

**Mindfulness-Based Music and Songwriting:
Pilot Data from a Novel Telehealth Intervention for Parents of Children with Disabilities**

Zoe S. Crawley

Honors Program in Psychological Sciences, Vanderbilt University

Vanderbilt Music Cognition Lab, VUMC

Dr. Miriam Lense

March 28, 2022

Abstract

The Mindfulness-Based Music & Songwriting (MBMS) intervention is a novel 7-week telehealth program aimed at reducing stress in caregivers of children with developmental and intellectual disabilities. The intervention curriculum combines mindfulness principles with therapeutic music and songwriting and is taught by a certified Music Therapist (MT-BC) over seven one-hour sessions. Measures of stress, wellbeing, depression, and anxiety were taken at baseline, post-study, and at a 4-week follow-up. Measures of affect and connection to the therapist were taken immediately before and after each session. The preliminary review of this intervention includes three primary analyses: evaluating changes in multiple outcome variables across baseline, post-study, and 4-week follow-up; changes in affect and connection to the therapist across the intervention; and changes in affect and connection to the therapist within individual sessions. Preliminary results show significant increases in wellbeing and decreases in stress and depression across the study, as well as significant increases in affect and connection to the therapist across all sessions. Limitations include small sample size and potential impacts on stress due to COVID-19. Findings support the continuation of the program, implementation of a randomized control trial, and further analyses of affect regulation as a primary mechanism.

Keywords: Caregiver, Disability, Mindfulness, Songwriting, Stress-Reduction

Mindfulness-Based Music and Songwriting:

Pilot Data from a Novel Telehealth Intervention for Parents of Children with Disabilities

Developmental and intellectual disabilities affect millions of children and their families across the United States and the world. “Developmental disability” categorizes a wide variety of disorders and diagnoses, but can generally be defined as a delay during the early developmental period that affects learning, language, motor skills, behavior, or other aspects of development (CDC, 2021). By the CDC’s estimates in 2020, 1 in 6 children are affected by a developmental disability. Intellectual disabilities are not defined by their period of onset but can be generally defined as significant delay or impairment in cognitive ability and function (Families Special Interest Research Group of IASSIDD, 2014). Current estimates suggest between 1 in 50 and 1 in 20 families include a child with an intellectual disability (CDC, 2021). For the purposes of this paper, developmental and intellectual disabilities will be grouped together, due to their overlapping populations, and referred to as I/DDs. Children and youth with I/DDs may need additional support and intervention to succeed. There is a wide body of research supporting a variety of interventions and best practices for children with I/DDs, as well as a growing body of literature on interventions and best practices to support the families and caregivers of children with I/DDs.

Parent/Caregiver Stress, Mental Health, and Wellbeing

It is imperative to understand the unique needs and challenges that parents/caregivers of children with I/DDs face. Beginning at the time of their child’s diagnosis, parents of children with I/DDs may be subject to unique parenting stress, which is defined as the distress that accompanies the demands and stressors of parenting (Deater-Deckard, 1998). In general, parents of children with I/DDs show higher rates of parental distress, in addition to mental distress and

negative psychological symptoms (Hayes & Watson, 2013). Estes and colleagues found that parents of children with autism spectrum disorder (ASD), in particular, are at significantly higher risk for increased stress compared to parents of typically developing (TD) children (Estes et al., 2013). Increased stress is also highly correlated with elevated emotional distress in this population (Baker et al., 2020). Parenting stress can greatly influence parental wellbeing but can be difficult to measure (Hayes & Watson, 2013). Therefore, it is important to consider the quantifiable consequences and correlates of parental distress.

One such association with higher levels of stress is psychiatric disorder and adverse psychopathology. Parents of children with I/DDs are at higher risk of psychiatric disorders like anxiety and depression (Emerson, 2003; Olsson & Hwang, 2001). Marquis and colleagues found that parents of children with I/DDs experience higher rates of depression and other mental health issues compared to parents of TD children (Marquis et al., 2020; Singer, 2006). Another measurable consequence of parenting stress is physical health. On various self-report measures, parents of children with I/DDs show poor physical health in addition to stress and poor mental health (Marquis et al., 2019). Parents/caregivers also report decreased quality of life on health-specific measures (Khanna et al., 2011). In comparing parents of children with I/DDs to parents of their TD peers, parents of children with I/DDs face additional unique challenges that may lead to decreased physical and mental health.

Recent studies have shown that parents are not the only ones impacted by parental distress; their children are as well. In 2015, Dykens concluded that poor wellbeing in parents is associated with poor outcomes in children. Previous studies also suggested that parental stress reduces the effectiveness of early intervention and teaching for parents (Osborne et al., 2008). To achieve the best possible outcomes for children with I/DDs, parents' physical and mental

wellness needs to be considered, as parents provide key intervention and education for their children. There is a documented need for parent/caregiver support, which should be considered a priority and crucial component of the support for children with I/DDs.

In order to inform clinical practices, specific mechanisms of parental distress must be identified. The role of affect regulation in managing stress is a particular mechanism of interest. The literature has long supported the connection between affect and wellbeing, as well as affect and stress (Dua, 1993; Lawton, 1983). Positive affect has been well associated with wellbeing, and more specifically with social connectedness and adaptive coping (Steptoe et al., 2008; Xu et al., 2015). Many studies have suggested mechanisms for this association, including that positive affect increases resilience and overall satisfaction, and is more generally a scaffold for happiness and wellbeing (Alexander et al., 2021; Lindquist et al., 2016). In addition, Sewart and colleagues propose that positive affect moderates the effects of daily stress and adverse psychopathology (Sewart et al., 2019). Based on this knowledge, similar studies have used affect as an indicator of parent coping and regulation.

There are a variety of family and social factors that have been shown to negatively influence parental distress, including child behavior, characteristics, and behavior problems (Davis & Carter, 2008; Hastings et al., 2006). Fewer factors are shown to positively influence parental wellbeing, though those that do should be noted. Closeness with the child, social support, and trait resilience all mediate the harmful effects of parental distress (Hoffman et al., 2009; McConnell & Savage, 2015; Weiss, 2002). For example, parents who are more involved in their community and have more supportive relationships show higher caregiver satisfaction and wellbeing (Burke & Heller, 2016). Noting the factors that may lower parental distress, particularly social support, gives some suggestions for potential mechanisms of empirically

informed intervention. Potential interventions should improve affect regulation and social connection to reduce overall parental stress.

Parent/Caregiver Interventions to Support Mental Health and Wellbeing

A few meta-analyses in the recent literature have focused on identifying interventions for parents and caregivers of children with I/DDs (Bourke-Taylor et al., 2021; Da Paz & Wallander, 2017; Frantz et al., 2018; Lindo et al., 2016). A wide variety of intervention types have been suggested, including mindfulness, psychoeducation, cognitive-behavioral therapy (CBT), stress-reduction, and behavior programs. Frantz et al (2018) identified mindfulness interventions as the most promising in decreasing parental stress and depression. Mindfulness-based interventions were common in these meta-analyses, and were associated with some of the most significant and promising results (Benn et al., 2012; Dykens et al., 2014; Ferraioli & Harris, 2013; Neece, 2014).

Mindfulness Interventions

Mindfulness is defined as the “process of deliberate awareness and nonjudgmental acceptance of thoughts and feelings in the present moment” (Bishop et al., 2004). Mindfulness techniques are derived from Buddhist meditative tradition and have been applied to a wide array of fields and programs (Brown & Ryan, 2003). In psychological intervention, a stress-reduction program known as Mindfulness-Based Stress Reduction (MBSR) has greatly risen in prevalence and empirical support, including for parents/caregivers of children with I/DDs (Bazzano et al., 2015; Benn et al., 2012; Dykens et al., 2014; Ferraioli & Harris, 2013; Neece, 2014). MBSR aims to “teach and promote the practice of “mindfulness,” or “paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally” (Kabat-Zinn, 1994). MBSR, and mindfulness-based interventions more generally, have the potential to greatly improve wellbeing in a wide range of populations.

The practice of mindfulness is of interest particularly because it can increase stress resilience and support relationship building. Specifically, the concepts of non-judgmental awareness and loving-kindness open participants up to identifying, naming, and re-appraising negative emotions and thoughts (Benn et al., 2012; Brown & Ryan, 2003). Mindfulness training is correlated with decreased stress, increased feelings of wellbeing, and improved parent-child relationships (Ferraioli & Harris, 2013; Hartley et al., 2019; Lo et al., 2017). Consistent and supported mindfulness practice can improve personal wellbeing, positive affect, and stress-resilience as well as positively influence parenting effectiveness and patience (Beer et al., 2013). Mindfulness also seems to be one of the few interventions for this population that shows lasting effects at post-study follow-up (Cachia et al., 2016; Neece, 2014).

Music and Songwriting

The current study proposes that music and songwriting are beneficial additions to mindfulness intervention in this population. Therapeutic songwriting is a specific technique of interest due to the success of prior research that combines songwriting with other models of clinical intervention (Reschke-Hernández, 2011). When used in conjunction with psychotherapeutic approaches, participants in therapeutic songwriting programs have reported the experience to be worthwhile, helpful, meaningful, and enjoyable (Baker et al., 2018). Multiple researchers agree that therapeutic songwriting is a beneficial addition to the standard therapeutic model (Baker & Yeates, 2018; Klein & Silverman, 2012). In addition to these prior findings, music is particularly of interest due to its unique mechanistic relevance to mindfulness intervention.

The effects of music exchange as a therapeutic tool can be understood through a few key mechanisms. The first is that music is an excellent method of mood and emotion regulation

(Thayer et al., 1994). Chin and Rickard (2014) show that music use is an effective emotion regulation strategy, with effects that are significant above and beyond the effects of trait affect. The influence of music on affect regulation is well-supported across a wide variety of clinical contexts, as well (Linnemann et al., 2015; Pelletier, 2004; Silverman, 2020). The second reason is that music facilitates interpersonal communication and connection (Hargreaves & North, 1999). Surveys on the functions of music use in daily life have found that social connection was rated one of the most important reasons respondents listen to music (Groarke & Hogan, 2016; Schäfer et al., 2013). In more formal shared music experiences such as instrumental ensembles and group singing, social connection and support are major components of shared learning and group cohesion (Dingle et al., 2013; Kenny, 2014). In a clinical context, group music experiences facilitate connection to the self and others, and have implications across many aspects of wellbeing (Lee et al., 2020; Minor et al., 2013; Warran et al., 2019). A study by Lynch and colleagues (2018) found a significant connection between choral singing and mindfulness. For these reasons, music and songwriting are believed to be valuable additions to the therapeutic intervention proposed in this study.

Mindfulness-Based Music and Songwriting

The Mindfulness-Based Music and Songwriting (MBMS) intervention is a novel telehealth intervention created for parents and caregivers of children with I/DDs. The program draws upon techniques and practices from mindfulness and therapeutic music and songwriting, with the goal of reducing stress and increasing wellbeing in this population. Over seven weekly individual telehealth sessions, participants in the MBMS intervention learn mindfulness practices and concepts such as deep breathing, mindful listening, and loving-kindness, while being led by a Board-Certified Music Therapist (MT-BC). Participants work with the MT-BC to apply these

practices as they develop two mindfulness-informed songs – one focused on sending loving-kindness towards the child and one focused on creating a space for loving-kindness within the self.

This study proposes that the MBMS program will decrease stress and increase wellbeing in parents of children with I/DDs through mindfulness practice and therapeutic songwriting, and that affect regulation and connection to the therapist are two key mechanisms of change. Program efficacy will be evaluated by cross-study changes in stress, depression, anxiety, and wellbeing as well as session-level changes in affect and social connection.

Aims and Hypotheses of Current Study

The goal of this pilot analysis is to examine the feasibility and preliminary outcomes of the MBMS intervention in parents/caregivers of children with I/DDs, given the demonstrated need for stress reduction and social support. There are three preliminary hypotheses investigated in this study:

1. Stress, depression, and anxiety will significantly decrease, and wellbeing will significantly increase across the full time course of the study.
2. Positive affect, and connection to the MT-BC will significantly increase and negative affect will significantly decrease across the seven sessions of intervention.
3. Positive affect and connection to the MT-BC will significantly increase and negative affect will significantly decrease from the start to the end of individual sessions.

This pilot analysis also includes an assessment of program feasibility, as MBMS is a new curriculum. Feasibility will be assessed by the fidelity of program delivery by the MT-BC and receipt of the program by study participants.

Methods

Participants

Inclusion/Exclusion Criteria

Parents and caregivers aged 18 years or older with a child with an I/DD were eligible to participate. Participants were required to have English language proficiency and availability to attend weekly sessions over Zoom and complete associated questionnaires and interviews.

Enrollment

Participants were recruited through local disability organizations and through the Vanderbilt University Medical center clinics. All study materials were IRB-approved. Participants received study materials including audio recordings of meditations and original songs, psychoeducational handouts and worksheets, and gift card compensation for their participation.

Demographic Information

Fourteen parents/caregivers were initially recruited to the study. One pilot-phase participant was not included in this analysis because their child was typically developing, and one withdrew from the study prior to sessions beginning due to lack of time in the schedule. For the purposes of this analysis, twelve parents/caregivers have been included.

Participants' average age was 38.5 (5.6) years ($M(SD)$) and were predominantly female ($n=11$). Participants were primarily married ($n = 11$) and biological mothers (83.3%, $n =10$). Participants had a mean of 2.6 (1.0) children in the household, with a range of 1-5.

Participants identified a primary child with an I/DD. Primary children were an average age of 9.4 (5.7) years, with a range of 3-24 years. Primary children were predominantly male ($n = 9$), 100% had at least one specific diagnosis from a professional, and 58.3% had diagnosed comorbidities per parent report. 66.7% of children had a diagnosis of ASD, followed by 33.3%

with ADHD, 33.3% with anxiety, 25.0% with developmental delay, and 16.67% with depression, among other diagnoses.

Procedure

The Mindfulness-Based Music and Songwriting (MBMS) program lasted seven weeks and was conducted over Zoom (Version 5.8.0). Participants met one-on-one with a Board-Certified Music Therapist (MT-BC) to complete 1-hour weekly sessions. In each session, participants were guided through a structured curriculum that teaches mindfulness principles such as mindful awareness, loving-kindness, and non-judgment. Over seven sessions, participants generated two songs with the MT-BC in a guided, therapeutic songwriting process. Every week, participants were also given a mindfulness exercise to practice daily at home.

The MT-BC was supported by Research Assistants (RAs) who coordinated the virtual sessions and provided technical support (e.g., to assist with Zoom meeting set up and technical issues) and remained in a separate virtual room during the sessions. Fidelity ratings completed by the MT-BC after each session ensured high fidelity to the program curriculum. Approximately 40% of sessions were double-rated by a research staff member, and average session fidelity was very high (>95% as rated by both MT-BC and research staff).

Materials

During the MBMS program, participants were provided with written mindfulness curriculum materials created by the study team and the MT-BC. The curriculum draws upon mindfulness programs included in previous interventions for parents of children with disabilities (Dykens et al., 2014). The curriculum includes information about mindfulness techniques, as well as prompts for mindfulness and songwriting exercises. Printed curriculum materials were

mailed to participants prior to the start of the intervention and all materials were also available online.

Participants were also given audio recordings of guided mindfulness meditations, and recordings and text files of songs or song fragments written in each session. Participants were sent the meditation files prior to the beginning of the program and were sent song recordings as they were created. Recordings were saved for future analysis, with participant consent.

Measures

Baseline, Post-Study, and Follow-up Measures

A series of online surveys were completed at baseline, immediately following the 7-week intervention, and at a 4-week follow-up. All online surveys were collected using REDCap (Research Electronic Data Capture), a secure data server (Harris et al., 2009).

Stress and Wellbeing. Participants reported experiences of stress using the Perceived Stress Scale (PSS) (Cohen, 1988). The PSS includes 10 items in which participants are given a statement and asked to rate how often they felt or thought that way during the last month, on a scale of 0 - Never to 4 - Very Often. The 10 items were summed for an overall Perceived Stress score. The Cronbach's alpha for the PSS measure was 0.89 at baseline, 0.83 at post, and 0.83 at follow-up. Participants reported experiences of wellbeing using Ryff's Psychological Wellbeing Scale (Ryff et al., 2007; Ryff & Keyes, 1995). This measure includes 18 items in which participants are given a statement related to wellbeing and asked to rate how strongly they agree on a scale of 0 - Strongly Disagree to 5 - Strongly Agree. The 18 items were summed for an overall Wellbeing Score. The Cronbach's alpha for the Ryff measure was 0.90 at baseline, 0.91 at post, and 0.90 at follow-up.

Psychological Health. Participants reported symptoms of depression using the Beck Depression Inventory, 2nd edition (BDI-II) Self-Report (Beck et al., 1996). Participants reported symptoms of anxiety using the Beck Anxiety Inventory (BAI) Self-Report (Beck et al., 1988). These measures both include 20 items in which participants are given a characteristic or symptom of depression/anxiety respectively, and are asked to choose a statement, correlating to a scale of 0 to 3, that best describes their experience of that symptom during the past two weeks. The total score range of the BDI-II is 0-63, in which 0-13 is minimal, 14-18 is mild, 20-28 is moderate, and 29-63 is severe depression. The Cronbach's alpha for the BDI measure was 0.87 at baseline, 0.82 at post, and 0.76 at follow-up. The total score range of the BAI is 0-63, in which 0-7 is minimal, 8-15 is mild, 16-25 is moderate, and 26-63 is severe anxiety. The Cronbach's alpha for the BAI measure was 0.96 at baseline, 0.89 at post, and 0.96 at follow-up.

Session Measures

The day before each weekly session, an online survey was sent to participants to catalog the participant's completion of at-home engagement/mindfulness practice. Immediately before and after each individual session, an online questionnaire was sent to participants to measure affect and social connection towards the MT-BC.

Home Engagement. Each week before their session, participants completed the Weekly Home Engagement Questionnaire to log their home mindfulness practice over the previous week. The questionnaire consists of 5 items and asks participants to report the week's suggested activity, how often they practiced a mindfulness strategy that week (0, 1, 2-3, 4-5, 6-7 days per week), how much time they spent engaging in their activity that week (<5, 5-10, 11-20, 21-30, 31-60, 60+ minutes per day), and (when relevant) how often they listened to their original song that week (0, 1, 2-3, 4-5, 6-7 days per week). The median number of days participants practiced

mindfulness per week was 4-5, and the median time they spent engaging in that activity was 5-10 minutes per day.

Positive and Negative Affect. Participants reported their affective state using the Positive and Negative Affect Schedule, short-form (PANAS-SF) (Watson et al., 1988). This measure includes 20 items, with 10 adjectives that describe positive feelings, and 10 that describe negative feelings. Participants are asked to rate the extent to which they feel that way in the present moment, on a scale of 1-Very slightly to 5 - Extremely. The 10 positive affect (PA) subscale items were summed for the overall PA score and the 10 negative affect (NA) items were summed for the overall NA score. The original validation shows that PA and NA scores are clearly differentiated factors and can be viewed as independent and uncorrelated (Watson et al., 1988). McDonald's omega was calculated as the measure of reliability due to the hierarchical structure of this measure and design (Hayes & Coutts, 2020; Revelle & Condon, 2019). The Omega value for the PANAS across session start was 0.93, and across session end was 0.91.

Connection to the Therapist. Participants reported their feelings of connection to the MT-BC using the Inclusion of Others in the Self Scale (IoS) (Aron et al., 1992). This single item measure presents a series of seven pairs of circles, one labeled "self", one labeled "other". Image 1 shows the circles not overlapping, then the images increasingly get closer until Image 7 shows the circles nearly fully overlapped. Participants are asked to check the picture that best describes how connected they feel to the music therapist.

Data Analysis

All analyses were run in RStudio, Version 1.4.1717, using R, Version 4.1.1 (R Core Team, 2021; RStudio Team, 2021). Linear mixed models were run using the lme4 package (Bates et al, 2015). Additional analyses were run using the psych package (Revelle, 2021).

Analysis 1: Mental Health Outcomes Across Study

A repeated-measures ANOVA was conducted to determine differences between the baseline, post, and follow-up measures: RYFF, PSS, BDI-II, and BAI. Time point (baseline, post, follow-up) was used as the within-subject factor variable. Significance was determined by p-value ($\alpha = .05$) and effect sizes were measured using generalized eta squared (η^2_G).

Analysis 2: Affect Regulation and Social Connection Across Sessions

A linear mixed model analysis was conducted to determine differences between session measures across the 7 sessions. Models were run for the following measures: PANAS Positive, PANAS negative, and IOS. The model in this analysis included session number as the fixed effect, and individual as the random effect.

Analysis 3: Affect Regulation and Social Connection Within Sessions

A linear mixed model analysis was conducted to determine differences between session measures from start to end of each session. Models were run for the following measures: PANAS Positive, PANAS negative, and IOS. The model in this analysis included session time as the fixed effect, and individual as the random effect.

Results

Analysis 1: Mental Health Outcomes Across Study

The first group of analyses consisted of repeated-measures ANOVAs to assess changes in participants' wellbeing, stress, depression, and anxiety across baseline, post, and follow-up periods. For each measure, mean score and standard deviation were also calculated, as shown in Table 1. The repeated-measures ANOVA showed significant differences in scores across the intervention on wellbeing, $F(2,22) = 5.85, p = .009$, perceived stress, $F(2,22) = 9.23, p = .001$, and depression, $F(2,22) = 16.2, p < .001$. Participants' wellbeing increased, stress decreased, and

depression decreased from baseline to post. There were no significant changes in participant anxiety symptoms.

Table 1

Participant Wellbeing, Stress, Depression, and Anxiety Scores across Study

Measure	Baseline		Post-Study		Follow-Up		<i>F</i>	<i>p</i>	η^2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Wellbeing	80.3	12.9	86.0	12.7	87.0	12.0	5.85	.009*	0.06
Stress	20.3	6.85	15.3	4.94	15.0	5.58	9.23	.001*	0.16
Depression	13.6	8.37	6.92	6.10	4.50	4.32	16.2	<.001*	0.23
Anxiety	9.00	11.4	6.92	7.18	7.08	9.54	1.05	.344	0.01

* Significance at $\alpha = .05$

Analysis 2: Affect Regulation and Social Connection Across Sessions

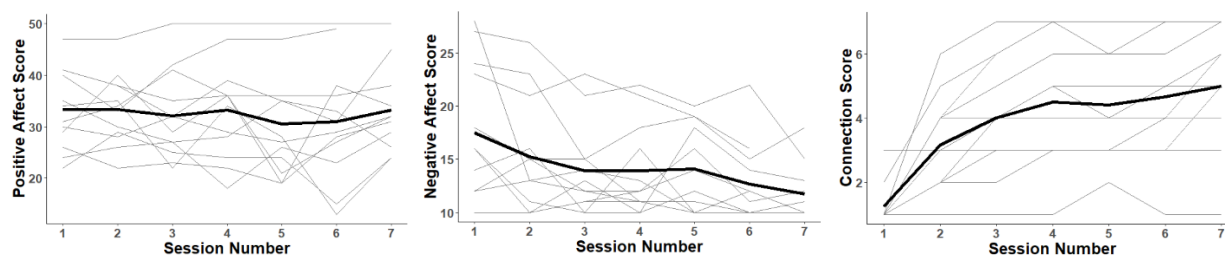
The first analysis of session measures examined changes in affect and social connection across the seven sessions. A linear mixed model was run as follows: Score ~ Session + (1|Participant), in which Score was defined as scores on PANAS Positive, PANAS Negative, and IOS, and Session was defined as the session number from 1-7. As shown in Table 2, positive affect did not significantly differ as a function of session number, meaning it was relatively stable across the seven sessions. However, there were significant main effects of session on negative affect ($p < .001$) and session on connection to the therapist ($p < .001$), meaning negative affect decreased across the seven sessions, and connection to the therapist increased.

Table 2

Participant Affect and Social Connection Scores across Sessions

Random Effects	Positive Affect		Negative Affect		Connection	
	Variance	<i>SD</i>	Variance	<i>SD</i>	Variance	<i>SD</i>
Participant	23.9	4.89	6.95	2.64	1.04	1.02
Fixed Effects	Estimate	<i>p</i>	Estimate	<i>p</i>	Estimate	<i>p</i>
<i>Intercept</i>	33.1	<.001*	17.3	<.001*	1.71	<.001*
Session	-0.16	0.555	-0.76	<.001*	0.54	<.001*
Marginal R^2 /Conditional R^2	.001/0.71		0.10/0.70		0.27/0.76	

* Significance at $\alpha = .05$

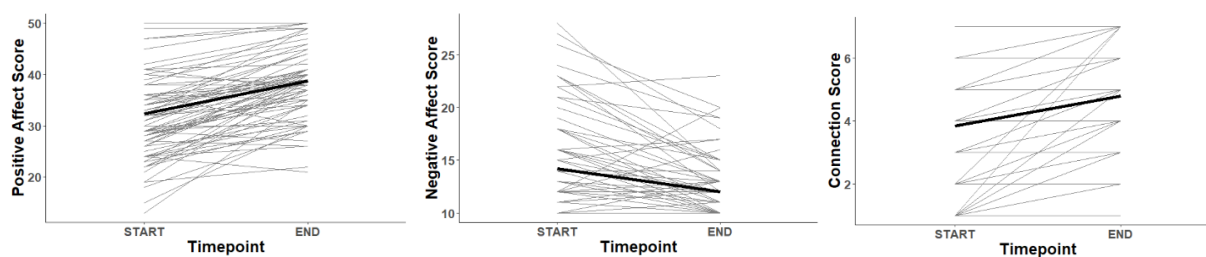
Figure 1*Participant Affect and Social Connection Across Sessions***Analysis 3: Affect Regulation and Social Connection Within Sessions**

The second analysis of session measures examined changes in affect and social connection from the start to the end of individual sessions. A linear mixed model was run as follows: $\text{Score} \sim \text{Time} + (1 | \text{Participant})$, in which Score was defined as scores on PANAS Positive, PANAS Negative, and IOS, and Time was defined as binary code for Session Start (0) and Session End (1). As shown in Table 3, there were significant main effects of time ($p < .001$) on positive affect, of time ($p < .001$) on negative affect, and of time ($p < .001$) on connection to the therapist, reflecting significant change across session from start to end on these three measures. This analysis suggests that from start to end of sessions, participants experienced increased levels of positive affect, decreased negative affect, and an increased connection to the music therapist.

Table 3*Participant Affect and Social Connection Scores Within Sessions*

Random Effects	Positive Affect		Negative Affect		Connection	
	Variance	<i>SD</i>	Variance	<i>SD</i>	Variance	<i>SD</i>
Participant	23.1	4.81	6.66	2.58	0.78	0.88
Fixed Effects	Estimate	<i>p</i>	Estimate	<i>p</i>	Estimate	<i>p</i>
<i>Intercept</i>	32.3	<.001*	16.3	<.001*	2.18	<.001*
Time	6.42	<.001*	-2.18	<.001*	0.95	<.001*
Marginal R^2 /Conditional R^2	0.13/0.71		0.13/0.61		0.23/0.81	

* Significance at $\alpha = .05$

Figure 2*Participant Affect and Social Connection Within Sessions***Discussion**

Families with children with I/DDs face unique challenges, and experience higher levels of stress, anxiety, and depression (Hayes & Watson, 2013; Marquis et al., 2020; Singer, 2006). Prior literature supports the need for a caregiver-focused intervention to decrease stress and increase wellbeing in this population (Bourke-Taylor et al., 2021; Lindo et al., 2016). Mindfulness-based interventions have shown promising outcomes in this population, and music and songwriting are tools of interest in modulating affect regulation and social connection as mechanisms of stress reduction (Bazzano et al., 2015; Dykens et al., 2014; Hargreaves & North, 1999; Neece, 2014; Thayer et al., 1994). The current study proposes the novel Mindfulness-Based Music and Songwriting (MBMS) program as an intervention for parents and caregivers of children with I/DDs to reduce stress and improve wellbeing.

Feasibility

Initial feasibility was assessed by participant attendance and participation as well as therapist implementation of the program curriculum. In this sample, every participant completed all seven study sessions, and 100% of participants completed their home practice at least 1 day per week with a median of 4-5 days/week of home practice. Although it is not a focus of this paper, participant interviews supported that session experiences were positive and impactful. In

response to the practice of songwriting, one parent noted, “I did like the fact that I was able to do something I'd never done before and have that experience.” Participants also reflected on the relationship they built with the music therapist. One parent reported, “I just instantly had this trust that [the MT] was capable and creative and talented. It's just like opening Christmas presents. To hear what she puts together with it and how she chooses to sing it and so forth. I love that.” These examples demonstrate the participants’ receipt and enjoyment of the program.

Outcomes

The primary goal of this study is to assess the preliminary outcomes of the MBMS program. Specifically, our analyses focused on (1) potential changes in participants’ wellbeing, stress, depression, and anxiety across MBMS; (2) potential changes in positive affect, negative affect, and connection to the music therapist across all MBMS sessions; and (3) potential changes in positive affect, negative affect, and connection to the music therapist from the start to the end of individual MBMS sessions.

Wellbeing, stress, and depression were significantly different across the full MBMS study, from baseline, to post, to 4-week follow-up. The analysis did not show a significant difference in anxiety, but the data shows a general decrease in anxiety in the sample. Lack of an effect for anxiety may reflect that anxiety scores were generally low (in the mild range) at baseline. These results partially support the first hypothesis, that stress, anxiety, and depression significantly decrease, and wellbeing significantly increases across the study’s time course. These results are consistent with the findings of previous mindfulness-based interventions in this population, in which significant changes in stress, anxiety, depression, and wellbeing are detected across the intervention, even as compared to no-intervention control groups (Bazzano et

al., 2015; Benn et al., 2012; Lo et al., 2017; Neece, 2014). The MBMS program may hold similar promise as other non-musical mindfulness-based programs studied in this population.

Across the seven intervention sessions, there was a significant decrease in negative affect and a significant increase in social connection with the music therapist. There was no significant change in positive affect scores, likely due to sample variability. Significant changes in negative affect but not positive affect have been shown in previous mindfulness interventions (Benn et al., 2012). These results partially support the second hypothesis, that positive affect and connection would increase, and negative affect would decrease across the 7 study sessions. The results of this analysis also suggest that affect regulation took place during the intervention, and that connection to the music therapist was facilitated even across the telehealth platform, which was notable given the relative lack of literature on similar telehealth interventions in this population.

In addition to the cross-program findings, positive affect and social connection increased and negative affect decreased from the start to the end of individual sessions. These results support our third hypothesis, that positive affect and connection to the music therapist will significantly increase during sessions, and negative affect will significantly decrease. These findings are promising and suggest that affect regulation and connection are modulated within individual sessions. Positive experiences within sessions may also motivate participants to develop and practice mindfulness skills, which is supported by previous literature that shows therapeutic songwriting is enjoyable and may increase motivation to participate in intervention (Baker et al., 2015; Klein & Silverman, 2012; Silverman et al., 2016). The mediating role of session-level changes is potentially a key mechanism of the MBMS program and should be investigated further, particularly in connection to longer-term mental health outcomes.

The results of these three primary analyses support the initial hypotheses and support the continuing implementation of the MBMS program. Significant changes in affect regulation and social connection are particularly interesting in a telehealth context, suggesting that therapeutic rapport can be established over Zoom, and that telehealth sessions are feasible for the implementation and practice of mindfulness skills.

Limitations and Future Directions

Though the primary hypotheses were supported, there are still several limitations to consider. One key limitation is the small sample size, which may have affected the power to detect effects of some analyses and limited the sample variability. In addition, the pilot study was run without a control group, meaning the analyses were limited to detecting change across the sample. In future studies, a randomized control group could be implemented to compare the MBMS program to a mindfulness-only intervention, as well as a no-intervention group. An additional experimental group that receives a mindfulness-only intervention would enable the examination of potential unique contributions of songwriting and music in program efficacy.

The COVID-19 pandemic is another potential limitation. The study was conducted during the early stages of the COVID-19 pandemic, while many participants were under state and federal quarantines. While the study was still able to be fully implemented due to the telehealth platform and online surveys, parents may have faced unforeseen challenges, which were not controlled for during our analyses. During this time parents faced many challenges related to the pandemic, including school closures, loss of access to childcare and child therapies, changes in employment, and illness (Patrick et al., 2020; Russell et al., 2020). We did not explicitly measure COVID-related events in this sample, but it is likely that parent depression, anxiety, and stress were influenced by these uncontrolled factors.

Another direction of interest is a broader analysis of the mechanisms of the MBMS program, particularly affect regulation. In the current sample, affect data was taken before and after each MBMS session, meaning our data is limited to that taken only at the time of intervention. Additional measures of affect would further our understanding of the ways in which affect regulation is occurring in our population. It is likely that some form of affect regulation is taking place between scheduled sessions, and that daily fluctuation in affective states may be important to understanding the impact of mindfulness training. One way to investigate this would be the addition of an ecological momentary assessment (EMA) measure to collect affect data while participants are engaged in daily activities between scheduled sessions.

A final direction of interest is the qualitative analysis of the parent interviews conducted post-study, and of the lyrics produced by participants during the program. This qualitative data would be of interest to better understand participant experiences, as well as to identify key themes and principles that participants identified during the program. Lyric data could also be analyzed for specific mentions of mindfulness principles and used as an additional measure of program impact.

Conclusion

The current study demonstrates significant changes in mental health outcomes as well as session-level changes in affect regulation and social connection as associated with participation in the novel telehealth Mindfulness-Based Music and Songwriting intervention. These results suggest that the MBMS intervention has potential for decreasing stress and increasing wellbeing in parents of children with I/DDs, and supports the continued implementation and investigation of the MBMS intervention.

References

- Alexander, R., Aragón, O. R., Bookwala, J., Cherbuin, N., Gatt, J. M., Kahrilas, I. J., Kästner, N., Lawrence, A., Lowe, L., Morrison, R. G., Mueller, S. C., Nusslock, R., Papadelis, C., Polnaszek, K. L., Helene Richter, S., Silton, R. L., & Styliadis, C. (2021). The neuroscience of positive emotions and affect: Implications for cultivating happiness and wellbeing. *Neuroscience & Biobehavioral Reviews*, 121, 220–249.
<https://doi.org/10.1016/j.neubiorev.2020.12.002>
- Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of Other in the Self Scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology*, 63(4), 596–612. <https://doi.org/10.1037/0022-3514.63.4.596>
- Baker, K., Devine, R. T., Ng-Cordell, E., Raymond, F. L., & Hughes, C. (2020). Childhood intellectual disability and parents' mental health: Integrating social, psychological and genetic influences. *The British Journal of Psychiatry*, 1–8.
<https://doi.org/10.1192/bjp.2020.38>
- Baker, Stretton-Smith, P., Clark, I. N., Tamplin, J., & Lee, Y.-E. C. (2018). A Group Therapeutic Songwriting Intervention for Family Caregivers of People Living With Dementia: A Feasibility Study With Thematic Analysis. *Frontiers in Medicine*, 5, 151.
<https://doi.org/10.3389/fmed.2018.00151>
- Baker, & Yeates, S. (2018). Carers' experiences of group therapeutic songwriting: An interpretive phenomenological analysis. *British Journal of Music Therapy*, 32(1), 8–17.
<https://doi.org/10.1177/1359457517728914>
- Bazzano, A., Wolfe, C., Zylowska, L., Wang, S., Schuster, E., Barrett, C., & Lehrer, D. (2015). Mindfulness Based Stress Reduction (MBSR) for Parents and Caregivers of Individuals

- with Developmental Disabilities: A Community-Based Approach. *Journal of Child and Family Studies*, 24(2), 298–308. <https://doi.org/10.1007/s10826-013-9836-9>
- Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology*, 56(6), 893–897. <https://doi.org/10.1037/0022-006X.56.6.893>
- Beck, A. T., Steer, R. A., Ball, R., & Ranieri, W. F. (1996). Comparison of Beck Depression Inventories-IA and-II in Psychiatric Outpatients. *Journal of Personality Assessment*, 67(3), 588–597. https://doi.org/10.1207/s15327752jpa6703_13
- Beer, M., Ward, L., & Moar, K. (2013). The Relationship Between Mindful Parenting and Distress in Parents of Children with an Autism Spectrum Disorder. *Mindfulness*, 4(2), 102–112. <https://doi.org/10.1007/s12671-012-0192-4>
- Benn, R., Akiva, T., Arel, S., & Roeser, R. W. (2012). Mindfulness training effects for parents and educators of children with special needs. *Developmental Psychology*, 48(5), 1476–1487. <http://dx.doi.org/10.1037/a0027537>
- Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., Segal, Z. V., Abbey, S., Speca, M., Velting, D., & Devins, G. (2004). Mindfulness: A Proposed Operational Definition. *Clinical Psychology: Science and Practice*, 11(3), 230–241. <https://doi.org/10.1093/clipsy.bph077>
- Bourke-Taylor, H. M., Lee, D.-C. A., Tirlea, L., Joyce, K., Morgan, P., & Haines, T. P. (2021). Interventions to Improve the Mental Health of Mothers of Children with a Disability: Systematic Review, Meta-analysis and Description of Interventions. *Journal of Autism and Developmental Disorders*. <https://doi.org/10.1007/s10803-020-04826-4>
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in

- psychological wellbeing. *Journal of Personality and Social Psychology*, 84(4), 822–848.
<https://doi.org/10.1037/0022-3514.84.4.822>
- Burke, M., & Heller, T. (2016). Individual, parent and social-environmental correlates of caregiving experiences among parents of adults with autism spectrum disorder: Caregiving for adults with ASD. *Journal of Intellectual Disability Research*, 60(5), 401–411. <https://doi.org/10.1111/jir.12271>
- Cachia, R. L., Anderson, A., & Moore, D. W. (2016). Mindfulness, Stress and Wellbeing in Parents of Children with Autism Spectrum Disorder: A Systematic Review. *Journal of Child and Family Studies*, 25(1), 1–14. <https://doi.org/10.1007/s10826-015-0193-8>
- CDC. (2021, February 26). Developmental Disabilities | CDC. Centers for Disease Control and Prevention. <https://www.cdc.gov/ncbddd/developmentaldisabilities/index.html>
- Chin, T., & Rickard, N. S. (2014). Beyond positive and negative trait affect: Flourishing through music engagement. *Psychology of Wellbeing*, 4(1), 25. <https://doi.org/10.1186/s13612-014-0025-4>
- Cohen, S. (1988). Perceived stress in a probability sample of the United States. *The Social Psychology of Health*, 31–67.
- Da Paz, N. S., & Wallander, J. L. (2017). Interventions that target improvements in mental health for parents of children with autism spectrum disorders: A narrative review. *Clinical Psychology Review*, 51, 1–14. <https://doi.org/10.1016/j.cpr.2016.10.006>
- Davis, N. O., & Carter, A. S. (2008). Parenting Stress in Mothers and Fathers of Toddlers with Autism Spectrum Disorders: Associations with Child Characteristics. *Journal of Autism and Developmental Disorders*, 38(7), 1278–1291. <https://doi.org/10.1007/s10803-007-0512-z>

- Deater-Deckard, K. (1998). Parenting Stress and Child Adjustment: Some Old Hypotheses and New Questions. *Clinical Psychology: Science and Practice*, 5(3), 314–332.
<https://doi.org/10.1111/j.1468-2850.1998.tb00152.x>
- Dingle, G. A., Brander, C., Ballantyne, J., & Baker, F. A. (2013). ‘To be heard’: The social and mental health benefits of choir singing for disadvantaged adults. *Psychology of Music*, 41(4), 405–421. <https://doi.org/10.1177/0305735611430081>
- Dua, J. K. (1993). The role of negative affect and positive affect in stress, depression, self-esteem, assertiveness, Type A behaviors, psychological health, and physical health. *Genetic, Social, and General Psychology Monographs*, 119(4), 515–552.
- Dykens, E. M., Fisher, M., Taylor, J., Lambert, W., & Miodrag, N. (2014). Reducing Distress in Mothers of Children with Autism and Other Disabilities: A Randomized Trial. *American Academy of Pediatrics*, 134(2), E454–E463. <https://doi.org/10.1542/peds.2013-3164>
- Emerson, E. (2003). Mothers of children and adolescents with intellectual disability: Social and economic situation, mental health status, and the self-assessed social and psychological impact of the child’s difficulties. *Journal of Intellectual Disability Research*, 47(4–5), 385–399. <https://doi.org/10.1046/j.1365-2788.2003.00498.x>
- Estes, A., Olson, E., Sullivan, K., Greenson, J., Winter, J., Dawson, G., & Munson, J. (2013). Parenting-related stress and psychological distress in mothers of toddlers with autism spectrum disorders. *Brain and Development*, 35(2), 133–138.
<https://doi.org/10.1016/j.braindev.2012.10.004>
- Families Special Interest Research Group of IASSIDD. (2014). Families Supporting a Child with Intellectual or Developmental Disabilities: The Current State of Knowledge. *Journal of Applied Research in Intellectual Disabilities*, 27(5), 420–430.

<https://doi.org/10.1111/jar.12078>

- Ferraioli, S. J., & Harris, S. L. (2013). Comparative Effects of Mindfulness and Skills-Based Parent Training Programs for Parents of Children with Autism: Feasibility and Preliminary Outcome Data. *Mindfulness*, 4(2), 89–101. <https://doi.org/10.1007/s12671-012-0099-0>
- Frantz, R., Hansen, S. G., & Machalicek, W. (2018). Interventions to Promote Wellbeing in Parents of Children with Autism: A Systematic Review. *Review Journal of Autism and Developmental Disorders*, 5(1), 58–77. <https://doi.org/10.1007/s40489-017-0123-3>
- Groarke, J. M., & Hogan, M. J. (2016). Enhancing wellbeing: An emerging model of the adaptive functions of music listening. *Psychology of Music*, 44(4), 769–791. <https://doi.org/10.1177/0305735615591844>
- Hargreaves, D. J., & North, A. C. (1999). The Functions of Music in Everyday Life: Redefining the Social in Music Psychology. *Psychology of Music*, 27(1), 71–83. <https://doi.org/10.1177/0305735699271007>
- Hartley, M., Dorstyn, D., & Due, C. (2019). Mindfulness for Children and Adults with Autism Spectrum Disorder and Their Caregivers: A Meta-analysis. *Journal of Autism and Developmental Disorders*, 49(10), 4306–4319. <https://doi.org/10.1007/s10803-019-04145-3>
- Hastings, R. P., Daley, D., Burns, C., & Beck, A. (2006). Maternal Distress and Expressed Emotion: Cross-Sectional and Longitudinal Relationships With Behavior Problems of Children With Intellectual Disabilities. *American Journal on Mental Retardation*, 111(1), 48–61. [https://doi.org/10.1352/0895-8017\(2006\)111\[48:MDAEEC\]2.0.CO;2](https://doi.org/10.1352/0895-8017(2006)111[48:MDAEEC]2.0.CO;2)
- Hayes, & Coutts, J. J. (2020). Use Omega Rather than Cronbach's Alpha for Estimating

Reliability. *But.... Communication Methods and Measures*, 14(1), 1–24.

<https://doi.org/10.1080/19312458.2020.1718629>

Hayes, S. A., & Watson, S. L. (2013). The impact of parenting stress: A meta-analysis of studies comparing the experience of parenting stress in parents of children with and without autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 43(3), 629–642. <https://doi.org/10.1007/s10803-012-1604-y>

Hoffman, C. D., Sweeney, D. P., Hodge, D., Lopez-Wagner, M. C., & Looney, L. (2009).

Parenting Stress and Closeness: Mothers of Typically Developing Children and Mothers of Children With Autism. *Focus on Autism and Other Developmental Disabilities*, 24(3), 178–187. <https://doi.org/10.1177/1088357609338715>

Kabat-Zinn, J. (1994). *Wherever You Go, There You Are: Mindfulness Meditation in Everyday Life*. Hachette Books.

Kenny, A. (2014). ‘Collaborative creativity’ within a jazz ensemble as a musical and social practice. *Thinking Skills and Creativity*, 13, 1–8.

<https://doi.org/10.1016/j.tsc.2014.02.002>

Khanna, R., Madhavan, S. S., Smith, M. J., Patrick, J. H., Tworek, C., & Becker-Cottrill, B. (2011). Assessment of Health-Related Quality of Life Among Primary Caregivers of Children with Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders*, 41(9), 1214–1227. <https://doi.org/10.1007/s10803-010-1140-6>

Klein, C. M., & Silverman, M. J. (2012). With Love From Me to Me: Using Songwriting to Teach Coping Skills to Caregivers of Those With Alzheimer’s and Other Dementias. *Journal of Creativity in Mental Health*, 7(2), 153–164.

<https://doi.org/10.1080/15401383.2012.685010>

- Lawton, M. P. (1983). The varieties of wellbeing. *Experimental Aging Research*, 9(2), 65–72.
<https://doi.org/10.1080/03610738308258427>
- Lee, S., O'Neill, D., & Moss, H. (2020). Promoting wellbeing among people with early-stage dementia and their family carers through community-based group singing: A phenomenological study. *Arts & Health*, 1–17.
<https://doi.org/10.1080/17533015.2020.1839776>
- Lindo, E. J., Kliemann, K. R., Combes, B. H., & Frank, J. (2016). Managing Stress Levels of Parents of Children with Developmental Disabilities: A Meta-Analytic Review of Interventions. *Family Relations*, 65(1), 207–224. <https://doi.org/10.1111/fare.12185>
- Lindquist, K. A., Satpute, A. B., Wager, T. D., Weber, J., & Barrett, L. F. (2016). The Brain Basis of Positive and Negative Affect: Evidence from a Meta-Analysis of the Human Neuroimaging Literature. *Cerebral Cortex*, 26(5), 1910–1922.
<https://doi.org/10.1093/cercor/bhv001>
- Linnemann, A., Ditzen, B., Strahler, J., Doerr, J. M., & Nater, U. M. (2015). Music listening as a means of stress reduction in daily life. *Psychoneuroendocrinology*, 60, 82–90.
<https://doi.org/10.1016/j.psyneuen.2015.06.008>
- Lo, H. H. M., Chan, S. K. C., Szeto, M. P., Chan, C. Y. H., & Choi, C. W. (2017). A Feasibility Study of a Brief Mindfulness-Based Program for Parents of Preschool Children with Developmental Disabilities. *Mindfulness*, 8(6), 1665–1673.
<https://doi.org/10.1007/s12671-017-0741-y>
- Lynch, J., & Wilson, C. E. (2018). Exploring the impact of choral singing on mindfulness. *Psychology of Music*, 46(6), 848–861. <https://doi.org/10.1177/0305735617729452>
- Marquis, Hayes, M. V., & McGrail, K. (2019). Factors Affecting the Health of Caregivers of

- Children Who Have an Intellectual/Developmental Disability. *Journal of Policy and Practice in Intellectual Disabilities*, 16(3), 201–216. <https://doi.org/10.1111/jppi.12283>
- Marquis, S. M., McGrail, K., & Hayes, M. (2020). Mental health of parents of children with a developmental disability in British Columbia, Canada. *Journal of Epidemiology and Community Health*, 74(2), 173–178. <https://doi.org/10.1136/jech-2018-211698>
- McConnell, D., & Savage, A. (2015). Stress and Resilience Among Families Caring for Children with Intellectual Disability: Expanding the Research Agenda. *Current Developmental Disorders Reports*, 2. <https://doi.org/10.1007/s40474-015-0040-z>
- Minor, A. J., Moody, S. J., Tadlock-Marlo, R., Pender, R., & Person, M. (2013). Music as a Medium for Cohort Development. *Journal of Creativity in Mental Health*, 8(4), 381–394. <https://doi.org/10.1080/15401383.2013.857928>
- Neece, C. L. (2014). Mindfulness-Based Stress Reduction for Parents of Young Children with Developmental Delays: Implications for Parental Mental Health and Child Behavior Problems. *Journal of Applied Research in Intellectual Disabilities*, 27(2), 174–186. <https://doi.org/10.1111/jar.12064>
- Olsson, M. B., & Hwang, C. P. (2001). Depression in mothers and fathers of children with intellectual disability. *Journal of Intellectual Disability Research*, 45(6), 535–543. <https://doi.org/10.1046/j.1365-2788.2001.00372.x>
- Osborne, L. A., McHugh, L., Saunders, J., & Reed, P. (2008). Parenting Stress Reduces the Effectiveness of Early Teaching Interventions for Autistic Spectrum Disorders. *Journal of Autism and Developmental Disorders*, 38(6), 1092–1103. <https://doi.org/10.1007/s10803-007-0497-7>
- Patrick, S. W., Henkhaus, L. E., Zickafoose, J. S., Lovell, K., Halvorson, A., Loch, S., Letterie,

- M., & Davis, M. M. (2020). Wellbeing of Parents and Children During the COVID-19 Pandemic: A National Survey. *Pediatrics*, 146(4), e2020016824.
<https://doi.org/10.1542/peds.2020-016824>
- Pelletier, C. L. (2004). The Effect of Music on Decreasing Arousal Due to Stress: A Meta-Analysis. *Journal of Music Therapy*, 41(3), 192–214.
<https://doi.org/10.1093/jmt/41.3.192>
- R Core Team. (2021). [Computer software] (4.1.1). R Foundation for Statistical Computing.
<https://www.R-project.org/>
- Reschke-Hernández, A. E. (2011). History of music therapy treatment interventions for children with autism. *Journal of Music Therapy*, 48(2), 169–207.
<https://doi.org/10.1093/jmt/48.2.169>
- Revelle, W. (2021). psych: Procedures for Psychological, Psychometric, and Personality Research. (R package version 2.1.9) [Computer software]. Northwestern University.
<https://cran.r-project.org/package=psych>
- Revelle, W., & Condon, D. M. (2019). Reliability from α to ω : A tutorial. *Psychological Assessment*, 31(12), 1395–1411. <https://doi.org/10.1037/pas0000754>
- RStudio Team. (2021). RStudio: Integrated Development for R. (1.4.1717) [Computer software].
RStudio. <http://www.rstudio.com/>
- Russell, B. S., Hutchison, M., Tambling, R., Tomkunas, A. J., & Horton, A. L. (2020). Initial Challenges of Caregiving During COVID-19: Caregiver Burden, Mental Health, and the Parent–Child Relationship. *Child Psychiatry & Human Development*, 51(5), 671–682.
<https://doi.org/10.1007/s10578-020-01037-x>
- Ryff, C. D., Almeida, D. M., Ayanian, J. Z., Carr, D. S., Cleary, P. D., Coe, C., Davidson, R. J.,

- Krueger, R. F., Lachman, M. E., Marks, N. F., Mroczek, D. K., Seeman, T. E., Seltzer, M. M., Singer, B. H., Sloan, R. P., Tun, P. A., Weinstein, M., & Williams, D. R. (2007). Midlife in the United States (MIDUS 2), 2004-2006: Version 8 (Version v8) [Data set]. ICPSR - Interuniversity Consortium for Political and Social Research.
<https://doi.org/10.3886/ICPSR04652.V8>
- Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological wellbeing revisited. *Journal of Personality and Social Psychology*, 69(4), 719–727.
<https://doi.org/10.1037/0022-3514.69.4.719>
- Schäfer, T., Sedlmeier, P., Städtler, C., & Huron, D. (2013). The psychological functions of music listening. *Frontiers in Psychology*, 4. <https://doi.org/10.3389/fpsyg.2013.00511>
- Sewart, A. R., Zbozinek, T. D., Hammen, C., Zinbarg, R. E., Mineka, S., & Craske, M. G. (2019). Positive Affect as a Buffer Between Chronic Stress and Symptom Severity of Emotional Disorders. *Clinical Psychological Science*, 7(5), 914–927.
<https://doi.org/10.1177/2167702619834576>
- Silverman, M. J. (2020). Music-Based Affect Regulation and Unhealthy Music Use Explain Coping Strategies in Adults with Mental Health Conditions. *Community Mental Health Journal*, 56(5), 939–946. <https://doi.org/10.1007/s10597-020-00560-4>
- Singer, G. H. S. (2006). Meta-Analysis of Comparative Studies of Depression in Mothers of Children With and Without Developmental Disabilities. *American Journal on Mental Retardation*, 111(3), 155. [https://doi.org/10.1352/0895-8017\(2006\)111\[155:MOCSOD\]2.0.CO;2](https://doi.org/10.1352/0895-8017(2006)111[155:MOCSOD]2.0.CO;2)
- Step toe, A., O'Donnell, K., Marmot, M., & Wardle, J. (2008). Positive affect and psychosocial processes related to health. *British Journal of Psychology*, 99(2), 211–227.

<https://doi.org/10.1111/j.2044-8295.2008.tb00474.x>

- Thayer, R. E., Newman, J. R., & McClain, T. M. (1994). Self-regulation of mood: Strategies for changing a bad mood, raising energy, and reducing tension. *Journal of Personality and Social Psychology*, 67(5), 910–925. <https://doi.org/10.1037/0022-3514.67.5.910>
- Warran, K., Fancourt, D., & Perkins, R. (2019). The experience and perceived impact of group singing for men living with cancer: A phenomenological study. *Psychology of Music*, 47(6), 874–889. <https://doi.org/10.1177/0305735619854526>
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063–1070. <https://doi.org/10.1037/0022-3514.54.6.1063>
- Weiss, M. J. (2002). Hardiness and Social Support as Predictors of Stress in Mothers of Typical Children, Children with Autism, and Children with Mental Retardation. *Autism*, 6(1), 115–130. <https://doi.org/10.1177/1362361302006001009>
- Xu, Y., Yu, Y., Xie, Y., Peng, L., Liu, B., Xie, J., Bian, C., & Li, M. (2015). Positive affect promotes wellbeing and alleviates depression: The mediating effect of attentional bias. *Psychiatry Research*, 228(3), 482–487. <https://doi.org/10.1016/j.psychres.2015.06.011>