Some of these exercises required sitting still and focusing on the breath (e.g., lotus breathing), others required art (e.g., mindful art), and other exercises encouraged movement (e.g., mindful walking). All autistic adults that registered in the mindfulness intervention received a workbook. This workbook provided a description of each week’s activity and included instruction for home practice (i.e., mindfulness exercises participants could do outside of the program). Sue Hutton, an experienced mindfulness facilitator delivered these sessions, with the assistance of autistic advisors (Lunsky et al., 2022).

The current study delivered the same MBI intervention as Lunsky and colleagues (2022), with some adaptations to make it more accessible to neurodiverse youth. First, the workbook was revised to include a youth and caregiver specific introduction with words of encouragement for youth (e.g., “Just try your best”) and “autistic adults” was changed to “neurodiverse youth and caregivers”. The techniques used were the same as the original components of MBSR (Zabat-Kinn, 1979) and with autistic adults (Lunsky et al., 2022) but the tone, pace, and energy used by the facilitator was adapted to be more appropriate for youth. Additional adaptations that occurred during groups included the facilitator modifying her language to be more accessible to youth rather than adults and providing additional examples and alternative options for exercises. For example, during the walking exercises, participants were encouraged to remain seated, or lie
MINDFULNESS BASED INTERVENTION

down, if standing or walking created an unpleasant sensory experience for them. There were also technical support personnel that monitored the chat, audio and camera privileges and any technical difficulties.

Similar to Lunsky & colleagues (2022), the MBI for this study was also delivered over Zoom by Sue Hutton and was delivered once a week, across six weeks for one hour each week. Youth from the current study were encouraged to participate within their comfort level and attempt each activity to the best of their ability. Recognizing that some youth may not want to have their cameras on or may not want to use their microphone, youth were told by the facilitators that they could keep their cameras off and instead use the chat to communicate. This helped to accommodate those with varying sensory, communication, and behavioural challenges. Parents were involved in the group to provide support to youth and were required to attend all sessions. Parents could participate in exercises and practices as they wish, and this often-encouraged participation from their child.

For a more detailed description of the intervention and the mindfulness workbook for neurodiverse youth see Appendix I.

Data Analysis

Quantitative Analysis

Quantitative measures were analysed in SPSS Statistics to examine the efficacy of the intervention for both immediate and long-term impacts. SPSS was used to first describe the key features of the data (i.e., outliers, missing data, normal distribution, and linearity) and to properly prepare the data for analysis. The amount of missing data was examined across each variable and participant. When a participant was missing
MINDFULNESS BASED INTERVENTION

over 20% of their data, often only completing baseline measures (i.e., no parent or child data at Time 2 and Time 3), they were removed using list-wise deletion. Consequently, seven (33%) participants were removed from the analysis. Next, to perform analyses, data were verified for interval level of measurement, independent observations, normally distributed data, and homogeneity of variance. Following verification of data assumptions, analysis was performed.

First, paired sample t-tests evaluated immediate change (limited efficacy) in outcome measures, using the means total score (i.e., SDQ & CAMM) between two time points (i.e., baseline & post-intervention). Next, the reliable change (RC) indices were calculated to determine if the strength of changes for each participant from baseline to post-intervention (i.e., six weeks) was clinically meaningful (Jacobson & Traux, 1991). The RC can be used to investigate if participants experience a change from before to after the intervention in terms of 1) how much change has occurred and 2) if the participants’ change has resulted in improvements (Guhn et al., 2014).

The equation for the reliable change as calculated by Jacobson & Truax (1991, pp. 14) is expressed as:

$$RC = (Time2 - Time1) / S_{diff}$$

The participant’s baseline score was subtracted from the post-intervention score and divided by the standard error of difference between the two scores. Standard error of difference is expressed as:

$$S_{diff} = 2 \sqrt{(SE)^2}$$

The reliability coefficients are outlined in the measures sections and will be used to calculate the results for this study. Statistical significance ($p < .05$) is achieved when the
MINDFULNESS BASED INTERVENTION

RC value is equal to or greater than 1.96, as this indicates that there is less than a 5% chance (i.e., \( p \)-value) that the post-intervention score falls within 2 standard deviations (with error) from the baseline score, thus showing a change of greater than two standard deviations has occurred.

To explore the longer-term impacts of participating in the MBI, an exploratory repeated measure ANOVA, with time as a 3-level within-subject factor was conducted using only those participants who completed data at all three time points (i.e., baseline, post-intervention, follow-up). Lastly, the RC index was computed to further explore if individual total score changes remained at follow-up. These two levels of analysis were done with exploratory purposes.

**Qualitative Analysis**

Thematic analysis (Braun & Clarke, 2006) was used to analyze the interviews. This analysis followed a six-step process: familiarization, coding, generating themes, reviewing themes, defining and naming themes, and writing up. To ensure trustworthiness, the research team employed investigator triangulation (Guion, 2002) which requires different perspectives to interpret the same set of data. Specifically, the main researcher analysed the transcripts, with the assistance of Dr. Brianne Redquest (BR) and Dr. Carly McMorris (CM). This helped to reduce potential research bias and enhance credibility. During the *familiarization* step the interviews were listened to twice, to increase familiarization with the data. Additionally, transcribed interviews were read several times by the principal researcher (HO) to ensure accuracy of transcriptions and, again, increase familiarization. During the *coding* step, the transcribed interviews used a color-coding technique to highlight key information (i.e., codes), including potentially...
MINDFULNESS BASED INTERVENTION

important or relevant information related to the research purpose. During the generating themes step, codes were reviewed to identify patterns, and to create broader, overarching themes. These themes were then divided into subthemes. During the reviewing themes step, themes and subthemes were reviewed by the research team to ensure they accurately represented the data. Themes were not confirmed until all research team members (i.e., HO, CM, & BR) agreed upon them. During the defining and naming themes, themes were finalized, labelled, and clearly defined to ensure that they were succinct and the titles for themes and subthemes accurately represented content. During the final step, writing up, the themes were summarized using quotes from the transcribed interviews.
Chapter 3: Results

Participants Demographic Information

Thirty-four participants expressed interest in participating in the study. Of those, 28 youth met inclusion criteria, signed consent, and were enrolled in the study along with their parents. Of those 28 participants, 23 participants completed the demographics questionnaire. These 23 youth participants were between the ages of 11-18 years ($M = 12.72$, $SD = 1.34$) and included both male (54%, $n = 12$) and female (42%, $n = 10$) participants. One youth did not disclose gender. Most youth had a primary diagnosis of autism (83%; $n = 19$), but also included primary diagnoses of FASD (9%), SLD (4%) or ADHD (4%). All youth demographic information is provided in Table 1.

Parents were between the ages of 34-54 years ($M = 44.38$, $SD = 5.95$) and predominantly identified as female (96%, $n = 22$). Most parent participants enrolled in the study were a biological parent (79%, $n = 18$), with the remainder (22%, $n = 5$) indicating they were either a step or adoptive parent. All parent demographic information is provided in Table 2.
### Table 1

#### Youth Demographics

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<th>M (SD)</th>
<th>n</th>
<th>%</th>
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<td>4</td>
<td>18</td>
</tr>
<tr>
<td>ADHD</td>
<td>13</td>
<td>13</td>
<td>57</td>
</tr>
<tr>
<td>SLD</td>
<td>7</td>
<td>7</td>
<td>30</td>
</tr>
<tr>
<td>OCD</td>
<td>4</td>
<td>4</td>
<td>18</td>
</tr>
</tbody>
</table>

Note. \( n = 23 \); participants who were recruited and completed demographic information. FASD: fetal alcohol spectrum disorder; ADHD: attention deficit hyperactive disorder; SLD: specific learning disorder; OCD: obsessive compulsive disorder.
Table 2

Parent Demographics

<table>
<thead>
<tr>
<th></th>
<th>M (SD)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>44.38 (5.95)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>44.38 (5.95)</td>
<td>22</td>
<td>96</td>
</tr>
<tr>
<td>Male</td>
<td>44.38 (5.95)</td>
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<td>4</td>
</tr>
<tr>
<td>Marital status</td>
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<td></td>
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<td>9</td>
</tr>
<tr>
<td>Single</td>
<td></td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Parental</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological</td>
<td></td>
<td>18</td>
<td>78</td>
</tr>
<tr>
<td>Adopted</td>
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<td>4</td>
<td>18</td>
</tr>
<tr>
<td>Stepparent</td>
<td></td>
<td>1</td>
<td>4</td>
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<tr>
<td>Education</td>
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<td></td>
<td></td>
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<tr>
<td>High School</td>
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<td>4</td>
<td>18</td>
</tr>
<tr>
<td>College/University</td>
<td></td>
<td>10</td>
<td>43</td>
</tr>
<tr>
<td>Undergraduate</td>
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<td>7</td>
<td>30</td>
</tr>
<tr>
<td>Graduate</td>
<td></td>
<td>2</td>
<td>9</td>
</tr>
</tbody>
</table>

Note. n = 23; participants who were recruited and completed demographic information

The COVID-19 pandemic impacted most families (e.g., loss of services & programs), with all parents reporting that their child was accessing at least one service prior to the pandemic, including individualized (45%, n = 11), group (9%, n = 2) and family (45%, n =11) services. Most parents reported that COVID-19 disrupted their lives moderately or extremely (87%). More than half (56%) of families reported feeling extreme or moderate fear for their own or their child's safety. Information on disruptions and difficulties due to COVID-19 is included in Table 3 and 4.
Table 3

**COVID Services and Disruptions**

<table>
<thead>
<tr>
<th>Disruption to services</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational Therapy</td>
<td>16</td>
<td>67</td>
</tr>
<tr>
<td>Speech Language</td>
<td>7</td>
<td>29</td>
</tr>
<tr>
<td>Physical Therapy</td>
<td>18</td>
<td>75</td>
</tr>
<tr>
<td>Psychology</td>
<td>14</td>
<td>60</td>
</tr>
<tr>
<td>Counseling</td>
<td>16</td>
<td>67</td>
</tr>
<tr>
<td>Respite care</td>
<td>18</td>
<td>77</td>
</tr>
<tr>
<td>Social work</td>
<td>16</td>
<td>67</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disruption to programs</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreational</td>
<td>20</td>
<td>82</td>
</tr>
<tr>
<td>Social skill</td>
<td>18</td>
<td>78</td>
</tr>
<tr>
<td>Activity-based</td>
<td>13</td>
<td>57</td>
</tr>
<tr>
<td>Behavioural</td>
<td>16</td>
<td>67</td>
</tr>
</tbody>
</table>

Table 4

**Disruptions and Difficulties with COVID-19**

<table>
<thead>
<tr>
<th></th>
<th>Not at all or somewhat</th>
<th>Moderately or quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>To what extent has your family's life been disrupted by the COVID-19 pandemic?</td>
<td>3</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>Has your family experienced financial hardship?</td>
<td>13</td>
<td>57</td>
<td>4</td>
</tr>
<tr>
<td>Have you feared for your own or your family's health or safety?</td>
<td>10</td>
<td>43</td>
<td>6</td>
</tr>
<tr>
<td>Have your children feared for their own or their family’s health or safety?</td>
<td>10</td>
<td>43</td>
<td>6</td>
</tr>
<tr>
<td>Has your family had difficulty getting food?</td>
<td>21</td>
<td>91</td>
<td>1</td>
</tr>
<tr>
<td>Has your family experienced a shortage of essential goods?</td>
<td>21</td>
<td>91</td>
<td>2</td>
</tr>
<tr>
<td>Has your family had difficulties finding childcare?</td>
<td>16</td>
<td>70</td>
<td>4</td>
</tr>
</tbody>
</table>
Research Question 1: Is a virtual adapted-MBI feasible for neurodiverse youth during a pandemic, based on Bowen’s (2009) feasibility framework?

1a. Demand

Demand, or expressed interest for the MBI, was measured by the number of people recruited. There were 34 who expressed interest, and 28 were eligible and consented. Of those, five did not respond after consent, and therefore were not enrolled in groups. These participants were enrolled across three groups (i.e., Group 1, n = 7; Group 2, n = 10; Group 3, n = 6); groups that were completed in December 2020, February 2021, and May 2021, respectively. Of those enrolled (n = 23), all completed baseline measures, fewer completed post-intervention (n = 16) and even fewer completed follow-up measures (n = 9; Figure 1).
1b. Implementation

Implementation operationalized as success or degree of executing the intervention as intended was assessed through program adherence and attrition rates. A total of five participants that completed the consent dropped out and did not show up for the first group session, some with a reason (e.g., COVID), others not. After the initial
session or before the full completion of the program, another five dropped out due to individual reasons (e.g., time conflict & online challenges). Therefore leaving 18 participants in the program. All 18 of these participants completed the program. Based on baseline measures, there was no significant difference between those who dropped out and didn’t complete the program than those stayed and fully completed the program. Specifically, those who completed the program \((n = 18)\) did not differ statistically from those who did not complete the program \((n = 5)\) on baseline measures (i.e., SDQ & CAMM).

Adherence was assessed in terms of attendance, the number of dropouts, and program completion. Attendance at four or more sessions out of six (60%) was considered completion, and all 18 of these participants completed the program, with most participants (89%) attending at least five or more sessions. Overall, participants were mainly compliant in completing the outcome measures while in the mindfulness groups (i.e., baseline to post-intervention; \(n = 16\)), with fewer completing the follow-up questionnaires \((n = 9)\) and exit interviews \((n = 9)\). Of the final nine participants who completed the exit interview, eight had completed all study requirements (i.e., program completion, baseline, post-intervention, follow-up measures, & exit interview).

1c. Limited Efficacy

Limited efficacy was assessed using paired sample \(t\)-tests and the reliable change (RC) indices to determine if there were changes in neurodiverse youth’s mindfulness (CAMM) and mental health (SDQ) from baseline to post-intervention. Analyses were only completed using data from 16 youth and parent reports; those who
MINDFULNESS BASED INTERVENTION

completed both baseline and post-intervention measures, in which demographic information for this subgroup is presented in Table 5.
Table 5

Youth Demographics

<table>
<thead>
<tr>
<th></th>
<th>M (SD)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>12.69 (1.30)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>5</td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>Male</td>
<td>11</td>
<td></td>
<td>69</td>
</tr>
<tr>
<td><strong>Primary diagnosis</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Autism</td>
<td>13</td>
<td></td>
<td>81</td>
</tr>
<tr>
<td>FASD</td>
<td>1</td>
<td></td>
<td>6.3</td>
</tr>
<tr>
<td>ADHD</td>
<td>1</td>
<td></td>
<td>6.3</td>
</tr>
<tr>
<td>SLD</td>
<td>1</td>
<td></td>
<td>6.3</td>
</tr>
<tr>
<td><strong>Secondary diagnosis</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intellectual Disability</td>
<td>4</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>Anxiety</td>
<td>11</td>
<td></td>
<td>69</td>
</tr>
<tr>
<td>ADHD</td>
<td>9</td>
<td></td>
<td>56</td>
</tr>
<tr>
<td>SLD</td>
<td>5</td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>OCD</td>
<td>3</td>
<td></td>
<td>19</td>
</tr>
</tbody>
</table>

Note. n= 16; participants who were recruited and completed demographic information

FASD: fetal alcohol spectrum disorder; ADHD: attention deficit hyperactive disorder; SLD: specific learning disability; OCD: obsessive compulsive disorder.

Both youth and parent reports show the severity of the mental health scores on the SDQ were clinically significant (Goodman, 1997). Youth self-report SDQ scores did not differ from baseline (M = 24.19, SD = 6.18) to post-intervention (M = 24.75, SD = 6.29), nor did parent-reported SDQ from baseline (M = 23.81, SD = 4.74) to post-intervention (M = 23.06, SD = 4.39) (Figure 3, Table 6). Similarly, there was no significant difference in mindfulness skills (CAMM) from baseline (M = 17.81, SD = 7.50) to post-intervention (M = 20.75, SD = 8.99). Neither youth mental health nor mindfulness skills improved immediately following participation in the virtual adapted-MBI.
MINDFULNESS BASED INTERVENTION

Figure 2

Mean Scores for SDQ

Note. Total scores for youth self-reported and parent-reported mental health \((n = 16)\) are shown for baseline and post-intervention. SDQ: Strengths and Difficulties Questionnaire.

Figure 3

Mean Scores on CAMM

Note. Total scores for youth mindfulness \((n = 16)\) are shown for baseline and post-intervention. CAMM: Child and Adolescent Mindfulness Measure.
MINDFULNESS BASED INTERVENTION

Table 6

*Paired Sample T-tests*

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Post-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>SDQ-Self</td>
<td>24.19</td>
<td>6.18</td>
</tr>
<tr>
<td>SDQ-Parent</td>
<td>23.81</td>
<td>4.74</td>
</tr>
<tr>
<td>CAMM</td>
<td>17.81</td>
<td>7.50</td>
</tr>
</tbody>
</table>

Note. *p*-values < or equal to .05 are considered significant

A reliable change (RC) index was calculated for each participant in this subsample (*n* = 16) and are reported in Table 7.

The change in total scores for each participant on outcome measures (i.e., SDQ & CAMM) were used to calculate the RC index. Reliable change values greater than 1.96 are indicative of clinically meaningful changes. In this sample, both youth and parent reports show the severity of the mental health scores on the SDQ were clinically significant (Goodman, 1997).

On the CAMM, three youth (19%) reported clinically meaningful changes in mindfulness, and two youth indicated improvements on the CAMM. In terms of youth mental health symptoms, four parents (24%) reported meaningful change, with three parents reporting clinically meaningful improvements in youth mental health. Lastly, only one youth reported clinically meaningful improvements in mental health symptoms. There was one youth that reported worse mental health and mindfulness at post-intervention.
MINDFULNESS BASED INTERVENTION

Table 7

Reliable Change Values from Baseline to Post-Intervention

<table>
<thead>
<tr>
<th>Participant ID</th>
<th>CAMM</th>
<th>SDQ Self</th>
<th>SDQ Parent</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>-.55</td>
<td>.48</td>
<td>-1.01</td>
</tr>
<tr>
<td>P2</td>
<td>.73</td>
<td>.48</td>
<td>1.01</td>
</tr>
<tr>
<td>P3</td>
<td>2.00*</td>
<td>.95</td>
<td>-.34</td>
</tr>
<tr>
<td>P4</td>
<td>.91</td>
<td>.24</td>
<td>-.34</td>
</tr>
<tr>
<td>P5</td>
<td>-.55</td>
<td>.24</td>
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<tr>
<td>P6</td>
<td>1.45</td>
<td>-.72</td>
<td>-1.68</td>
</tr>
<tr>
<td>P7</td>
<td>-.18</td>
<td>.00</td>
<td>-3.36*</td>
</tr>
<tr>
<td>P8</td>
<td>1.27</td>
<td>.00</td>
<td>2.35*</td>
</tr>
<tr>
<td>P9</td>
<td>.73</td>
<td>-.24</td>
<td>-5.70*</td>
</tr>
<tr>
<td>P10</td>
<td>3.09*</td>
<td>-.48</td>
<td>1.34</td>
</tr>
<tr>
<td>P11</td>
<td>-.18</td>
<td>-.95</td>
<td>.00</td>
</tr>
<tr>
<td>P12</td>
<td>1.27</td>
<td>.00</td>
<td>.67</td>
</tr>
<tr>
<td>P13</td>
<td>1.09</td>
<td>1.67</td>
<td>-2.68*</td>
</tr>
<tr>
<td>P14</td>
<td>-.18</td>
<td>-.95</td>
<td>-.34</td>
</tr>
<tr>
<td>P15</td>
<td>.18</td>
<td>-.72</td>
<td>1.01</td>
</tr>
<tr>
<td>P16</td>
<td>-2.55*</td>
<td>2.15*</td>
<td>3.36*</td>
</tr>
</tbody>
</table>

Notes: Reliable change indexes are considered clinically significant (*) > or equal to 1.96. The negative value (-) RCI of the SDQ show improvements in mental health. The negative (-) RCI of the CAMM, show a decrease in mindfulness scores.

1d. Practicality

Practicality was measured through ease or difficulty implementing the program from start to finish, as well as the ability for participants to show benefits or impacts after the intervention and be able to apply these benefits outside of the program. The facilitator and technical supports indicated that the program was successfully delivered across all groups, and the MBI weekly schedule was followed. The MBI sessions were completed as planned, and the mindfulness practices were virtually delivered with limited issues. Small issues or challenges included slow internet connections, general Zoom disruptions, and a few participants who had no experience with
webcam/microphone use. These challenges did not impact the quality of or accuracy of the program delivery and practicality. The thematic analysis described below also offers valuable information regarding the practicality of the intervention.

1e. Acceptability

Acceptability was evaluated using both the open-ended questions from the exit interviews and the satisfaction rating responses from the satisfaction survey, with both youth and their caregivers completing it at the end of the MBI. During these interviews, participants were asked to identify strengths and weaknesses of the MBI and its delivery. Nine youth, plus their caregivers, completed an exit interview together. Overall, MBI had good acceptability based on satisfaction ratings and open-ended responses, with all nine participants indicating they would recommend the program to others. Participants were asked to rate the following areas: overall satisfaction with the group, satisfaction with group facilitation, and satisfaction with the group organization, on a scale from 1 (very dissatisfied) to 5 (very satisfied). Average ratings were 4.06 on group satisfaction, 4.17 on group facilitation, and 4.17 on group organization.

Participant experiences fell into two main themes: 1) Finding purpose in mindfulness, and 2) What works for one may not work for all. These themes were further broken down into subthemes described in more detail below. Please note that pseudonyms were used to protect the confidentiality of participants.

Theme 1: Finding Purpose in Mindfulness

All participants stated that mindfulness was helpful and improved their lives in at least one way. Further, all participants said that they would recommend MBI to other individuals, and more than half planned to continue using mindfulness in their lives.
Mindfulness skills were mentioned by most participants as a practical skill that helped them cope in stressful situations. This theme has been divided into three subthemes: 1) the utility of mindfulness, 2) building coping skills, and 3) increasing awareness and self-improvement.

**Utility of Mindfulness**

Several participants discussed the accessibility of mindfulness in their everyday lives. For example, participants described that mindfulness did not require tangible resources, which meant that it could be utilized anywhere and at any time. One youth stated, “It was really helpful and useful, and when stressed I have skills in my back pocket” (Laura, youth). Given that participants could carry these “skills in their back pocket”, it allowed them to use mindfulness outside of the group sessions. For example, Greg (youth) stated, “During online schooling, sometimes technical issues made me experience stress and I had to use [these] techniques”. Jessica (youth) described that she used mindfulness when she was stressed at school stating, “I did one of the breathing activities and it helped me be calm.” Chris (youth) shared a potential benefit of using mindfulness at home: “The mindfulness eating, would be a perfect way to slow down and actually do what my parents really want me to do”. While mindfulness was most often used outside the sessions to reduce stress, Mandy (caregiver), explained an additional purpose for mindfulness: “It helped the kids with sleeping”.

Youth and caregivers emphasized the advantages of learning a variety of mindfulness skills, as opposed to learning just one. One caregiver shared: “One technique might not resonate with you or your child, but they would teach you another one, and we got to explore all sorts of techniques” (Jackie, caregiver). Similarly, Roy
MINDFULNESS BASED INTERVENTION

(youth) shared: “I learned that some things work for me, and some don’t and trying them is all important”.

The practicality and usefulness of mindfulness extended from first time learners to those who had prior experience with mindfulness. First-time learner, Greg (youth) shared: “It’s always wonderful to get new skillsets as we go through life.” Roy (youth) with previous experience in mindfulness conveyed, “I learned mindfulness at school but had never done a walking meditation before, and it made me feel better.”

The purpose of mindfulness and the associated impacts were mentioned by several participants. Chris (youth) described mindfulness as “very helpful, it can put your mind into shape, really.” Lucy, a caregiver, shared “It is like yoga, and it is for improvement of mental health.” Associated impacts were also described, for example Chris (youth) stated: “I tried using the eating method, and it’s very satisfying, actually” and Taylor (youth) shared “You learn how to relax, and how to calm yourself”.

Building Coping Skills

Several participants discussed how mindfulness helped them manage their mental health. For example, one youth described how it helped him better manage his symptoms of obsessive-compulsive disorder, “It also makes me feel like I need to decrease my habits of handwashing. That’s another part of my anxiety that I have, and it helps a lot with my condition” (Chris, youth).

Three participants shared that they applied their mindfulness skills when feeling stressed. The breathing practice was the most common technique to use during these times of stress. One youth shared: “Sometimes I do some breathing when I am stressed” (Heath, youth). Andrew, a youth, described the impact of using these
breathing exercises during times of stress, “When I would do the breathing activities, it would actually help me calm down.” One participant shared how she felt immediately after the sessions: “It really helped calm me down, and after the meetings, I felt calm and relaxed” (Sheryl, youth). More explicitly, one participant explained how he felt when practicing mindfulness: “You get out of your head and just relax, and maybe not actually have a care in the world” (Chris, youth). Finally, a caregiver described how she felt better equipped:

“I feel like I’m better equipped now because I wouldn’t have ever done meditation in my life before, and so it was really interesting for me to find out what it was about and what it actually is and how it can help us” (Jackie, caregiver).

**Increasing Awareness and Self-Improvement**

Through engagement with mindfulness, participants learned more about themselves and were able to identify strategies that worked for them. Several participants described what they had learned about themselves. Roy, a youth, shared: “I learned that sometimes I don’t pay enough attention to my feelings.” This was further echoed by Heather (youth): I learned that I don’t have a lot of attention. Similarly, Sheryl, a youth, shared, “I learned that it takes me a bit to get focused.”

In terms of strategies, several youth participants explained what worked best for them. Jessica (youth) stated “I learned that I could calm myself in different ways.” Similarly, Andrew (youth) shared, “I learn strategies from reading and writing like how to get less stressful in stressful situations.” Greg also described knowing which strategy worked best for him, “I learned that breathing is the best stress reliever for me, and I have been encountering quite a bit lately” (Greg, youth).
MINDFULNESS BASED INTERVENTION

Theme 2: What Works for One, May Not Work for All

While the intervention group was associated with many benefits, it also came with challenges. This theme will highlight the areas of concern identified by participants, including their ability to focus and interact with participants. Recommendations for future groups were provided to help mitigate future challenges and improve group adherence and participation. This theme was broken down into three subthemes: 1) Attention and focus, 2) Virtual format, and 3) Improvements for future groups.

Attention and Focus

Attention and focus were common challenges, with several participants identifying factors that impacted their ability to pay attention during MBI sessions and often felt easily distracted. One participant shared: “I found it difficult to stay focused, it was long, and I just wanted to do other things, like play with toys” (Sheryl, youth). One participant provided a recommendation that could help him stay focused: “The group could have been more entertaining and may have helped with focus” (Howard, youth). Similarly, Andrew (a youth) recommended:

“Maybe more practical activities, where people can get engaged. The organization and the facilitators were good; I just wish people were talking and sharing opinions and having more things to do after the session. And making something, so they want to do it after, and so they practice it. Some people don’t practice it at all, so things that will help them remember to practice it” (Andrew, youth).
Virtual Format

As mentioned, several participants noted that paying attention and focusing throughout sessions was challenging. A significant contributor to this was the virtual format. Roy (youth) stated: “It might work better attention-wise and interaction-wise if it was face-to-face instead of online.” Caregivers also reiterated this. For example, Sharon (caregiver) shared: “It was hard to manage distractions for her, and it is easier to get distracted while at home.” Similarly, Dianne (caregiver) shared: “With his ADHD and autism, he has a lot of trouble concentrating, so it is very easy to drift away from the online format when no one may notice”. Participants described needing more activities to increase group engagement and improve overall participation. When asked, as an interview follow-up question, ‘Would the group have been better in-person/face-to-face’, almost half said “Yes,” with one caregiver sharing: “Also, sometimes the kids had their cameras or sound on, and they were either really distracting, clearly not paying attention, or were chitchatting, and not really taking the advice really well” (Jackie, caregiver). One caregiver, whom had two youths who participated in the program, specified her challenge with the virtual format stating: “When you are dealing with youth with autism, there’s a space thing that needs to be respected, so sometimes it just wasn’t physically possible to be in the view of the camera” (Mandy, caregiver). Finally, although the virtual intervention was accessible, it offered limited flexibility in scheduling. Some caregivers found this challenging at times. For example, Diane (caregiver) shared: “The ability to schedule across participants’ availabilities can make it difficult. The online format makes it easier for people to get online, but it can be hard to schedule around school, dinner, and late at night.”
While participants described the challenges they encountered with the virtual delivery of the program, there were some benefits. Youth and caregivers often focused on different areas of the MBI when describing benefits. The caregivers were more likely to describe the general advantages of the MBI, including virtual delivery, facilitation, and accessibility of intervention materials. Youth tended to focus more on specific uses of the MBI, including preferred mindfulness practices, unique situations where they applied mindfulness skills, and emotions recognized from mindfulness practices. Therefore, the youth did not focus on the virtual delivery of MBI when asked about benefits, although they rated the facilitation and organization as acceptable.

Caregivers reported that the virtual delivery was convenient from home. They also reported that the online format allowed for all participants to see each other (i.e., if cameras were all on), sharing: “It was nice to be able to see everyone’s faces on the screen” (Jackie, Caregiver). Additionally, although there were challenges (e.g., multiple participants speaking and being distracting on camera), one caregiver appreciated how the group handled these distracted. ‘The technical support people were able to handle these issues and mute these participants’ (Sharon, caregiver).

**Improvement for future groups**

Finally, a common recommendation given by participants was having more participant engagement within the group. Many participants asked for activities to be ‘more fun’. Specifically, one participant asked for more opportunities to interact and engage; although he described himself as shy, he wished more activities were tailored to him sharing his experience, stating, “I couldn’t, or maybe did not have enough time to say what I was thinking or feeling” (Roy, youth). Another recommendation for the group
was given by Andrew (youth), “Maybe talk about more interesting topics. So, people would stay and wouldn’t leave, and more people would talk more and give their opinions.” Another recommendation to improve group interest and interaction was provided: “To improve the group, more interactive things, with some sort of games to go along with the activities, would be helpful” (Jessica, youth).

**Research Question 2: Is participating in a virtual adapted-MBI associated with long-term improvements in neurodiverse youth’s mindfulness skills and mental health?**

This was strictly an exploratory analysis to observe patterns of change and test the hypothesis that MBI can show long-term impacts. This analysis included nine participants who completed the outcome measures (i.e., SDQ Self & Parent, & CAMM) at all three-time points (i.e., baseline, post-intervention, & follow-up). Results from a repeated measure ANOVA (see Table 8) showed that there were no statistically significant differences in youth self-reported mental health (SDQ) $F(1,8) = 1.10$, $p = .34$, or parent-reported youth mental health $F(1,8) = 3.84$, $p = .09$. Similarly, mindfulness skills, as reflected by the total CAMM score, $F(1,8) = .01$, $p = .918$ did not show statistically significant differences.

A reliable change (RC) index was calculated for each participant in this subsample ($n = 9$) between baseline and follow-up (3 months) and is reported in Table 9. On the CAMM, one youth indicated improvements in mindfulness. For youth mental health, the parent-reported youth outcomes on the SDQ showed that four parents (44%) reported meaningful change, with clinically meaningful improvements in youth mental health. Lastly, two youths reported clinically meaningful changes in mental health symptoms, with worse mental health at follow-up.
<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
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<th>F</th>
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<td>Baseline</td>
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<td>5.07</td>
<td>1.8</td>
<td>1.10</td>
<td>.34</td>
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<tr>
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<tr>
<td>Follow-up</td>
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<td>4.98</td>
<td></td>
<td></td>
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<tr>
<td><strong>SDQ Parent</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>26.00</td>
<td>3.50</td>
<td>1.8</td>
<td>3.84</td>
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<tr>
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<td>4.58</td>
<td></td>
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<tr>
<td>Follow-up</td>
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<td>4.75</td>
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<td><strong>CAMM</strong></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Baseline</td>
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<td>6.36</td>
<td></td>
<td></td>
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<tr>
<td>Post-intervention</td>
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<td>8.61</td>
<td>1.8</td>
<td>.01</td>
<td>.92</td>
</tr>
<tr>
<td>Follow-up</td>
<td>16.33</td>
<td>4.03</td>
<td></td>
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</tbody>
</table>
Table 9

Reliable Change Values from Baseline to Follow-up

<table>
<thead>
<tr>
<th>Participant ID</th>
<th>CAMM</th>
<th>SDQ Self</th>
<th>SDQ Parent</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>-.43</td>
<td>2.04*</td>
<td>-2.59*</td>
</tr>
<tr>
<td>P2</td>
<td>-.64</td>
<td>2.62*</td>
<td>.86</td>
</tr>
<tr>
<td>P3</td>
<td>-.85</td>
<td>-.29</td>
<td>-.43</td>
</tr>
<tr>
<td>P4</td>
<td>-.21</td>
<td>-1.46</td>
<td>-.3.02*</td>
</tr>
<tr>
<td>P5</td>
<td>.85</td>
<td>-.87</td>
<td>1.72</td>
</tr>
<tr>
<td>P6</td>
<td>.21</td>
<td>.29</td>
<td>.43</td>
</tr>
<tr>
<td>P7</td>
<td>-.64</td>
<td>.29</td>
<td>-6.90*</td>
</tr>
<tr>
<td>P9</td>
<td>2.99*</td>
<td>.58</td>
<td>-5.60*</td>
</tr>
<tr>
<td>P11</td>
<td>-1.71</td>
<td>.87</td>
<td>--1.72</td>
</tr>
</tbody>
</table>

Notes: Reliable change indexes are considered clinically significant (*) > or equal to 1.96. The negative value (-) RCI of the SDQ show improvements in mental health. The negative (-) RCI of the CAMM show a decrease in mindfulness scores.
Chapter 4: Discussion

This thesis evaluated a 6-week virtual adapted-MBI for neurodiverse youth during the COVID-19 pandemic. Overall, the virtual adapted-MBI was feasible in demand, implementation, practicality, and acceptability. When group means were examined, there were no significant differences in mental health symptoms immediately after participation or at a 3-month follow-up. There were, however, slight differences in mindfulness skills, although these differences were not statistically significant. When considering the reliable change indices between baseline and post-intervention and baseline and follow-up, there were significant improvements in mental health and mindfulness skills for some participants but not all. Finally, the exploratory analysis was performed to explore patterns in the sample of long-term changes from participating in MBI. It was strictly performed due to support from previous literature and to inform the future analysis. Given the heterogeneity of traits and mental health issues often experienced by neurodiverse people, the reliable change indices can better represent this sample’s changes in mental health and mindfulness skills. Satisfaction ratings for the group were high, and all participants described benefits associated with the MBI; however, some challenges were mentioned (e.g., group participation & attentional challenges).

MBI research has focused on improving mental health symptoms, particularly anxiety and depression, among various populations, including postsecondary students, caregivers of those with disabilities, psychiatric patients, and trauma survivors (Keng et al., 2011) yet has failed to consider neurodiverse youth. Despite neurodiverse youth being at heightened risk for experiencing mental health concerns, the impact of MBI
MINDFULNESS BASED INTERVENTION

among this population remains understudied. Most of these MBIs are also delivered in person, with a few exceptions being delivered virtually to autistic adults (Gaigg et al., 2020; Lunsky et al., 2022). Virtual delivery is beneficial for this population, especially during the pandemic, because it limits the spread of COVID-19 and eliminates the need to travel or leave home, particularly for those with limited access to transportation, social anxiety, or behavioural concerns.

This is the first study to evaluate the feasibility and to explore the long-term impacts of a virtual adapted-MBI for neurodiverse youth in attempt to fill a knowledge and clinical gap. Before the pandemic, accessible mental health supports for neurodiverse youth were limited. Since the pandemic, mental health has further worsened (e.g., disruption in routines, increased isolation, & familial stress) and due to physical restrictions, support and services were even more limited (White et al., 2021). As such, the current study offered an accessible support, MBI, that could be delivered safely during the pandemic. This thesis provides evidence to suggest that a virtual adapted-MBI is feasible for youth with an NDD, but further research examining the impact and efficacy is warranted.

Demand and Implementation

The group was feasible in terms of demand and implementation. Recruitment for the group was successful; specifically, we could recruit 6-8 participants for each group. There was expressed interest from both youth and parents to participate in MBI. Given the significant disruption that many families of neurodiverse individuals experienced during the pandemic (Isensee et al., 2022), it was anticipated that there would be demand and interest in participating in these groups. Most caregivers in the current
MINDFULNESS BASED INTERVENTION

study reported that COVID-19 impacted their family to some degree, and they worried for their family’s health. Therefore, having an accessible group offered virtually reduced the need to go out in public when anxiety surrounding the fear of illness was high. This is consistent with existing literature suggesting neurodiverse families during COVID-19 experienced a disruption in services (Isensee et al., 2022), and further supports are needed.

However, although there was initial demand for the group, five participants only joined a single session after consenting, and five different participants dropped out after the first session. This may suggest that youth and parents were interested in learning mindfulness skills, yet external factors (e.g., COVID-19, parental stress, & online demands) may have impacted commitment week-to-week. This level of dropout rate (36%) for the current study was a bit higher than anticipated based on previous research (e.g., 12.5% dropout rate for a CBT online program for adolescents; Skar, 2022); however, it is unclear if this is due to the MBI or because of the context by which the group took place (i.e., in the middle of a global pandemic). Additionally, drop-out rates may be due to skepticism around the application of MBI in neurodiverse individuals. Some researchers have highlighted that there may be risks associated with participating in MBI for neurodiverse individuals, such as unintentionally bringing attention to sensory challenges or previous traumatic experiences (Zhu et al., 2019).

Despite the dropout rates, participants who completed the first session completed the entire 6-week program. The reason for all dropouts is unknown, but it could be that some participants felt the program was not for them or they became disinterested in learning mindfulness. Also, there were often challenges with scheduling
and time conflicts that may have also impacted dropout rates. Alternatively, those who joined at least the first session before dropping out may have seen a lack of fit for the virtual delivery or the group content. It is also likely that dropouts were affected by COVID-19 and the increased online demands that families experienced with school and other services being online (Manning et al., 2021). Consequently, the requirement to be online excessively may create ‘burnout’ of virtual activities and increase dropout rates.

It is important to fully understand why participants dropped out to inform future MBIs, and to mitigate dropout rates. There are two ways the current study could mitigate these dropout rates, first including a brief educational session on mindfulness benefits and the process of facilitating the practices. This could help participants determine if their expectations are met and allow them to decide if MBI is a good fit. Second, future studies could also consider maintaining weekly contact with participants to improve dropout rates and increasing accountability for home mindfulness practices.

While program completion was high, completion of the various research measures was very low. Despite incentives, at baseline ($40) and 3-month follow-up ($40) to participate, only 35% completed the questionnaires at all three time points. This could be due to increased demands during COVID-19, particularly for parents who had numerous questionnaires to complete that may find study participation too overwhelming or time-consuming, along with the weekly group commitment. The addition of a neurodiverse youth advisor in future research can help understand limitations or disinterest in completing research measures and can aid in selecting more accessible or appropriate measures to increase research completion.
MINDFULNESS BASED INTERVENTION

Limited Efficacy

There were no significant group differences in youth or parent-reported mental health symptoms or mindfulness skills, which is consistent with previous studies (de Bruin et al., 2015; Haydicky et al., 2015; Van de Weijer-Bergsma et al., 2012). For example, de Bruin & colleagues (2015) found no changes in worry or mindfulness awareness in adolescents with autism and attributed this to the Conscious Competence Theory (Maslow, 1940). This theory describes the process of learning and applying mindfulness. Before the intervention, there is ‘no knowledge of mindfulness or awareness of one’s skills; after the intervention, there is ‘knowledge of mindfulness skills and their lack of or limited skills’; and finally, if mindfulness practice is continued after MBI, the ‘skills may translate to possessed traits,’ and therefore show changes on mindfulness measures (de Bruin et al., 2015). This theory is linked to the current study in that neurodiverse youth did not show group differences in the mindfulness measure (CAMM) immediately or long-term after the intervention. The youth may have learned mindfulness practices and how to recognize emotions, but the skill of mindfulness was not immediately built, detected, or translated to a possessed trait.

While there is evidence of MBI improving mental health scores in previous studies, the tools used to assess mental health symptoms are inconsistent and vary considerably across studies. For example, Ridderinkhof & colleagues (2018) showed that autistic children and youth improved in emotional and behavioural functioning (The Child Behaviour Checklist [CBCL]) following a nine-week MBI. Additionally, Tan & colleagues (2015) reported that adolescents with mental health concerns significantly decreased mental distress (Depression, Anxiety and Stress Scale [DASS]) in an MBI
MINDFULNESS BASED INTERVENTION

when compared to a control. Despite similar cohorts and symptomology, there are
distinct differences between these studies and the current study, including the virtual
delivery, the implementation during a pandemic, the lack of a control group, and an
incomparable measure of mental health (SDQ).

There are several reasons we may not have found group differences. The level of
coccurring diagnosis could have impacted the ability to detect discrepancies using the
group means due to the level of needs. For example, four participants reported
intellectual disability, along with their primary (i.e., NDD) and secondary diagnoses (i.e.,
mental health). Of the four individuals with ID, three had autism, ADHD, and anxiety,
meaning they had four diagnoses (i.e., ID, autism, ADHD, & anxiety). Additionally, the
severity of mental health symptoms for most participants, at all-time points, fell into a
clinically significant range for both self and parent-reported (SDQ: Total score > 17;
Goodman, 1997). This means that most participants had significant mental health
concerns. Consequently, there may have been changes in mental health symptoms
following participating in the MBI; however, these changes were washed out as the
youth may have too high mental health needs that may require a more intensive
treatment approach. This sample was susceptible to mental health concerns before the
pandemic, has experienced increased risk, and still are exposed to stigma, social
challenges, and lack of support (Lee et al., 2021). Future work should consider if using
the MBI may be more impactful on mental health symptoms when it is offered alongside
additional support and services (Strunk et al., 2017). Future research may want to
compare the impact of MBI on mental health when offered alone and when it is provided
MINDFULNESS BASED INTERVENTION

alongside additional supports such as behavioural management, psychotherapy, or physical health programs.

While there were no significant differences between youth’s reported mental health and mindfulness skills at baseline, post-intervention, and follow-up, according to the reliable change index and qualitative feedback, some participants showed individual improvements. Three participants showed improvements in mental health and two in mindfulness skills between baseline and post-intervention. These are clinically meaningful changes that are supported by the literature. Ridderinkhof & colleagues (2021) evaluated MBI by looking at participants' personal goals and individual change over time. They had a sample of five adolescents, and individuals evaluated reliable change, similar to the current study. They found that most had decreased worry and improvements in behavioral outcomes, with one participant showing worsened outcomes (Ridderinkhof et al., 2021). This is like the current findings, with one participant reporting significantly worse mental health and mindfulness skills after the intervention. Previous literature indicates that not all mindfulness practices will be ‘pleasant,’ and many individuals experience at least one challenge when ‘being mindful,’ even if there are more overall benefits (Shapiro, 1992).

Additionally, mindfulness may lead initially to an increasingly aware of negative emotions or feelings before there are noticeable benefits (Davidson & Kaszniak, 2015). Consistent with this, during interviews, youth reported overall benefits of mindfulness, including coping with stress and increased recognition of their emotions. It could be that these unique benefits indicate that group means are not necessarily representative of
MINDFULNESS BASED INTERVENTION

the total sample’s experiences, therefore indicating why there was no group mean changes.

Another potential reason for not seeing significant improvement in symptoms after MBI may not be that it wasn’t helpful, but that participants’ sensory challenges negatively impacted their mental health. While we didn’t specifically ask participants about their sensory challenges, previous researchers have suggested that bringing awareness (that which is practiced in MBI) to an anxiety-provoking thought can further intensify it and increase symptoms (i.e., feelings of overwhelm) (Farias, 2022). Additionally, individuals with autism often need to take sensory breaks to de-stress from sensory triggers. In contrast, mindfulness practices often encourage youth to do the opposite and to focus on these sensory experiences (e.g., mindful eating, breathing, & walking). Future research should consider adding outcome measures that should measure coping skills, stress, and self-awareness in neurodiverse youth and further capture the benefits seen in this sample.

Acceptance and Practicality

Along with the meaningful change in individual scores, all participants shared at least one benefit or learned skill, including those they could use in their everyday lives (e.g., intentional breathing, awareness of body movements, & identifying feelings or emotions). During exit interviews, participants elaborated on how MBI improved their lives. Participants often described mindfulness as more applicable and valuable in stressful situations. The current literature shows benefits of mindfulness are commonly associated with both in-person and virtual MBIs, (Hartley et al., 2019; Lunsky et al.,
2022; Zhang et al., 2021) and may show consistency across the current study and previous studies.

One novel finding is that several participants, during exit interviews, shared that MBI improved awareness of their own emotions. Further, youth became more aware of their mental and physical symptoms, including attentional difficulties and triggers of stress. Participants also noted that they could identify coping skills (e.g., deep breathing) that worked best for them, compared to ones that didn’t, when they felt stressed. Previous researchers have suggested that mindfulness practices indirectly raise awareness and clarity of emotions (Schellekens et al., 2017). Mental health literacy, a term linked to emotions and behaviors, can support help-seeking behaviors in mental health diagnoses; those who recognize and understand their mental health diagnoses are better able to know where they need support (Jorm et al., 1997). Current literature on emotional self-awareness difficulties in autism specifically shows that problems emerge during adolescence and seem to increase with age, similar to the trend of mental concerns in autism (Huggins et al., 2020). Often, children with autism can have difficulties interpreting and processing their own emotional experiences and paying attention to emotional stimuli (Huggins et al., 2020). Therefore, it could be that MBI could potentially improve awareness of emotions and thoughts in neurodiverse youth. Future research exploring the impact of MBI on the mental health literacy of youth with NDDs is warranted. This work may aid in the unique development or adaptation of interventions that promote mental health literacy among youth with NDDs. Improved mental health literacy in neurodiverse youth can help strengthen their ability to detect signs of mental health concerns and utilize strategies that best support them.
during distress. This will also help them better describe their mental health concerns to others (e.g., parents, service providers, & teachers) to improve their lives.

Finally, although there were many benefits of the MBI, there were a few challenges. While they provide flexibility and accessibility, virtual interventions may not offer the same benefits as in-person learning and may limit socialization for those who want it. This was corroborated by participant interview responses, indicating that face-to-face connections could improve group participation and ability to focus/decrease distractions. For example, participants indicated it was hard to stay focused online, and it was easier to ‘tune out.’ Additionally, when at home, participants felt there was an increasing number of distractions that would have been limited if it was delivered in person, including noise or objects in the home environment. They also reported it was hard to ignore or look away when a participant was distracting on screen, which added difficulty to their ADHD. This was also found by Lunsky & colleagues (2022), in which participants reported that they had challenges with internet connections and often felt distracted by both visual and auditory stimuli during the virtual intervention.

On the other hand, some researchers suggest that virtual platforms and their contexts can be predictable and structured, often less sensory provoking or challenging, and allow autistic individuals to maintain specific routines (Wojciechowski & Al-Musawi, 2017). Indeed, caregivers reported clear benefits of virtual delivery, including convenience and ease of participating. Virtually delivery was also perceived positively for social aspects because participants could see each other. Finally, caregivers indicated that although there were distractions online, often with multiple participants talking, the group was more easily managed through virtual delivery, with the help of
MINDFULNESS BASED INTERVENTION

technical support individuals who could re-direct individuals to the chat function or disable camera/audio temporarily. Lunsky & colleagues reported similar benefits to virtual delivery, including no need to commute, flexible breaks as needed (e.g., turning off the camera), and improved access for those with social anxiety (2022).

Current evidence of virtual mindfulness in youth with NDDs is quite limited, mainly focusing on autism. The results are inconsistent due to different methodologies (e.g., videoconferencing, online games, and app-based interventions), and small sample sizes not being generalizable (Rideout et al., 2021). To further explore experience and preferences for virtual interventions, future research could compare the impacts of virtual MBI and in-person MBI. Additionally, future work with neurodiverse youth should consider screening participants for preference for delivery type (i.e., virtual, in-person, or hybrid; individual versus group) and place participants in the appropriate intervention type.

Recommendations

Participants from the current study offered several suggestions that they felt could improve the program. Some youth suggested that longer sessions and more sessions would be beneficial. Participants further recommended incorporating various practices including visuals to accompany teachings, and expansion of more ‘traditional’ mindfulness terms. Several participants wanted more interactive and engaging opportunities to connect with other participants and preferred the groups to be “more fun.” This MBI, based on an adapted-MBI for adults, may not have fully considered age-specific needs or adaptations. As a next step, the MBI used in this study should be further adapted to meet the needs of youth. Reaven & colleagues (2009) made use of
youth’s strengths, talents, and areas of interest during sessions, and integrated youths’ personal experiences into sessions. Reaven & colleagues (2009) suggested that using youths’ interests can improve focus and personalization of learning in MBI. Still, ensuring the group is not distracted or derailed by these interests is also essential. Neurodiverse individuals can often have unique interests that are very important to them and allowing participants to share an interest or hobby with the group (e.g., incorporating a ‘show and share’ during group sessions) could help improve socialization and interpersonal connection, and these interests can be used within the application of mindfulness skills without changing the foundational concepts of MBI or limiting group effectiveness. Future research needs to ensure interventions are age-appropriate, appealing, and fun for neurodiverse youth.

Limitations

This is the first study to examine the effectiveness of a virtual adapted-MBI in neurodiverse youth. While this study has many strengths, there are several limitations to consider that affect generalizability. The first limitation of this study is the small sample size (i.e., $n = 23$). Further, analyses were conducted with fewer than 23 participants ($n = 16$) due to missing participant data. A small sample size reduces the statistical power and can also increase the margin of error (Jones et al., 2003). A larger sample size would improve power, group homogeneity, and the ability to detect an effect. Due to the sample size, the current study was also limited regarding what factors or predictors could be explored. The four groups (i.e., autism, FASD, SLD, & ADHD) or timing of pandemic waves could have been examined separately, but the groups did not hold enough power to be dissected further.
MINDFULNESS BASED INTERVENTION

Only nine youth (and their parents) completed the exit interview and those who did not may have been less satisfied. Future work should increase sample size, improve dropout rates, and increase participants’ incentive to complete research measures.

In addition to the sample size, this sample was predominantly autistic white individuals, making it less generalizable to non-white and other NDD populations. The socioeconomic status of families was not collected. With no information on SES, it is difficult to know if those from a lower SES may have had limited opportunity to learn about the research and participate. Future research should recruit from communities with higher diversity (e.g., race, SES) to ensure findings are further generalizable.

Participants were not required to meet any cutoff in mental health or IQ to be eligible for the group. The high level of mental health concerns may have produced a floor effect, where minimal changes occurred from the intervention. Furthermore, the current sample was heterogenous with various support needs, some needing minimal support and others requiring full-time support during MBI sessions. This also impacted level of participation in the intervention, as the group was diverse in needs. Future work should ensure that groups are customized to include those with similar needs and that group adaptations consider group support needs.

The measures in the current study have been previously used with neurodiverse youth and are reliable and valid measures of mental health and mindfulness skills. The SDQ has been used in neurodiverse youth (Russell et al., 2013). The SDQ relied on both parent and self-report, but the CAMM relied only on self-report, which is another limitation. Additionally, the parent-reported SDQ, at post-intervention, showed low internal consistency ($\alpha = 0.38$), a limitation.
The CAMM was used to measure mindfulness skills. It has been used in previous studies with autistic youth, establishing internal consistency ($\alpha = .71$). However, like the current findings (de Bruin et al., 2015; Ridderinkoff et al., 2017) did not find any changes in mindfulness awareness in children using the CAMM. Therefore, it may not be the appropriate measure for neurodiverse youth. Future studies should consider using measures of mindfulness that look at mechanisms of change after mindfulness. Future research could include the CAMM alongside other measures or facets of mindfulness (i.e., psychological flexibility (Acceptance and Action Questionnaire; [AAQ-2]), self-awareness; (Toronto Alexithymia Scale; [TAS-20]). Future research should also consider additional measures for youth outcomes and parent-reported measures.

Because there was no control group (i.e., of individuals without NDDs, virtual MBI outside a pandemic, or waitlist-control group), it is not possible to compare data of the target population with a comparison group. A control group, by comparison, could demonstrate the high rates of mental health in the current sample.

Participants recruited for the study may have had previous success or participated in an intervention offered by the ENHANCE lab in the past. This may limit the ability to determine or detect expressed interest from individuals who had not participated previously (e.g., FYF). Future research should expand recruitment strategies to ensure it reaches other individuals.

Finally, although the intervention was delivered using the manual and the same lead facilitator, treatment fidelity was not measured, so the reliability of the administration of the intervention may need to be more consistent. Consistency is essential to ensure everyone who completed the intervention receives the same training.
MINDFULNESS BASED INTERVENTION

and teaching and would improve the ability to compare group findings. Future research should include a secondary facilitator that could measure the consistency of intervention across groups of neurodiverse youth. Lastly, the MBI home practices were recommended to all participants. However, groups needed to be followed or tracked on compliance and the amount of home practice completed. Therefore, looking for associations between the effectiveness of MBI and commitment to home practice is not feasible and limits understanding of the application of skills outside sessions. Future research should include a mindfulness diary for participants to document at-home practices to determine if it impacts MBI's effectiveness.

Future Directions

Despite limitations, the current study suggests the feasibility of a virtual adapted-MBI for neurodiverse youth, with further research warranted on its impacts. With inconsistent findings in the literature, more rigorous studies are needed to establish the effectiveness of MBI with youth with disabilities. Recognizing individualized differences and applying a thorough methodology to studies with larger sample sizes could mediate how researchers determine the effectiveness of MBI. Future studies should identify coping strategies with emotional and behavioural challenges because focusing on intrinsic skills (e.g., self-awareness) and managing internal stressors can help individualize therapy. The next steps require an understanding of what groups of youth with NDDs specifically could benefit from MBI (e.g., gender, age, sensory challenges, & social interests) and the type of intervention suitable for unique challenges and strengths.
MINDFULNESS BASED INTERVENTION

Implications

Feasibility studies help establish evidence-based interventions, those that are both efficacious and effective. Without studies demonstrating feasibility, there is a limited way to understand the implications of intervention for specific populations. Although this thesis did not show statistical significance in group differences, there were meaningful, significant differences at individual levels and in the qualitative results. A consideration of these results is the clinical vs. statistical significance. The findings show the clinical impact on some participants and the meaningful change that mindfulness had on their mental health. The reliable change and qualitative themes identify where the data shows improvements, and specific recommendations were provided for future implemented groups. MBI should be used as an additive training or intervention, including teaching skills that increase mental health literacy. The intervention needs to be sensitive to individualized needs and strengths in neurodiverse youth. Finally, incorporating age-specific adaptation so that the intervention is appealing to youth is essential.

Conclusion

There are unique benefits and challenges to conducting virtual MBI; both are important to the feasibility and efficacy of MBI for future research and clinical practice. Detectable change in mindfulness skills may likely take longer than six weeks to be maintained, and a sufficient sample size is needed to observe more group-level differences. Despite this, at individual levels, there was mental health improvement from MBI, and qualitative findings support the improvement of self-awareness, coping skills, and application of skills in stressful situations. Future research needs to identify specific
MINDFULNESS BASED INTERVENTION

and targeted interventions for individualized needs, minimize heterogeneity and maximize power in samples, and increase compliance and standardization of MBIs.
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MINDFULNESS BASED INTERVENTION


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https://doi.org/10.1542/peds.2008-3434


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https://doi.org/10.3389/fdgth.2021.742196


https://doi.org/10.3389/fpsyg.2021.792945
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MINDFULNESS BASED INTERVENTION


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A VIRTUAL Mindfulness PROGRAM

Created specifically for neurodiverse youth and their caregivers

Mindfulness is a set of easy meditation techniques that can help reduce stress and anxiety.

We are looking for youth aged 12–18 with a diagnosis of autism spectrum disorder (ASD) or fetal alcohol spectrum disorder (FASD) and one of their caregivers to participate in a virtual group mindfulness program.

Sessions will be online and last 1 hour each week for 6 weeks.

This program is being offered for free as part of a research study. You and your child will be asked to complete questionnaires and answer some questions before the group starts, at the end of the group, and 3–months later. You will be reimbursed $40 for your time.

Contact us at enhancelab@ucalgary.ca to learn more about upcoming groups!
APPENDIX B: Child’s Demographic

Child’s Current Age: ____________

Child’s Date of Birth (dd/mm/yyyy): ____________

What is your child’s gender?

a) Male
b) Female
c) Non-binary (don’t identify as either male or female)
d) Prefer not to say

4. What is your child’s first language/language most often spoken at home?

a) English
b) French
c) Other.
4.1 Please specify: ________________________

5. What is the ethnic origin of your child?

a) White, Anglo, or European Canadian
b) East Asian (e.g. Chinese, Japanese, Korean)
c) Southeast Asian (e.g. Filipino, Vietnamese, Thai)
d) Pacific Islander, and/or indigenous persons of Hawaii, New Zealand, etc.
e) Indian, Pakistani, Bangladeshi, Nepalese, Sri Lankan, etc.
f) Hispanic or Latinx, Spanish and/or Portuguese (including Mexican Canadian, Central American, etc.)
g) Indigenous persons of North America and/or the Metis people
h) Black, Caribbean, and/or African Canadian
i) Multiethnic or multiracial (more than one race or ethnicity).
5.1 Please describe: ________________
j) Other
5.2 Please describe: _______________________
k) I’d rather not answer

6. Was your child born in Canada?

a) Yes
b) No.
6.1 If not, where? __________________________________________
6.2 How long have they lived in Canada (in years)? ________________
MINDFULNESS BASED INTERVENTION

7. Please select all statements that describe your child’s current educational arrangements (select ALL that apply):

   a) My child is home schooled
   b) My child is in a mainstream classroom with typically developing peers
   c) My child is in a special classroom for children with disabilities
   d) My child is at a special school for children with disabilities
   e) My child is in public/catholic school
   f) My child is in a private school
   g) My child is not in school
   h) Other.

   7.2 Please describe: _____________________________________________

7.3 If your child is currently not in school, please describe what your child does during a typical weekday (e.g., day programming, vocational day program, etc.)

_________________________________________________________________

Child Health and Service Use

8. What is your child’s primary diagnosis currently? (Please select one of the following):

   a) Autism Spectrum Disorder (including Asperger’s Syndrome, Autistic Disorder, etc.)
   b) Fetal Alcohol Spectrum Disorder (FASD)
   c) Pervasive Developmental Disorder (PPD) or (PDD-NOS)
   d) Learning Disorder
   e) Intellectual Disability
   f) Global Developmental Delay (GDD)
   g) Other

   8.1 Please specify: _____________________________________________

9. Has your child received a diagnosis of Intellectual Disability from a registered health professional?

   a) Yes
   b) No

   9.1 If yes, please indicate the level of Intellectual Disability:

   a) Mild
   b) Moderate
   c) Severe/Profound
   d) Not known
10. Does your child currently have any long-term health conditions, other than their primary diagnosis or disability? Please select all that apply:

a) Food or digestive allergies
b) Respiratory allergies (e.g., hay fever)
c) Any other allergies
d) Asthma
e) Bronchitis
f) Diabetes
g) Heart condition or disease
h) Epilepsy
i) Kidney condition or disease
j) Migraines
k) Psoriasis/eczema, or any other skin condition
l) None
m) Other, please specify: ______________

10.1 Other, please specify: ______________

10.2 Are they currently receiving any treatment or taking any medications for these physical health issues?
   a) Yes
   b) No

10.3 If yes, please describe: __________________________

11. Does your child have any mental health diagnoses or concerns (aside from their primary diagnosis or disability):

   a) Yes
   b) No

11.1 If yes, is it: (select all that apply)

a) Anxiety
b) Depression
c) Suicidal thoughts and/or behaviours (e.g., attempts)
d) Attention Deficit Hyperactivity Disorder (ADHD)
e) Oppositional Defiant Disorder/Conduct Disorder
f) Learning Disability
g) Obsessive Compulsive Disorder
h) Tourette’s/Tic Disorder
i) Communication Disorder
j) Eating/feeding disorder
k) Substance abuse/misuse
MINDFULNESS BASED INTERVENTION

l) Schizophrenia or other psychotic disorder
m) Bipolar Disorder
n) Sleep Disorder
o) Personality Disorder
p) Other

14.2 Please specify: _______________

11.2 Are they (or were they prior to COVID-19) receiving non-medical treatment (e.g., psychotherapy) for their mental health issues?

a) Yes
b) No

11.3 If yes, is it (select all that apply):

a) Individual therapy (e.g., cognitive-behaviour therapy [CBT])
b) Group therapy
c) Family therapy
d) Parent coaching/counseling
e) Other

please specify: _______________

11.4 Are they currently taking medication for their mental health issues?

a) Yes
b) No

11.5 If yes, please describe: _____________________________

12 Please indicate which services your child was accessing prior to COVID-19:

a) Occupational therapy
b) Speech-language therapy
c) Physical therapy
d) Psychologist/Psychotherapy/Counseling (e.g. individual, family, or group therapy for a mental health concern, such as anxiety)
e) Psychiatrist
f) Parent coaching/counselling
g) Dietary therapies/interventions
h) Social work services
i) Physiatrist (physical medicine physician)
j) Neurologist
k) Orthopaedics/Orthopaedic surgeon
l) Recreational/leisure program
m) Social skills/friendship programs
MINDFULNESS BASED INTERVENTION

n) Activity-based programs (e.g., music)
o) Housing/residential options
p) Respite care (in- and out-of-home)
q) Specialized transportation
r) Crisis intervention/management
s) Behavioural intervention programs for behaviour management
t) Community safety training
u) Life skills training
v) Employment or adult day programs
w) None
x) Other services not listed here
   15.1 Other, please specify: ______________

12.2 Please select the services that your child was accessing that have been disrupted or changed due to COVID-19. Examples of changes or disruptions: service is now being offered online or over the phone, service is temporarily unavailable, or service has been cancelled altogether

Carry forward choices from 5.1

12.3 How has your child’s access to [insert service] been disrupted or changed since COVID-19?

   a) It has been moved online/over the phone
   b) It is temporarily unavailable or is offered less frequently
   c) It has been cancelled altogether
   d) Other
      12.4 Other, please specify: _______
APPENDIX C: Parent/Caregiver Demographic & COVID Impacts

13. What is your relationship to the child?
   a) Biological parent
   b) Adoptive parent
   c) Step-parent
   d) Grandparent
   e) Other relative (e.g., aunt, cousin)
   f) Other
      13.1 Please specify: __________

14. I identify as:
   a) Male
   b) Female
   c) Non-binary (don’t identify as either male or female)
   d) Prefer not to say

15. What are the first three letters/numbers of your postal code: ______

16. What is your current age:_______

17. What is your current relationship status?
   a) Married/Common law
   b) In a relationship, but not currently living together
   c) In a relationship and living together, but not considered common law
   d) Divorced/Separated
   e) Widowed
   f) Single
   g) Other
   h) Prefer not to say
   i) Other
      17.1 Please specify: __________
18. Including yourself, how many people live in your household now? People who live in your household on a part-time basis also count.

*Note: please enter “0” in any categories that don’t apply to you.*

- a) Number of adults 65 or older _____
- b) Number of adults aged 18-64 _____
- c) Number of children aged 10-17 _____
- d) Number of children aged 5-9 _____
- e) Number of children under 5 _____

19. What is the highest level of education **you have completed**?

- a) Elementary school
- b) High school
- c) Some college/university
- d) Trade, technical, vocational school, or business/community college (e.g., SAIT, NAIT)
- e) University undergraduate degree
- f) Master’s degree
- g) PhD

20. What is the highest level of education **your partner has completed**?

- a) Elementary school
- b) High school
- c) Some college/university
- d) Trade, technical, vocational school, or business/community college (e.g., SAIT, NAIT)
- e) University undergraduate degree
- f) Master’s degree
- g) PhD
- h) Not applicable

21. How long have you been living in Canada (in years)? ________________

22. Which of these phrases best describes how you and your family typically manage financially (prior to COVID-19)?

- a) We manage very well
- b) We manage quite well
- c) We manage
- d) We have some trouble managing
- e) We don’t manage very well/have some financial difficulties
- f) We are in deep financial trouble
MINDFULNESS BASED INTERVENTION

23. Which of the following options best describes your community?

   a) Remote area of the country  
   b) Rural area of the country  
   c) Suburban area  
   d) Urban area  

24. How would you describe your current work/employment situation:

   a) Working for pay for an individual or a company  
   b) Self-employed  
   c) Attending school  
   d) Volunteering  
   e) At-home parent  

   **Section 4: Impacts of COVID-19**

25. Have you had COVID-19?

   a) Yes, I had a confirmed positive test for COVID-19  
   b) I suspect I have had COVID-19 but it was not confirmed  
   c) No, I have not had COVID-19  

   25.1 How would you best characterize your symptoms?

   a) Mild (did not greatly impact daily activities)  
   b) Moderate (impacted daily activities, but were resolved at home)  
   c) Severe (required hospitalization)  

26. Has any other member of your household had COVID-19? Please check all that apply

   a) Yes, another member of my household had a confirmed positive test for COVID-19  
   b) I suspect a member of my household had COVID-19 but it was not confirmed  
   c) No, no other member of my household has had COVID-19  

   26.1 If yes, how many members of your household had confirmed positive test for COVID-19? _________  

   26.2 If yes, how many members of your household do you suspect have had COVID-19 (that was not confirmed)? _______
MINDFULNESS BASED INTERVENTION

27. Has a member of your extended family, or a close friend (outside of your household) had COVID-19 (either confirmed or suspected)?
   a) Yes
   b) No

   27.1 If Yes, was this person hospitalized for COVID-19?
      a) Yes
      b) No
      c) Not Certain

28. Please check off potential impacts of COVID-19 that your family has experienced
   a) Myself and/or my partner/spouse lost a job (temporarily or permanently) because of COVID-19
   b) Myself and/or my partner/spouse had to apply for government financial assistance (e.g. CERB and other financial relief programs) because of COVID-19
   c) Myself and/or my partner experienced a change to the number of hours we work (e.g. full-time to part-time)
   d) I was required to work from home due to COVID-19
   e) My family was not able to stay in our own home (e.g. had to relocate, were at a relative’s house)
   f) My family had to travel to get back to our home during the outbreak
   g) None of these apply

29. Please check all of the following that apply:
   a) I am a front-line health care worker
   b) My partner/spouse is a front-line health care worker
   c) Another person in my household is a front-line health care worker
   d) None of these apply

30. Please check all of the following that apply:
    Note: the term “essential worker” here should include workers performing a duty in an essential service during the pandemic and that are required to leave their home (e.g. working at a grocery store, pharmacy, transportation, etc.), but not include front-line health care workers included in the previous question.
    a) I am an essential worker
    b) My partner/spouse is an essential worker
    c) Another person in my household is an essential worker
    d) None of these apply
31. How vulnerable do you think you are to catching/contracting COVID-19 and/or developing severe complications (e.g., due to age, underlying medical condition, social and economic circumstances, working conditions, etc.)?

   a) Very vulnerable / very high risk  
   b) Somewhat vulnerable / high risk  
   c) Neutral  
   d) Somewhat invulnerable / low risk  
   e) Very invulnerable / very low risk

32. How vulnerable do you think your child is to catching/contracting COVID-19 and/or developing severe complications (e.g., due to age, underlying medical condition, social and economic circumstances, working conditions, etc.)?

   a) Very vulnerable / very high risk  
   b) Somewhat vulnerable / high risk  
   c) Neutral  
   d) Somewhat invulnerable / low risk  
   e) Very invulnerable / very low risk

33. Please respond to the following questions regarding events that have happened since the COVID-19 pandemic.

<table>
<thead>
<tr>
<th>Question</th>
<th>Not at All</th>
<th>Somewhat</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>To what extent has your family’s life been disrupted by the COVID-19 pandemic?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Has your family experienced financial hardship?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Have you feared for your own or your family’s health or safety?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Has your child feared for their own or their family’s health or safety?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Has your family had difficulty getting food?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Has your family experienced a shortage of essential goods (e.g., toilet paper, cleaning supplies)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

34. Is there anything else that you would like us to know about how you or your child are doing during COVID-19 pandemic? (open text response)
MINDFULNESS BASED INTERVENTION

APPENDIX D: Youth Measures

Mindfulness Groups – Child/Adolescent Questionnaire Booklet
NDD Cohort

Child Acceptance & Mindfulness Measure (CAMM)

We want to know more about what you think, how you feel, and what you do. Read each sentence and check the statement that tells how often each sentence is true for you.

<table>
<thead>
<tr>
<th>Sentence</th>
<th>Never True</th>
<th>Rarely True</th>
<th>Sometime True</th>
<th>Often True</th>
<th>Always True</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I notice small changes in my body, like when my breathing slows down or speeds up.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2. I get upset with myself for having feelings that don’t make sense.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3. I pay attention to my muscles and notice when they feel tight or relaxed.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4. At school, I walk from class to class without noticing what I am doing</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5. I do things without thinking about what I am doing.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6. I pay close attention to my thoughts.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>7. I try only to think about things that make me happy.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8. I keep myself busy so I don’t notice my thoughts or feelings.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>9. When I’m doing something, I focus only on what I’m doing and nothing else.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>10. I tell myself that I shouldn’t feel the way I’m feeling.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Question</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>11.</td>
<td>When something good happens, I can’t stop thinking about it.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>12.</td>
<td>When I take a shower or bath, I notice how the water feels on my body.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>13.</td>
<td>I notice my thoughts as they come and go.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>14.</td>
<td>When I’m eating, I notice the way it feels to chew my food.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>15.</td>
<td>I push away thoughts that I don’t like.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>16.</td>
<td>It’s hard for me to pay attention to only one thing at a time</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>17.</td>
<td>I think about things that have happened in the past instead of thinking about things that are happening right now.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>18.</td>
<td>I get upset at myself for having certain thoughts.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>19.</td>
<td>I do many things at once.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>20.</td>
<td>I think about the future.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>21.</td>
<td>I think that some of my feelings are bad and that I shouldn’t have them.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>22.</td>
<td>I notice when my feelings begin to change.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>23.</td>
<td>I pay close attention to whatever is happening right now.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>24.</td>
<td>I notice how things around me smell.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>25.</td>
<td>I stop myself from having feelings that I don’t like.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
Strengths and Difficulties Questionnaire (SDQ)

For each item, please select the option that best describes you. It would help us if you answered all items as best as you can, even if you are not absolutely certain. Please give your answers on the basis of how things have been for you over the last six months.

<table>
<thead>
<tr>
<th></th>
<th>Not True</th>
<th>Somewhat True</th>
<th>Certainly True</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I try to be nice to other people. I care about their feelings.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2. I am restless, I cannot stay still for long.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3. I get a lot of headaches, stomach-aches, or sickness.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4. I usually share with others, for example, CD’s, games, food.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5. I get very angry and often lose my temper.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>6. I would rather be alone than with people my age.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7. I usually do as I am told.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>8. I worry a lot.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>9. I am helpful if someone is hurt, upset, or feeling ill.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>10. I am constantly fidgeting or squirming.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>11. I have one good friend or more.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>12. I fight a lot. I can make other people do what I want.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>13. I am often unhappy, depressed, or tearful.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>14. Other people my age generally like me.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>15. I am easily distracted, I find it difficult to concentrate.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>16. I am nervous in new situations. I easily lose confidence.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>17. I am kind to younger children.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>18. I am often accused of lying or cheating.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>19. Other children or young people pick on me or bully me.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>20. I often offer help to others (parents, teachers, children)</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>21. I think before I do things.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>22. I take things that are not mine from home, school, or elsewhere.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>23. I get along better with adults than with people my own age.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>24. I have many fears, I am easily scared.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>25. I finish the work I’m doing. My attention is good.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
APPENDIX E: Parent Measure

The following questions are to be answered by you about your child.

Strengths and Difficulties Questionnaire

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain. Please give your answers on the basis of how the person you are describing has been over the last six months.

<table>
<thead>
<tr>
<th>Question</th>
<th>Not True</th>
<th>Somewhat True</th>
<th>Certainly True</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Considerate of other people’s feelings</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2. Restless, overactive, finds it hard to sit down for long</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3. Often complains of headaches, stomach-aches, or sickness</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4. Shares readily with others, for example, food and drink</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5. Often loses temper</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>6. Would rather be alone than with other people</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7. Generally willing to do what other people want</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8. Many worries, often seems worried</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>9. Helpful if someone is hurt, upset, or feeling ill</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>10. Constantly fidgeting or squirming</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>11. Has at least one good friend</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>12. Often fights with others or bullies them</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>13</td>
<td>Often unhappy, depressed, or tearful</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>Generally liked by others</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>Easily distracted, concentration wanders</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>Nervous in new situations, easily loses confidence</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>Kind to children</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>Often lies or cheats</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>Picked on or bullied by others</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>Often volunteers to help others (family members, friends, colleagues)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>21</td>
<td>Thinks things out before acting</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>Steals from home, work, or elsewhere</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>23</td>
<td>Gets along better with older people than with people his/her age</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td>Many fears, easily scared</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>25</td>
<td>Sees tasks through to the end, good attention span.</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
APPENDIX F: Exit Interview Script

Interview Instructions

[Greet the participant; introduce yourself; make sure that they are comfortable, in a quiet space, and can hear you well; spend some time building rapport]

Introduction

I would like to ask you a few questions about the group. The purpose of this interview is so that we can collect information about your perceptions of the group, including potential benefits, challenges, the impact that it has had on your everyday life, and any comments you have about how we can make the group better. I expect that the interview will take about 15 minutes.

I was not involved in the group sessions and so you can think of me as a neutral person that won’t be offended by any negative comments that you have. As a reminder, your name will not be attached to your responses. Our conversation today is confidential, which means that I won’t tell anyone about what we talk about without your consent, unless I am worried that there is a danger to you, your child, or anyone else. Your participation will not in any way affect your relationship with the group facilitators, Special Olympics/Alberta Health Services, CAMH, or the University of Calgary.

This interview will be audio-recorded to make sure that we can accurately collect your responses. Are you comfortable with this?

Do you have any questions for me before we begin?

[start recording]

If you were to have a conversation with another person that is considering the mindfulness program, what would you tell them?
MINDFULNESS BASED INTERVENTION

What benefits did you experience as a result of this group?

What problems did you experience as a result of this group?

How did this group impact your daily life (home, work)?

What did you learn about yourself as a result of this group?

Do you have any recommendations for how you would improve the group?

Overall, how satisfied are you with the group, on a scale from 1 to 5 [read participant response options]?

   a) 1 – Very dissatisfied
   b) 2 – Dissatisfied
   c) 3 – Neutral
   d) 4 – Satisfied
   e) 5 – Very satisfied

   If participant responds 1-2, ask why they were dissatisfied with the group.

How would you rate your satisfaction with the facilitation of the group (for example, the facilitator’s ability to engage with the group, effectively teach concepts, lead the group through practices) on a scale from 1 to 5 [repeat response options if needed]?

   a) 1 – Very dissatisfied
   b) 2 – Dissatisfied
   c) 3 – Neutral
   d) 4 – Satisfied
   e) 5 – Very satisfied

   If participant responds 1-2, ask why they were dissatisfied with the facilitation of the group.

How would you rate your satisfaction with the organization of the group (for example, the technology used, communication over email, the structure of sessions, etc.) on a scale from 1 to 5?

   a) 1 – Very dissatisfied
   b) 2 – Dissatisfied
   c) 3 – Neutral
   d) 4 – Satisfied
   e) 5 – Very satisfied
MINDFULNESS BASED INTERVENTION

If participant responds 1-2, ask why they were dissatisfied with the organization of the group.

Do you have any final comments about the group?

Thank you very much for your time and feedback!

APPENDIX G: Youth Consent

UNIVERSITY OF CALGARY
CONSENT TO PARTICIPATE IN RESEARCH

TITLE: A mindfulness-based intervention for individuals with neurodevelopmental disorders and their caregivers during COVID-19

SPONSOR: Special Olympics Canada & the Alberta Children’s Hospital Foundation

INVESTIGATORS: Dr. Carly McMorris (PI)\(^1\), Dr. Yona Lunsky (Co-Investigator)\(^2\), Dr. Jonathan Weiss (Co-Investigator)\(^3\) Dr. Brianne Redquest (Co-Investigator)\(^2\), Jamie Valis (Collaborator)\(^4\), Tom Davies (Collaborator)\(^5\), & Stephanie Howe (Study Coordinator)\(^1\).

\(^1\)University of Calgary, Werklund School of Education; Alberta Children’s Hospital Research institute
\(^2\)The Centre for Addiction and Mental Health
\(^3\)York University, Department of Psychology
\(^4\)Special Olympics International
\(^5\)Special Olympics Canada

the ENHANCE Lab
enhancelab@ucalgary.ca
403-441-8473

INTRODUCTION

This consent form is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something described here, or information not included here, please ask. Take the time to read this carefully and to understand any accompanying information. You will receive a copy of this form for your records.
MINDFULNESS BASED INTERVENTION

You were identified as a possible participant in this study because you are a kid or teen (aged between 12 and 18) with autism spectrum disorder (ASD) or fetal alcohol spectrum disorder (FASD). Your participation in this research study is voluntary.

WHY IS THIS STUDY BEING DONE?

The purpose of this research study is to see whether an online mindfulness group lowers levels of stress in neurodiverse kids and teens and their caregivers.

We know that due to COVID-19, this is a stressful time for everyone. It may be especially stressful for kids and teens with neurodevelopmental disorders and their caregivers, who can be particularly vulnerable to stress. Mindfulness is a set of skills that can include meditation, being kind to ourselves and others, and paying attention to how our bodies feel. We know from past research that when people practice mindfulness regularly, it can help them to feel calm. We would like to practice mindfulness with Albertan families of children with ASD and FASD virtually (online video chats) and see whether kids and caregivers find it to be useful in reducing their levels of stress.

HOW MANY PEOPLE WILL TAKE PART IN THIS STUDY?

About 20-39 kids and teens and one of their caregivers (parents or legal guardians) will take part in this study Canada-wide. We will be running two groups at the same time. Each group will contain up to 15 kids or teens and 15 caregivers.

WHAT WILL HAPPEN IF I TAKE PART IN THIS STUDY?

Pre-screening: If you are interested in being a part of this study, the first thing that you (or your caregiver) will do is to talk to a member of the research team over the phone about the study and answer some questions. Your answers to these questions will determine whether or not you can continue in the study. These will be questions about you (e.g. what language you speak at home, whether you have an electronic device with internet connection, whether you have a caregiver that would be interesting in participating in the study with you, and whether you can commit to virtually attending all of the sessions.

Questionnaires (Time 1): Before the group starts, we will ask you and your caregiver to complete some questionnaires. A member of the research team will ask you the questions over the phone. We estimate that these questionnaires will take you less than one hour to complete. The questionnaires will ask you questions about how mindful you are (e.g., how much you pay attention to your emotions and sensations in your body) and your well-being (how you are doing mentally and emotionally). Your caregiver will also be asked to answer questions about you, including about the ways you think, feel, and behave.

Mindfulness Group: The group sessions will take place for one hour each week for 6 weeks. Both you and your caregiver should try your best to attend all of the sessions. Sessions will be
like an online class that will teach you about mindfulness. You will practice it together in a group with other kids and teens and their caregivers. Each week you will learn a new technique and you will be expected to practice on your own throughout the week. Each week we will ask you three questions about how you have been doing that week. **Please note that this group should not replace any treatment you are already receiving for mental health issues.** It is more of a class that will teach you skills that are proven to help with stress and anxiety.

**Questionnaires (Time 2):** After the last session of the group, we will ask you to complete some of the same questionnaires for a second time. You will also be asked about how much you liked the group and whether or not you think it was helpful.

**Questionnaires (Time 3):** Three months after the group has ended, we will ask you to complete the same questionnaires again.

**HOW LONG WILL I BE IN THIS STUDY?**

Completing the questionnaires will take about 1 hour each time. Group sessions will be for one hour each week. How long you practice mindfulness each week is up to you.

The group will last for 6 weeks and then we will contact you again 3 months later to complete questionnaires for Time 3.

**ARE THERE ANY POTENTIAL RISKS OR DISCOMFORTS THAT I CAN EXPECT FROM THIS STUDY?**

There are minimal risks involved in this study. The only risk of completing the questionnaire assessments is that you may become tired. For this or any other reason, you may stop at any time.

The mindfulness group is designed to help you feel calmer than you might have been feeling before. We don’t think that you will become frustrated or stressed in the group, but if you do, you may take a break at any time. Group facilitators and your caregiver will also be online to check in with you and help you if you are feeling stressed.

**ARE THERE ANY POTENTIAL BENEFITS IF I PARTICIPATE?**

A benefit of participating in this study is that you will be learning new skills that can help you to feel calm and it will not cost you anything.

It will also help our team to find out whether this group is useful for families of children with neurodevelopmental disorders in Alberta. It can tell us whether it is something that can help other kids and their caregivers in the future and whether there is anything that we can do to make the group better.
MINDFULNESS BASED INTERVENTION

CAN I STOP BEING IN THE STUDY?

Yes. You can decide to stop at any time. Tell a member of the research team or your group facilitators if you are thinking about stopping or decide to stop.

CAN THE RESEARCHERS REMOVE ME FROM THIS STUDY?

The researchers may end your participation in this study for a number of reasons, such as if your safety and welfare are at risk, if you are disruptive or disrespectful to facilitators and/or other group members, or if you miss too many (two of more) group sessions. The researchers or the study sponsor might also decide to stop the study at any time.

WITHDRAWAL OF STUDY DATA

If you decide to revoke this consent at any time and withdraw your data from the study, we will destroy your research data whenever possible. To revoke your consent, please speak to a member of the research team. There are certain times that we are no longer able to destroy your data (if it has already been included in analyses and published or presented). If you decide to withdraw your data from the study, please let us know within three months of your participation.

WILL I BE PAID FOR PARTICIPATING, OR DO I HAVE TO PAY FOR ANYTHING?

You will receive a $40 gift card (1 per child/caregiver pair) as compensation for the time it takes you to complete the questionnaires. You will receive a gift card for Time 1 and again at Time 3.

WILL INFORMATION ABOUT ME AND MY PARTICIPATION BE KEPT CONFIDENTIAL?

The researchers will do their best to make sure that your private information is kept confidential, unless required by law (e.g., disclosed child abuse or neglect must be reported) and legal requests (e.g., court applications seeking disclosure of research data are possible in studies of criminal behavior).

Information about you will be handled as confidentially as possible, but there is always the potential for an unintended breach of privacy. The research team will handle data according the Data Management Plan as outlined below:

- No identifiable information about you (e.g. your name) will be kept with the research data.
- You will have a participant ID number that will be on all of the measures (e.g. questionnaires) you complete. A master list linking your participant ID number and your identifiable information will be kept separate from the research data.
- All physical (e.g. paper) research data and records will be maintained in a secure location at the University of Calgary. Only authorized individuals will have access to it.
MINDFULNESS BASED INTERVENTION

- All electronic research data and records will be stored on an external hard drive that is kept in a secure location and password-protected. This data will be backed up onto a password-protected laptop

HOW LONG WILL INFORMATION FROM THE STUDY BE KEPT?

We will keep your research records for at least five years after the study has ended. We will limit access to your personal information to the researchers listed on the first page of this form. If we let other researchers use the information we have collected from this study for related research, it will not contain your personal information. We will not use your name in any publication of the research results. Any future use of this research data is required to undergo review by a Research Ethics Board.

CONTACT FOR FUTURE RESEARCH

University of Calgary researchers may contact me in the future to ask me to take part in other research studies.

☐ YES
☐ NO

CONTACTS

Since this group will be online, we may be far away from you geographically. We would like to make sure that we can contact someone close to you in the rare event of an emergency or other unforeseen circumstance. We will always let you know before we contact the people you identify below.

Are you ok with us contacting an emergency contact, if needed?

☐ YES
☐ NO

Emergency Contact Name: _______________________
Relationship to You: _______________________
Phone Number: _______________________

Are you ok with us contacting your primary health care physician (e.g., family doctor) if needed?

☐ YES
☐ NO
MINDFULNESS BASED INTERVENTION

Physician Contact Name: _______________________
Phone Number: ____________________
Please enter your home address below:

______________________________________________________________________

WHO CAN I CONTACT IF I HAVE QUESTIONS ABOUT THIS STUDY?

The Research Team:
You may contact the Study Coordinator at enhancelab@ucalgary.ca / 403-441-8473 or the Principal Investigator, Dr. Carly McMorris at camcmorr@ucalgary.ca / 403-220-5457 with any questions or concerns about the research or your participation in this study.

Conjoint Health Research Ethics Board (CHREB):
If you have any questions concerning your rights as a possible participant in this research, please contact the Chair, Conjoint Health Research Ethics Board, University of Calgary at 403-220-7990.

HOW CAN I FIND OUT ABOUT THE STUDY RESULTS?

When the study is completed, or when results associated with this study are published, we will send you an email notifying you of what we found.

WHAT ARE MY RIGHTS IF I TAKE PART IN THIS STUDY?
Taking part in this study is your choice. You can choose whether or not you want to participate. Whatever decision you make, there will be no penalty to you.
- You have a right to have all of your questions answered before deciding whether to take part.
- Your decision will not affect your relationship with the University of Calgary or Alberta Health Services.
- If you decide to take part, you may leave the study at any time.

HOW DO I INDICATE MY AGREEMENT TO PARTICIPATE?

Your signature on this form indicates that you have understood to your satisfaction the information regarding your participation in the research project and agree to participate as a participant. In no way does this waive your legal rights nor release the investigators or involved institutions from their legal and professional responsibilities.

SIGNATURE OF STUDY PARTICIPANT

________________________________
Name of Participant
A signed copy of this consent form has been given to you to keep for your records and reference.
INTRODUCTION

This consent form is only part of the process of informed consent. It should give you the basic idea of what the research is about, and what your child’s participation will involve. If you would like more detail about something mentioned here, or information not included here, please ask. Take the time to read this carefully and to understand any accompanying information.

Your child was identified as a possible participant in this study because they are a child or adolescent with autism spectrum disorder (ASD) or fetal alcohol spectrum disorder (FASD). Your child’s participation in this research study is voluntary. You are signing this form as your child’s caregiver (parent or legal guardian)

WHY IS THIS STUDY BEING DONE?
MINDFULNESS BASED INTERVENTION

The purpose of this research study is to see whether an online mindfulness group lowers levels of stress in neurodiverse kids and teens and their caregivers.

We know that due to COVID-19, this is a stressful time for everyone. It may be especially stressful for kids and teens with neurodevelopmental disorders and their caregivers, who can be particularly vulnerable to stress. Mindfulness is a set of skills that can include meditation, being kind to ourselves and others, and paying attention to how our bodies feel. We know from past research that when people practice mindfulness regularly, it can help them to feel calm. We would like to practice mindfulness with Albertan families of children with ASD and FASD virtually (online video chats) and see whether kids find it to be useful in reducing their levels of stress.

HOW MANY PEOPLE WILL TAKE PART IN THIS STUDY?

About 20-30 kids and one of their caregivers (parents or legal guardians) will take part in this study Canada-wide. We will be running two groups at the same time. Each group will contain up to 15 kids or teens and 15 caregivers.

WHAT WILL HAPPEN IF MY CHILD TAKES PART IN THIS RESEARCH STUDY?

Questionnaires (Time 1): Before the group starts, we will ask your child to complete some questionnaires. A member of the research team will ask them these questions over the phone. We estimate that these questionnaires will take no more than one hour to complete. The questionnaires will ask your child questions about how mindful they are (e.g., how much they pay attention to their emotions and sensations in their body) and their well-being (how they are doing mentally and emotionally).

Mindfulness Group: The group sessions will take place for one hour each week for 6 weeks. Both you and your child should try your best to attend all of the sessions. Sessions will be like an online class that will teach you about mindfulness. You will practice it together in a group with other a kids and teens and their caregivers. Each week you will learn a new technique and you and your child will be expected to practice on your own throughout the week. Each week we will also ask your child to complete a very brief survey (three questions) about how they have been doing that week. Please note that this group is not a therapy for significant mental health issues, and should not be considered a replacement for treatment. It is more like a class that will teach your child skills that are proven to help with stress and anxiety. If your child is seeing a mental health professional, they should continue to do so.

Questionnaires (Time 2): After the last session of the group, we will ask your child to complete some of the same questionnaires for a second time. Your child will also be asked about how much they liked the group and whether or not they think it was helpful.
MINDFULNESS BASED INTERVENTION

**Questionnaires (Time 3):** Three months after the group has ended, we will ask your child to complete the same questionnaires again.

**HOW LONG WILL MY CHILD BE IN THE RESEARCH STUDY?**

Completing the questionnaires will take about 1 hour each time. Group sessions will be for one hour each week. How long your child practices mindfulness each week is up to him/her.

The group will last for 6 weeks and then we will contact you and your child again 3 months later to complete questionnaires for Time 3.

**ARE THERE ANY POTENTIAL RISKS OR DISCOMFORTS THAT MY CHILD CAN EXPECT FROM THIS STUDY?**

There are minimal risks involved in this study. The only risk of completing the questionnaire assessments is that your child may become tired. For this or any other reason, they may stop at any time.

The mindfulness group is designed to help your child feel calmer than they might have been feeling before. We don’t think that your child will become frustrated or stressed in the group, but if they do, they may take a break at any time. Group facilitators will also be online to check in with kids and help if they are feeling stressed.

**ARE THERE ANY POTENTIAL BENEFITS TO MY CHILD IF THEY PARTICIPATE?**

A benefit of participating in this study is that your child will be learning new skills that can help them to feel calm. This program will be provided to you and your child free of cost.

It will also help our team to find out whether this group is useful for families of children with a neurodevelopmental disorder in Alberta. It can tell us whether it is something that can help other kids and their caregivers in the future and whether there is anything that we can do to make the group better.

**CAN MY CHILD STOP BEING IN THE STUDY?**

Yes. You can decide to stop your child’s participation at any time. Tell the researchers if you are thinking about stopping or decide to stop your child’s participation.

**CAN THE RESEARCHERS REMOVE MY CHILD FROM THIS STUDY?**

The researchers may end your child’s participation in this study for a number of reasons, such as if their safety and welfare are at risk, if they are significantly disruptive, or if they miss too many (two or more) group sessions. The researchers or the study sponsor might also decide to stop the study at any time.
WITHDRAWAL OF STUDY DATA

If you decide to revoke this consent at any time and withdraw your child’s data from the study, we will destroy their research data whenever possible. To revoke your consent, please speak to a member of the research team. There are certain times that we are no longer able to destroy the child’s data (if it has already been included in analyses and published or presented). If you decide to withdraw your child’s data from the study, please let us know within three months of your participation.

WILL MY CHILD BE PAID FOR PARTICIPATING, OR DO I HAVE TO PAY FOR ANYTHING?

You will receive a $40 gift card (1 per child/caregiver pair) as compensation for the time it takes you to complete the questionnaires. You will receive a gift card for Time 1 and again at Time 3.

WILL INFORMATION ABOUT MY CHILD’S PARTICIPATION BE KEPT CONFIDENTIAL?

The researchers will do their best to make sure that your child’s private information is kept confidential, unless required by law (e.g., disclosed child abuse or neglect must be reported) and legal requests (e.g., court applications seeking disclosure of research data are possible in studies of criminal behavior).

Information about your child will be handled as confidentially as possible, but there is always the potential for an unintended breach of privacy. The research team will handle data according the Data Management Plan as outlined below:

- No identifiable information about your child (e.g. their name) will be kept with the research data.
- He/she will have a participant ID number that will be on all of the measures (e.g. questionnaires) they complete. A master list linking your child’s participant ID number and their identifiable information will be kept separate from the research data.
- All physical (e.g. paper) research data and records will be maintained in a secure location at the University of Calgary. Only authorized individuals will have access to it.
- All electronic research data and records will be stored on an external hard drive that is kept in a secure location and password-protected. This data will be backed up onto a password-protected laptop

HOW LONG WILL INFORMATION FROM THE STUDY BE KEPT?

We will keep your child’s research records for at least five years after the study has ended. We will limit access to his/her personal information to the researchers listed on the first page of this form. If we let other researchers use the information we have collected from this study for related research, it will not contain your child’s personal information. We will not use their name in any publication of the research results. Any future use of this research data is required to undergo review by a Research Ethics Board.
MINDFULNESS BASED INTERVENTION

CONTACT FOR FUTURE RESEARCH

University of Calgary researchers may contact me in the future to ask for my child to take part in other research studies.

☐ YES
☐ NO

CONTACTS

Since this group will be online, we may be far away from you geographically. We would like to make sure that we can contact someone close to your child in the rare event of an emergency or other unforeseen circumstance. We will always let you know before we contact the people you identify below.

Are you ok with us contacting an emergency contact for your child, if needed?

☐ YES
☐ NO

Emergency Contact Name: _______________________

Relationship to Child: _______________________

Phone Number: _______________________

Are you ok with us contacting your child’s primary health care physician (e.g., family doctor) if needed?

☐ YES
☐ NO

Physician Contact Name: _______________________

Phone Number: _______________________

WHO CAN I CONTACT IF I HAVE QUESTIONS ABOUT THIS STUDY?

The Research Team:
You may contact the Study Coordinator at enhancelab@ucalgary.ca / 403-441-8473 or the Principal Investigator, Dr. Carly McMorris at camcmorr@ucalgary.ca / 403-220-5457 with any questions or concerns about the research or your participation in this study.
Conjoint Health Research Ethics Board (CHREB):
If you have any questions concerning your rights as a possible participant in this research, please contact the Chair, Conjoint Health Research Ethics Board, University of Calgary at 403-220-7990.

HOW CAN I FIND OUT ABOUT THE STUDY RESULTS?

When the study is completed, or when results associated with this study are published, we will send you an email notifying you of what we found.

WHAT ARE MY CHILD’S RIGHTS IF THEY TAKE PART IN THIS STUDY?

Your child’s participation in this study is your choice. You can choose whether or not you want your child to participate. Whatever decision you make, there will be no penalty to you or your child.

- You have a right to have all of your questions answered before deciding whether your child will take part.
- Your decision will not affect you or your child’s relationships with the University of Calgary, or Alberta Health Services.
- If you decide for your child to take part, they can leave the study at any time.
- Your child may refuse to answer any questions that they do not want to answer and still remain in the study.

HOW DO I INDICATE AGREEMENT FOR MY CHILD TO PARTICIPATE?

Your signature on this form indicates that you have understood to your satisfaction the information regarding your child’s participation in the research project and agree for them to participate. In no way does this waive your or your child’s legal rights nor release the investigators or involved institutions from their legal and professional responsibilities.

Name of Child

..........................................................

SIGNATURE OF PARENT OR LEGAL GUARDIAN

Name of Parent or Legal Guardian

..........................................................

Signature of Parent or Legal Guardian             Date
A signed copy of this consent form has been given to you to keep for your records and reference.
MINDFULNESS BASED INTERVENTION

APPENDIX I: Mindfulness Neurodiverse Workbook