

Predictors and Impacts of Engagement in an App-Based Social Support Forum: Exploring  
Maternal Depression, Anxiety, and Self-Compassion

by

Kaeley Simpson

A Thesis submitted to the Faculty of Graduate Studies of

The University of Manitoba

in partial fulfillment of the requirements of the degree of

MASTER OF ARTS

Department of Psychology

University of Manitoba

Winnipeg

Copyright © 2023 by Kaeley Simpson

### **Abstract**

Mothers with young children experienced elevated rates of depression and anxiety during the COVID-19 pandemic. Social support is a protective factor against depression and anxiety and is positively associated with indicators of mental well-being such as self-compassion. Social support contributes to mental well-being through improving appraisals of stressful events and mitigating feelings of isolation. Engaging in online social support forum communities may be an innovative avenue for mothers to receive social support and improve their mental well-being. However, little is known about the predictors and impacts of social support forum usage in mothers. In the present study mothers with depression and/or anxiety and a child 18-36 months old ( $N = 69$  randomized) were invited to participate in a 10-week app-based mental health and parenting program called Building Emotional Awareness and Mental Health (BEAM). BEAM consisted of psychoeducational mental health and parenting videos, online telehealth group therapy, symptom monitoring, and a social support forum. Quantitative and qualitative methods were employed to explore predictors and impacts of engaging in the BEAM program forum. Pearson bivariate correlations revealed higher levels of education, income, and having more adults in the household ( $\geq 2$ ) were associated with more forum engagement throughout the BEAM program. Pre-intervention mental health symptoms (i.e., depression, anxiety, self-compassion) were not associated with forum engagement. Multiple linear regressions revealed time spent on forum and number of posts made on the forum did not significantly predict change in participant depression, anxiety, or self-compassion scores pre- to post-intervention. Finally, a thematic analysis of post-intervention open-ended questionnaire data provided a detailed

understanding of participant experiences using the forum. Themes derived demonstrate ways in which participants were supported by the forum (e.g., connecting with other mothers) and participant suggestions for forum improvement. The current research provides insights into who may engage in online support forums more frequently and provides preliminary information about the impact of forum use in mothers with depression and/or anxiety. Future research in this area to further elucidate the links between social support forum usage and mental health are suggested.

*Key words:* social support, online forums, depression, anxiety, self-compassion, mothers

## Table of Contents

<b>Introduction.....</b>	<b>6</b>
Social Support and Mental Health in Mothers.....	8
Social Support and Depression.....	8
Social Support and Anxiety.....	10
Social Support and Self-Compassion.....	11
Support Needs During COVID.....	13
Online Forums.....	14
An Intervention to Address Mental Health and Support Needs: The BEAM Program.....	16
<b>The Current Study.....</b>	<b>19</b>
Research Objectives and Anticipated Findings.....	19
Objective 1: Explore Predictors of Forum Engagement.....	19
Objective 2: Explore Impacts of Forum Engagement on Mental Health.....	21
Objective 3: Understand Participant Experiences Using the Forum.....	22
<b>Method.....</b>	<b>22</b>
Participants.....	22
Measures.....	23
Procedure.....	26
<b>Statistical Analyses.....</b>	<b>27</b>
<b>Results.....</b>	<b>28</b>
Participant Description.....	28
Quantitative Results.....	30
Qualitative Results.....	33
<b>Discussion.....</b>	<b>36</b>
Strengths and Limitations.....	42
Implications and Future Directions.....	43

**References..... 45**

**List of Tables**

Table 1. Participant Demographics..... 65

Table 2. Demographics & Forum Engagement Correlations ..... 66

Table 3. Pre-Intervention Mental Health & Forum Engagement Correlations.....67

Table 4. Linear Regression Models for Change in Mental Health Pre- to Post-Intervention..... 68

**List of Figures**

Figure 1. Core Components of the BEAM Program ..... 69

Figure 2. Visuals of the BEAM Forum..... 70

Figure 3. Participant CONSORT Flow Diagram..... 71

Figure 4. Violin Plot of Forum Engagement ..... 72

Figure 5. Forum Engagement by Quintile Group..... 73

Figure 6. Map of Themes from Post-intervention Qualitative Responses..... 74

**Appendix**

Appendix A. Sociodemographic Questionnaire.....75

## **Predictors and Impacts of Engagement in an App-Based Social Support Forum: Exploring Maternal Depression, Anxiety, and Self-Compassion**

The global COVID-19 pandemic posed unprecedented challenges to family well-being. Research on the impacts of COVID-19 highlighted elevated rates of depression and anxiety in mothers, nearly three times higher than pre-pandemic rates (Tomfohr-Madsen et al., 2021; Shorey et al., 2021). Research suggests social isolation is a contributing factor to this increased prevalence (Cameron et al., 2020; Lebel et al., 2020). Maternal symptoms of depression and anxiety in the postnatal period can lead to negative parent-child interactions (Farmer & Lee, 2011; Lovejoy et al., 2000), decrease maternal sensitivity (Bernard et al., 2018; Nicol-Harper et al., 2007), and adversely affect child social and emotional outcomes (Stein et al., 2014; Rees et al., 2019). For mothers themselves, depression, anxiety, and social isolation are associated with negative health outcomes and low quality of life, and symptom persistence can exacerbate these negative impacts (Dobson & Dozois, 2008; Penninx et al., 2013). Due to the detrimental impacts mental health problems can have on the health and well-being of mothers and their children there is a critical need to address these concerns early on.

Social support is a protective factor against depression and anxiety and can mitigate feelings of social isolation (Wang et al., 2018). Although social support buffers the impact of mental health problems, mothers often do not receive adequate social support during the postpartum period (Corrigan et al., 2015). Mothers report receiving less attention and support from healthcare professionals during the postpartum period compared to the prenatal period and a lack of support from sources outside of their family (Senator, 2015; World Health Organization, 2008). Concerningly, this inadequate amount of social support was magnified within the context of COVID-19 due to restricted ability to see family and friends, physical

distancing mandates, and global lockdowns (Luykx et al., 2020; Sommerlad et al., 2021). Therefore, it is particularly important to examine ways in which maternal social support can be enhanced virtually. Digital options, such as online social support forums, offer an innovative avenue to provide mothers with access to social supports. Recent research reveals mothers are increasingly seeking online support with 21.8% of mothers reporting they sought online parenting and mental health support in the past year (Cameron et al., 2020). Additionally, our research team's Parent Advisory Board has expressed the value of having access to online social support options, such as forums (MacKinnon et al., 2022). Preliminary evidence suggests online forums offer an effective modality to receive social support as mothers report forum communities as valuable, empowering, and a good informal knowledge base throughout the challenges of parenting (Doty & Dworkin, 2014). Despite this promising research, no research to date has quantitatively examined factors that predict engagement in online social support communities or the impact that engagement has on changes in mental health symptomology. The purpose of the current research was to fill this key research gap, exploring both predictors and impacts of online social support forum usage in mothers with toddlers aged 18-36 months. Secondary purposes were to qualitatively examine participant experiences and perspectives of using online forums. The social support forum within the present study was embedded within a mental health and parenting mobile application called Building Emotional Awareness and Mental Health (BEAM). Participating mothers were encouraged to use the forum in combination with other program components as a way to improve their well-being through receiving social support and connecting with other mothers.

### **Social Support and Mental Health in Mothers**

Becoming a mother is often met with joy and happiness (Nelson et al., 2014). However, becoming a mother is frequently challenging and is accompanied with a new array of demands and challenges (Baxter et al., 2008). The mental health of mothers with young children has been extensively studied with literature demonstrating prevalence rates of clinically significant depressive symptoms between 10-22% and clinically significant anxiety symptoms between 12-17% during the postpartum period (Fairbrother et al., 2016; Leach et al., 2017; Shorey et al., 2021; Woody et al., 2017). Prevalence rates rose rapidly during the COVID-19 pandemic with meta-analyses indicating 25-30% of mothers were exhibiting clinically significant symptoms of depression and anxiety (Tomfohr-Madsen et al., 2021). One factor that protects against these mental health problems is social support (Harandi et al., 2017). Social support involves having a reliable social network and a perception that one is cared for by others (e.g., friends, family, health services) (Leahy-Warren et al., 2011). This reception of social support enhances psychological health and is repeatedly linked to psychological well-being (Taylor, 2011). Given the benefits of social support, it is an especially pertinent construct to consider within the context of COVID-19, since accessibility to social support during the pandemic drastically changed and decreased (Szkody et al., 2020).

### ***Social Support and Depression***

There is a well-documented inverse relationship between social support and depression (Gariépy et al., 2016). Research on social support and depression is often guided by stress and coping social support theory which describes social support as a resource that buffers stress responses to stressful life events (Lakey & Cohen, 2000). Social support is theorized to improve individuals' appraisals of stressful events and increase active coping strategies. According to

social support theorists, having these rich social networks improves mental health by decreasing or preventing negative self-appraisals, enhancing resilience to stress, and facilitating problem-solving skills (Dobson & Dozois, 2008; Ozbay et al., 2007). On a neurological and physiological level, greater social support networks are associated with diminished cortisol reactivity to social stressors and diminished activity in brain areas (i.e., dorsal anterior cingulate cortex and Brodmann's area) associated with distress (Eisenberger et al., 2007). Both diminished cortisol activity and diminished activity in the dorsal anterior cingulate cortex and Brodmann's area are linked to decreases in perinatal depressive symptoms (Damaraju, 2018; Trifu et al., 2019).

Indeed, for mothers with depression the provision of social support is a useful mechanism for mothers to cope with depressive symptoms and various stressful events (Billings & Moos, 1982). Research shows that having strong social and intimate bonds with supportive friends can buffer depression during the postpartum period (Beck, 2001; Xie et al, 2009). In one study examining social support and its relation to postpartum depression, Cutrona (1984) discovered that higher levels of perceived social support were associated with lower depression scores. More specifically, social integration was found to be a key component to predicting depression scores of mothers with young children. Further research reveals social support positively influences the mental health of first-time mothers six weeks post-childbirth (Leahy-Warren et al., 2011) and has a significant inverse association with depressive symptoms one year following childbirth (Brown et al., 2012). Specifically, informational, emotional, instrumental and appraisal support provided by informal social support networks (e.g., family and friends) improved parenting self-efficacy and mental health in mothers with young children (Leahy-Warren et al., 2011). An additional study examined the relationship between social support and depression longitudinally, discovering social support reliably predicted symptoms of depression and anxiety both during

pregnancy and to two years post-childbirth (Milgrom et al., 2019). Reassurance of worth (i.e., relationships in which the persons' skills and abilities are acknowledged) and having a "reliable alliance" (i.e., relationships in which a person can count on others for assistance) were shown to be the strongest predictors of lower perinatal depressive and anxious symptoms during the postpartum period (Milgrom et al., 2019).

It is also important to consider the bidirectionality of the relationship between social support and depression. As noted, social support is continually shown to predict lower depressive symptoms, however depressive symptoms also can predict engagement with social support networks and the quality of these interactions (Cruwys et al., 2014; Dimidjian et al., 2008). Depression is characterized by decreased behavioural activation, loss of pleasure in activities, tiredness, lack of energy, and increased desire to withdraw. These symptoms all are likely to contribute to social behaviours. Indeed, research shows people with depression spend less time in groups and use more negative emotion words in social interactions with partners and friends (Baddeley et al., 2012). Notably, depression severity moderates these relationships with more severe symptoms resulting in less health service and support interactions among depressed individuals (Schomerus et al., 2012). Thus, depressive symptoms may work to prevent individuals from accessing services and supports to improve their well-being.

### ***Social Support and Anxiety***

Social support is also significantly associated with anxiety. Similar to depression, theoretical and empirical literature demonstrates that anxiety is strongly related to how an individual appraises and processes information (McNally, 2001). People with anxiety are more likely to appraise situations as stressful, worrisome, and uncontrollable (Wells & Carter, 1999). Social support is shown to be a significant moderator of the impact of cognitive appraisals and

perceived stress on mental well-being (Abshire et al., 2018; Demirtas et al., 2015). Further, greater social support is associated with increased use of active coping strategies such as positive re-interpretation and problem solving among individuals with anxiety (Roohafza et al., 2014). Within the perinatal period specifically, one key risk factor for maternal anxiety is poor quality social relationships and conversely a protective factor is higher levels of social support (Leach et al., 2017; Razurel et al., 2016). Research reveals perception of social support is significantly associated with both trait and state anxiety in pregnancy and six weeks postpartum (Atkan, 2012) and that informational and emotional support buffers against anxiety in mothers with young children (Sufredini et al., 2022). However, anxiety may also impact individual's engaging with social supports, as anxious people are more likely to be socially withdrawn (Vasey & Dadds, 2001). Moreover, people with anxiety tend to converse less with people they do not know well and reveal less information about themselves to others (Cuming & Rapee, 2010). This may limit the amount of support they are able to obtain or their engagement in social support interventions.

### ***Social Support and Self-Compassion***

In addition to depression and anxiety, social support is related to other indicators of mental well-being such as self-compassion. Self-compassion involves treating oneself with kindness and understanding during challenging times (Neff, 2003). Self-compassion is comprised of three components: self-kindness, mindfulness, and common humanity (Neff, 2003). Self-kindness involves offering oneself kindness and warmth as opposed to being self-critical, mindfulness involves holding painful thoughts in a balanced awareness, and common humanity is the recognition that one is not isolated in their suffering (Neff, 2003). Self-compassion helps individuals adaptively cope with negative emotions, challenges, and failures encountered and fosters positive self-regard (Neff, 2003; Neff, 2011).

Social support and self-compassion are interrelated concepts in that social support may lead to the development of self-compassion. Feeney and Collins (2015) developed an integrative model of social support which explains pathways through which social support enhances psychological well-being. The researchers posit that receiving social support increases forgiveness and kindness, helps to restore healthy affective balance, and increases self-acceptance. These outcomes are related to two components of self-compassion: self-kindness and mindfulness. In addition, through reciprocally sharing challenging experiences with others, individuals can put their adversity into perspective and see challenges as common occurrences among the human experience, which captures the common humanity component of self-compassion. Further, social support positively impacts self-perceptions and encourages people to have positive, self-forgiving, and balanced perspectives of themselves which again is directly related to what the construct of self-compassion entails (Feeney & Collins, 2015; Wilson et al., 2020). Some research has empirically tested Feeney and Collins's (2015) model through examining the relationship between social support and self-compassion and has found greater social support indeed is directly related to higher self-compassion (Wilson et al., 2020). Additional research has revealed greater support and care during pregnancy and the perinatal period is significantly related to maternal self-compassion scores (Golmakani et al., 2020). Therefore, social support interventions for mothers should increase maternal self-compassion levels.

Finally, self-compassion may predict engagement in mental health or social support interventions. Self-compassion is related to increased self-improvement behaviours (Breines & Chen, 2012) and motivation to pursue what is best for health and well-being (Terry and Leary, 2011; Zessin et al., 2015). Moffitt et al. (2018) found higher self-improvement motivation and a

desire to work towards becoming one's ideal self, among women who were more self-compassionate. According to self-determination theorists, engaging in behaviours for these reasons will lead to positive outcomes such as behavioral adherence (Teixeira et al., 2012).

### **Support Needs During COVID**

Taken together, an abundance of literature suggests social support is critical for promoting mental well-being for mothers with young children (Sufredini et al., 2022). Yet, mothers with young children often do not receive adequate social support (Corrigan et al., 2015; Fowles et al., 2012). This lack of support can be in part attributed to the myth of the “supermom” in which mothers are expected to seamlessly transition into the role of motherhood and meet the impossibly high standards society places on mothers to be perfect (Senator, 2015). Mothers have reported that due to these standards, they have been met with the expectation to adjust to the role of motherhood on their own, despite longing for additional social support (Ugarriza et al., 2007). Notably, the strict quarantines and social distancing mandates put into place with the onset of the COVID-19 pandemic, dramatically decreased the ability to easily access social support (Simpson et al., in prep; Zanardo et al., 2020). As a result of global shutdowns and physical distancing mandates, many mental health inpatient and outpatient visits were limited or eliminated (Druss, 2020), group psychotherapy or peer support meetings were cancelled (Starace & Ferrara, 2020), urgent issues only were treated (Percudani et al., 2020), and people were restricted from seeing anyone outside of the people they lived with (Smith et al., 2022). Qualitative analyses of mothers' experiences during this time reveal mothers were concerned about their lack of socialization, missed out on connecting with other mothers, and felt denied the opportunity to access integral support (Montgomery et al., 2023; Ollivier et al., 2021).

Furthermore, as supports became less available, support needs increased. COVID-19 posed additional challenges to families in turn inevitably increasing the support needs of mothers. Research suggests that during COVID-19 mothers with young children were experiencing heightened distress, despair, and grief due to deprivation of family support, and altered family relationships (Chivers et al., 2020). For mothers with mental health problems, these additional psychosocial stressors could worsen the severity and symptoms of their depression and anxiety. Indeed, these various stressors posed a greater risk to individuals with pre-existing mental health disorders, but research revealed poorer access to supports and services reported among individuals with pre-existing mental health disorders during COVID-19 (Momen et al., 2020; Moreno et al., 2020). One study examined mental health care service use among a sample of mothers with depression during COVID-19 and discovered only 5% of these mothers accessed services in the past month (Cameron et al., 2020), underscoring the need to find innovative ways to provide social support services to mothers. Fortunately, social support is understood to be a construct that can be enhanced through interventions. Maternal social support groups provided via various interventions have effectively increased mothers' reception of social support and improved maternal well-being (Strange et al., 2015; Strange et al., 2019). During the pandemic mothers were increasingly seeking such support online and expressed a desire for access to online support or chat groups (MacKinnon et al., 2022; Roos et al., 2020). One way to provide this online support to mothers, similar to that of in person social support groups, is through the use of online forums.

### **Online Forums**

Online forums can be defined as an internet space where individuals have conversations, usually through posting questions, answers, thoughts, and responses. There are many various

forum communities online, almost all involving asynchronous engagement. Most forums online are also open ended and ongoing, meaning that individuals do not only have access for a defined amount of time. Some forums are open to anyone with an interest in the forum community, while others are restricted to individuals who meet certain criteria (e.g., age, profession, location, interests). Research to date has examined forum use in a variety of populations including individuals with lupus (Sloan et al., 2021), eating disorders (McCaig et al., 2020), college students (Wang & Yang, 2012), and individuals with mood disorders (Bauer et al., 2013; Pan et al., 2020). Such studies have found individuals use online forums to seek and provide social support to and from others with shared experiences.

For mothers specifically, online forums may provide an avenue to share personal experiences, connect with others who understand, and provide and receive social support. Recent research reveals mothers are increasingly seeking online support with 21.8% of mothers reporting they sought online parenting and mental health support in the past year (Cameron et al., 2020). Online forums are shown to be an effective source of support for mothers across various populations including mothers with autistic children (Reinke & Solheim, 2015), new mothers struggling with breastfeeding (Wagg et al., 2019), and mothers who have children with special health care needs (Baum, 2004). Mothers explain that these forum communities are “valuable”, “empowering”, and provide a good informal knowledge base throughout the challenges of parenting (Brady & Guerin, 2010; Doty & Dworkin, 2014). Mothers report that through engaging in online forums they have had opportunities to share challenging experiences, overcome feelings of isolation, and build self-kindness through positive self-concepts being reinforced by others (Doty & Dworkin, 2014; Hall & Irvine, 2009; McDaniel et al., 2012). A recent study asked mothers open-ended questions about their experiences using an online forum

housed on BabyCenter, an online media company providing information on pregnancy, and child development (Teaford et al., 2019). Mothers spoke to the value of the social support they were able to obtain from engaging in the forum. One mother wrote, “[Seeing peoples’] experiences were helpful. What I felt was abnormal others related and I felt reassured and validated.”

Another shared how helpful it was to “receive support and understanding from people going through the same things. Not everyone in my own life understands”. Further, an analysis of the content of parenting forums during the COVID-19 pandemic showed mothers used online forums to obtain social support, information regarding parental self-care, the transition to parenthood, and connect with others with shared experience (Pierce et al., 2022). F

Forum communities consisting of all mothers may be particularly useful as affirmational support (e.g., validation) has been identified as a vital support need for people with mental health problems and that this type of support is perceived best when the affirmation is given by someone who understands their experience (Letourneau et al., 2007). Within the context of COVID-19, using online forums may offer a useful support resource for mothers as using forums does not require face-to-face contact or having to leave one’s home. Although qualitative research demonstrates the value and benefit of using forums for various mother populations, no research to date has examined forum use in mothers with depression and/or anxiety nor examined quantitative impacts of forum use in this population.

### **An Intervention to Address Mental Health and Support Needs: The BEAM Program**

The BEAM program is an evidence-based therapeutic program co-developed with parent partners that aims to address the mental health and parenting needs of mothers with young children. The BEAM program was developed during the pandemic as a response to the increasing mental health needs of mothers with young children along with the inaccessibility and

closures of once existing supports. BEAM is a 10-week program delivered on a mobile application and includes: (a) psychoeducational mental health and parenting videos using transdiagnostic therapy modules (Barlow et al., 2017; Farchione et al., 2012) and emotion-focused parenting strategies (Roos et al., 2023), (b) weekly group telehealth therapy led by a mental health professional, (c) mental health symptom monitoring to track progress (Lambert & Harmon, 2018), and (d) an online social support community forum. Key elements of the BEAM program are depicted in Figure 1.

A pilot trial of the BEAM app-based program was conducted from July, 2021 to October, 2021, with a summer break from August 12 to September 8, 2021. For the pilot, participants were split into two groups for the duration of program: those with children aged 6-18 months were in the BEAM infant group (Xie et al., 2022) and those with children aged 18-36 months were in the BEAM toddler group (MacKinnon et al., 2022). The program content was the same for both groups, however the groups had separate online forums so participants could interact with peers with children at a similar developmental stage, and therefore were more likely to have shared experiences and create supportive peer connections. Participants were encouraged to complete weekly reflection assignments in the forum and to engage in discussions with other mothers to provide and receive social support. The forum was monitored by clinical coaches (individuals with a Masters or PhD in clinical psychology, and supervised by a registered clinical psychologist) who encouraged discussion, and replied to participant posts in the forum. Qualitative feedback from participants on the forum specifically, revealed the forum was beneficial in providing mothers with a sense of connection and community and that participants valued the ability to engage in the online support community during times that worked best for them (Simpson et al., in prep). However, critiques of the forum were also noted such as not being

able to reply directly to comments, tag other participants in posts, and that feeling like posting about the weekly assignment was more like “homework” and not overly supportive (MacKinnon et al., 2022; Simpson et al., in prep).

A phase II efficacy Randomized Control Trial (RCT) of version 1.0 of BEAM was conducted from February 2022 – May 2022 for mothers of toddlers 18-36 months (Xie et al., 2022). The program included a one week scheduled break between April 17<sup>th</sup> – 24<sup>th</sup>, due to the telehealth session for that week landing on Easter Monday. Due to budgetary constraints and significant challenges with app developers in the app redesign phase (Rioux et al., 2022), creating a more refined forum aligned with user-experience preferences from the pilot was not fully feasible. Significant functionality issues with the forum such as difficulty navigating threads, not being able to tag others, needing to login to the forum each time, and a separate window opening in the app when trying to access the forum remained (MacKinnon et al., 2022). Although the app developers noted we should be satisfied with the functionality of the forum and that it was a “minimum viable” product, we believe these factors may have significantly impacted participant experiences using the forum during the BEAM program.

Despite these significant challenges, two changes to the forum were able to be made for the present RCT. First, the forum within the BEAM program was guided by parent coaches (i.e., members of our research team’s Parent Advisory Board with lived experience of mental health problems and parenting stress) rather than clinical coaches. Parent coaches monitored the forum content, encouraged discussion, and provided support to participants engaging in the forum. Parent coaches were specifically trained to provide empathetic, validating, and reassuring responses to participant posts. This change was made to make the forum feel less clinical and more like a community of all mothers with shared experiences. Second, the weekly forum

assignments were removed. The goal of this was to allow for spontaneous conversation on topics directed by participants themselves, rather than topics outlined by the research team. Detailed visuals of the forum are depicted in Figure 2.

### **The Current Study**

The current study involves a secondary analysis of BEAM RCT program data. Specifically, the current research analyzed 1) sociodemographic and baseline mental health predictors of forum engagement during the BEAM program, 2) the impact of forum engagement (i.e., time spent on forum and number of posts made on forum) on pre- to post-intervention mental health change scores (i.e., change in depression, anxiety, and self-compassion), and 3) participant experiences and perspectives of the revised BEAM forum that was modified for the RCT. Although past qualitative research has found participants value and benefit from engaging in online social support forums, extant literature on forum usage among mothers has not explored predictors of forum engagement nor followed participants overtime to determine impacts that forum usage has on mental health symptomology. Therefore, this research is exploratory in nature and will allow for these under-researched relationships to be examined.

### ***Research Objectives and Anticipated Findings***

**Objective 1: Explore Predictors of Forum Engagement.** The first objective of this research is to determine factors (i.e., sociodemographic characteristics and baseline mental health scores) that predict participant engagement in the BEAM forum.

#### ***Anticipated findings.***

Although this question is exploratory in nature, it was anticipated that demographic characteristics would be associated with engagement in the BEAM forum. First, it was hypothesized that indicators of socioeconomic status (e.g., income, educational background,

employment status) would be positively associated with forum engagement. This is based on research demonstrating that individuals who belong to lower income and education groups access mental health services less than those who belong to a higher socioeconomic group (Steele et al., 2007). Commonly reported barriers to care reported by individuals who are lower in socioeconomic status include cost, transportation, stigma, and lack of information around mental health care (Packness et al., 2019; Tulli et al., 2020). Notably, socioeconomic status has been shown to predict mental health service use, independent of clinical severity (Amone-P'Olak et al., 2010). The BEAM program aimed to reduce accessibility related concerns through app-based, telehealth, and asynchronous engagement options, however barriers to mental health service use such as stigma or lack of information, may have remained.

It was also hypothesized that number of adults in the home, marital status, number of children in the home, and employment status would impact engagement in the forum. Mothers with young children are busy and it was expected that some mothers would have more time available to engage in the forum than others. Therefore, it was expected that mothers who were married, had more adults in the home, and fewer children would engage more frequently in the forum. Previous research aligns with these hypotheses revealing married individuals are more likely to utilize mental health services (Pandey et al., 2019) and that mothers with multiple children often have greater childcare responsibilities which poses a large barrier to accessing care (Heaman et al., 2015).

Finally, the present study examined how baseline maternal depression, anxiety, and self-compassion scores predict forum usage throughout the BEAM program. First, it was hypothesized that mothers with severe depression would use the forum less frequently than mothers experiencing more moderate symptoms due to the debilitating symptoms associated

with severe depression such as an increased desire to withdraw, low motivation, and a sense of helplessness (Dobson & Dozois, 2008). Second, it was expected that anxiety severity would be inversely related to forum engagement. This is based on research demonstrating that individuals with severe anxiety are more withdrawn and less likely to seek out social supports, especially from people they do not know very well (Bal et al., 2017). Third, it was anticipated that self-compassionate mothers would use the forum more frequently than mothers who were less self-compassionate as theory links self-compassion to self-improvement motivation and adherence to behaviours that improve health and well-being (Teixeira et al., 2012; Zessin et al., 2015).

**Objective 2: Explore Impacts of Forum Engagement on Mental Health.** The second objective of this research is to explore how using the forum impacted changes in mental health from pre- to post-intervention.

*Anticipated findings.* Based on previous literature, it was hypothesized that greater time spent on the forum and greater number of posts made during the program would significantly predict change in participant depression, anxiety, and self-compassion scores pre- to post-intervention. That is, participants who engaged in the forum more frequently would have larger reductions in depressive and anxious symptomology and larger improvements in self-compassion compared to participants who engaged less frequently. This observed relationship was expected to emerge through the quantitative examination of the effect of forum usage frequency on changes in mental health symptoms and through the thematic analysis of mothers' post-intervention responses to how using the forum impacted their mental health and well-being. This hypothesis is based on the stress and coping theory that posits social support as a resource that buffers stress and improves coping in turn favorably impacting depression and anxiety (Lakey &

Cohen, 2000). Moreover, social support has been shown to facilitate the development of self-compassion (Maheux & Price, 2016).

**Objective 3: Understand Participant Experiences Using the Forum.** The final objective of the present research was to obtain a detailed and additive understanding of participant experiences using the BEAM forum. Given the transition to online mental health services and the increases in demands for accessing online social supports, understanding the feasibility, acceptability, and impacts of forum use for mothers is crucial.

## Method

### Participants

The current study drew secondary data from the larger BEAM RCT. Participants were recruited online between mid-November 2021 and February 2022 via social media advertisement and our research lab accounts. To meet the eligibility criteria for BEAM participants needed to identify as a mother or primary caregiver of a child aged 18-36 months, be over the age of 18, reside in Manitoba or Alberta, be able to comfortably read and speak English and report clinically elevated levels of depression and/or anxiety. To be eligible participants also had to consent to wear a Fitbit throughout the duration of the BEAM program, be available to attend Zoom telehealth groups, agree to random allocation, and attend a pre-test Zoom assessment. Participants were excluded from the study if they reported a history of suicidality (i.e., attempting suicide) in the past year or self-harm (i.e., intentionally harming themselves resulting in injury that did or should have received medical attention) in the past 6 months. This exclusionary criterion was set as the BEAM program is not suitable to treat acute mental health needs. A total of 140 mothers were enrolled and randomized to BEAM (n = 70) or Service as Usual (SAU) (n = 70). One participant (n = 1) randomized to the BEAM program, dropped out of the program before it began and thus did not receive the allocated BEAM intervention.

Participant enrolment, allocation, and retention information is provided in the CONSORT flow diagram depicted in Figure 3. For the present study, participants include the  $n = 69$  mothers who were randomized to and received the BEAM intervention. Participants allocated to the SAU condition in the RCT are not included in the present analysis, given that they did not receive access to the BEAM forum. G\*Power was used to confirm the sample size of 69 in this secondary analysis is adequately powered to achieve 80% power ( $\alpha = .05$ ). The power analysis used was an a priori power analysis for linear multiple regressions assuming a moderate effect size of 0.15, an  $\alpha$  error probability of 0.05, power of 0.80, and two predictor variables. This power calculation is based on moderate effect sizes previously observed between social support and depression (Gariépy et al., 2016).

## Measures

**Demographics.** Participants provided demographic and descriptive information about their age, age of children, number of children they have living with them, educational background, marital status, household income, employment status, and cultural background. See Appendix A for a full list of questions included in the sociodemographic questionnaire.

**Online Forum Usage.** Participant forum usage was measured by both the time spent on the forum and the frequency of forum posts made on the forum throughout the 11 weeks participants had forum access. Time spent on the forum was measured in minutes and this analytic data was pulled directly from the BEAM mobile application which uses Google Analytics. Time was measured from the time participants logged into the forum until the time of exiting the forum page. If a participant was on the forum page and then their phone turned off due to inactivity, the participant was logged out of the forum. A total for each participants'

number of posts made throughout the program was created by summing every individual post and comment each participant made in the forum over the course of the program.

**Patient Health Questionnaire-9 (PHQ-9).** Depression levels of participants were measured pre- and post-intervention using the PHQ-9. The PHQ-9 is a 9-item measure used to establish depressive disorder diagnoses and assess depression symptom severity (Kroenke et al., 2001). Each item asks participants to report over the past week how often they have been bothered by certain problems such as feeling tired or having little energy, having little interest or pleasure in doing things, and having poor appetite or overeating. Participants responded to each item using a 4-point Likert scale ranging from 0 (*not at all*) to 3 (*nearly every day*). Scores range from 0 to 27, with higher scores indicating more severe symptoms of depression. Change in depression levels pre- to post-intervention were calculated using participant pre- and post-intervention PHQ-9 total scores, with larger negative scores indicating greater reductions in depression symptomology. The PHQ-9 had good reliability in the present study, with an internal consistency of  $\alpha = .78$  at pre-assessment and  $\alpha = .80$  at post-assessment.

**General Anxiety Disorder-7 (GAD-7).** Pre- and post-intervention anxiety levels were assessed using the GAD-7 Item Scale, a self-report measure of anxiety severity (Spitzer et al., 2006). Each item asks participants to rate how often they have been bothered by certain problems (e.g., feeling nervous, anxious, or on edge, becoming easily annoyed or irritable) over the past two weeks. The GAD-7 has 7 items that are rated on a 4-point Likert scale ranging from 0 (*not at all*) to 3 (*nearly every day*). Scores range from 0 to 21, with higher scores indicating more severe symptoms of anxiety. Change in anxiety levels pre- to post-intervention were calculated using participant pre- and post-intervention GAD-7 total scores, with larger negative scores indicating

greater reductions in anxiety symptomology. Internal consistency of the GAD-7 in the present study was high with an  $\alpha = .86$  and  $\alpha = .90$  at pre- and post-assessment, respectively.

**Self-Compassion Scale – Short Form (SCS-SF).** Participant's pre- and post-intervention self-compassion levels were assessed using the SCS-SF, a self-report measure of self-compassion (Raes et al., 2011). The SCS-SF equally assesses the three components of self-compassion and their opposing constructs: self-kindness (self-criticism), mindfulness (overidentification), and common humanity (isolation). The scale is comprised of 12-items in which participants respond to each item using a 5-point Likert scale ranging from 1 (*almost never*) to 5 (*almost always*). Sample items from the scale include “I try to see my failings as part of the human condition”, “When something upsets me, I try to keep my emotions in balance”, and “When I’m going through a very hard time, I give myself the caring and tenderness I need”. Self-compassion scores for each participant were computed by reverse scoring negatively items measuring the negative poles of self-compassion and then summing responses to obtain a total self-compassion score. Change in self-compassion scores pre- to post-intervention were calculated using participant pre- and post-intervention self-compassion total scores, with higher scores indicating greater increases in self-compassion. In the present study the SCS-SF had high reliability, with an internal consistency of  $\alpha = .82$  at pre-assessment and  $\alpha = .88$  at post-assessment.

**Post-Intervention Open-Ended Forum Questionnaire.** In the online post-intervention questionnaire participants were asked five open ended questions about their experiences using the forum: a) How did using the forum impact you? b) How (if at all) did using the forum affect your mental health? c) In what ways did you feel supported by the forum? d) What, if anything, got in the way of you using the forum? and, e) How (if at all) could the forum be improved to

better address your support and mental health needs?. Participants were be prompted to type responses to these questions in text boxes in REDCap.

### **Procedure**

After receiving ethics approval from the Research Ethics Board at the University of Manitoba, participants were recruited via social media advertisement and our research lab accounts. Interested individuals were sent an eligibility screener via the online survey application, Research Electronic Data Capture (REDCap). To meet the eligibility criteria for BEAM, participants needed to identify as a mother or primary caregiver of a child aged 18-36 months, be over the age of 18, reside in Manitoba or Alberta, be able to comfortably read and speak English, report clinically elevated levels of depression and/or anxiety, consent to wear a Fitbit throughout the duration of the BEAM program, be available to attend Zoom telehealth groups, agree to random allocation, and attend a pre-test Zoom assessment. Individuals meeting the eligibility criteria received a consent form with a description of the study, confidentiality information, and information about potential risks and benefits to participating. Consenting participants then took part in a pre-intervention zoom assessment with one of our research team members. Upon completing the zoom assessment, participants completed a pre-intervention questionnaire and then were randomized to either the BEAM intervention or control group. Randomization was completed by a Research Assistant who was not affiliated with the BEAM program using an online randomization tool (<https://www.randomlists.com/team-generator>). Participants randomized to the BEAM intervention were provided with a BEAM login to the app and forum and given access to the program for the allotted 10-week program plus the one-week break. Participants randomized to the control group were provided with a list of community resources. Participants in the BEAM intervention group completed a pre-intervention assessment

(week 0) and then were given access to the BEAM app program for 10 weeks, plus the one-week break. Following week 10 of the program content, participants completed a post-assessment (week 10). Both assessments took place on REDCap and took participants approximately 45 minutes to complete. Data from the pre-assessment and post-assessment questionnaires was used in the current study. In addition to these time points, participants also completed a follow-up assessment and short weekly assessments throughout the BEAM program. Participants were compensated \$30 CAD for completing the pre-assessment, \$30 CAD for completing the post-assessment, and \$40 CAD for completing the follow-up assessment. Participants also received an additional \$30 CAD for completing the weekly questionnaires. Therefore, those who participated in the full study could be compensated up to \$130 CAD. If at any point throughout the study a participant decided they no longer wanted to participate in the program assessments or treatment, they were able to withdraw their participation without any penalty. One participant allocated to the BEAM program withdrew from the study prior to the commencement of the BEAM program. They chose not to continue with their participation in the program however did not choose to withdraw their data from the study components already completed.

### **Statistical Analyses**

**Quantitative Analyses.** Pearson bivariate correlations were used to assess the association between sociodemographic characteristics, pre-intervention mental health scores, time spent on forum, and number of posts made on forum. Next, to assess how time spent on the forum and number of posts made on the forum predicted changes in mental health symptomology from pre- to post-intervention, a series of linear regressions were conducted. Pearson correlations were examined to determine significant relationships between sociodemographic characteristics (e.g.,

age, number of children) and dependent variables to inform statistical controls needed within the models.

**Qualitative Analysis.** To qualitatively analyze participant experiences using the BEAM social support forum, open-text responses from questionnaire were analyzed using a reflexive thematic analysis. This approach is a systemic way of identifying meaning-based patterns in participants' descriptions of their experiences (Braun & Clarke, 2019; Braun & Clarke, 2006). A reflexive thematic analysis was chosen as the approach allows you to understand participant experiences, searching for core concepts and processes, while sticking close to the data. Analyses were led by author KS and two research assistants. The thematic analysis followed a six-phased method: (1) First, coders became *familiarized* with the data by reading through all participant responses, (2) Using line by line coding in Microsoft Excel, *initial codes were generated*. All data was independently double coded, KS coded all data and the two research assistants each coded one half of the data. Each coder took notes throughout the coding process about any challenges encountered during coding to reach high inter-rater reliability with the coding process. If any coder had difficulty categorizing data, all coders discussed together in weekly meetings until a unanimous agreement on which codes to apply was reached. After codes had been generated for all the data, coders independently (3) *collated codes into candidate themes*. All coders discussion initial themes until consensus was met. Next the coders (4) *revised* and (5) *defined* themes, through a consensus-building model, and (6) *produced the report* of the themes that were generated from the data. According to Braun and Clarke (2013) this process is considered to be peer review.

## Results

### Participant Description

A total of 70 participants were randomized to the BEAM intervention. All participants consented to take part in the study, however one ( $n = 1$ ) dropped out prior to the start of the BEAM program. Therefore, data from 69 participants was included in the present analyses. The age of participants ranged from 22 to 42 with a mean age of 32.17 ( $SD = 4.85$ ). Most participants had two or more children (58.6%), a household income  $> \$60,000$  (57.2%), had received some form of post-secondary education (77.1%), and self-identified as white (68.1%). A full summary of participants' demographic information is displayed in Table 1.

### **Quantitative Data Management**

Data screening and cleaning was completed based on recommendations outlined in statistics textbooks by Field (2017), Pallant (2010), and Tabachniak and Fidell (2007). First, data was exported from REDCap and uploaded into an IBM SPSS data sheet. All analyses were conducted in SPSS 27 (IBM Corp, 2020). Descriptives and frequencies on all sociodemographic and mental health variables (i.e., depression, anxiety, self-compassion) were run to ensure all data was entered correctly and to screen for any potential errors. Item level missing data for all variables was then assessed using Little's MCAR test. All variables measured at pre-intervention in the present study had less than 3% missing data and data were missing at random. Among the 70 participants who completed the pre-intervention questionnaire, 13 were lost to follow-up and did not complete the post-intervention questionnaire. Little's MCAR test was employed for the 57 participants who completed the post-intervention questionnaire. Analyses revealed less than 4% missing data and that data were missing at random. Next, negatively worded items were reverse scored and composite variables were formed. Total composite scores were computed for each mental health variable for participants who completed  $>70\%$  of the items on each respective scale. After forming composite variables, I assessed for any univariate outliers for the

depression, anxiety, and self-compassion measures. I computed standardized z-scores for each variable to examine if any scores had z-score values above or below  $\pm 3.29$  (Tabachniak & Fidell, 2007). No univariate outliers were found in the present study.

Time spent on forum (in minutes) and number of posts made on the forum for each participant were pulled from Google Analytics and exported into the SPSS file. Variables for both time on forum and number of posts on forum had significant outliers, both with a Shapiro Wilk value of  $p < .001$ . Additionally, examination of histograms for each respective variable revealed significant floor effects with many participants spending no time on the forum and/or making no posts on the forum. Due to significant outliers and floor effects, variables were converted into five equal quintiles to create a continuous variable of time spent on forum and number of posts made on forum.

### **Quantitative Results**

Descriptive statistics for all pre-intervention mental health variables and mental health change scores were ran. Pre-intervention PHQ-9 scores ranged from 4.00–24.00 ( $M = 13.68$ ,  $SD = 4.91$ ), GAD-7 scores ranged from 2.00–21.00 ( $M = 14.07$ ,  $SD = 5.04$ ), and self-compassion scores ranged from 17.00–49.00 ( $M = 28.79$ ,  $SD = 6.93$ ). Higher scores on these measures indicate higher levels of depression, anxiety, and self-compassion, respectively. Mental health change scores were calculated by subtracting the total post-intervention score from the pre-intervention score. Depression change scores ranged from -15.00–10.00 ( $M = -3.51$ ,  $SD = 4.57$ ), anxiety change scores ranged from -15.00–8.00 ( $M = -4.64$ ,  $SD = 5.30$ ), and self-compassion change scores ranged from -6.00–31.00 ( $M = 3.33$ ,  $SD = 7.00$ ). Larger negative scores for depression and anxiety indicate greater reduction in depressive and anxious symptoms while larger positive scores for self-compassion indicate a greater increase in self-compassion levels.

In terms of forum use, across the 11 weeks that participants ( $N = 69$ ) had access to the forum (10-week program plus 1 week break), time spent on forum ranged from 0 minutes to 267.97 minutes ( $M = 27.92$  min,  $SD = 43.84$ ). Of the 69 participants, 14 had a total time spent of 0 minutes as they did not login to the forum at any point during the program. Participants who logged into the program were significantly older ( $t_{67} = -2.132$ ,  $p = 0.04$ ) and had a higher household income ( $t_{62} = -2.380$ ,  $p = 0.02$ ) compared to the participants who did not login to the forum during the duration of the BEAM program. The number of posts participants made ranged from 0 to 36 ( $M = 3.84$ ,  $SD = 6.01$ ). Of these participants, 27 made 0 posts during the program. A visual of forum engagement across the 11 weeks is displayed using a Violin Plot in Figure 4. Due to significant outliers and floor effects, a continuous variable of time spent on forum and number of forum posts was created to better capture overall forum usage. Upon examining patterns of usage of participants, quintiles were chosen to be the most natural way to group the participants. Thus, participants were sorted into five equal quintiles based on the amount of time they spent on the forum and the number of posts they made, respectively. Those in quintile 1 engaged least frequently, while those in quintile 5 most frequently. Graphs displaying forum use among all five groups are displayed in Figure 5.

To determine factors that were associated with engagement in the BEAM forum a series of correlations were conducted. For exploratory purposes, Pearson bivariate correlations were used to examine associations between demographics and the quintile variables for forum engagement (Table 2). Time spent on forum was significantly associated with number of adults in the household (i.e.,  $>2$ ) ( $r = .26$ ,  $p = .03$ ), education level ( $r = .27$ ,  $p = .03$ ), and household income ( $r = .43$ ,  $p < .001$ ). Similarly, number of posts made on the forum was significantly related to number of adults in the household (i.e.,  $> 2$ ) ( $r = .27$ ,  $p = .02$ ) and household income ( $r$

= .42,  $p < .001$ ). That is, participants with more adults in their household, higher educational backgrounds, and higher household incomes engaged more frequently in the forum. Time spent on the forum was also significantly positively associated maternal age ( $r = .25$ ,  $p = .04$ ), however number of posts made was not ( $r = .16$ ,  $p = .18$ ). A series of Pearson bivariate correlations were then used to explore pre-intervention mental health scores associated with forum engagement. Pre-intervention depression, anxiety, and self-compassion scores were not significantly associated with time spent on the forum during the BEAM program or number of posts made on the forum (Table 3).

Next, linear regressions were used to determine if time spent on forum and number of posts made on forum were associated with change in mental health pre- to post-intervention. Prior to running analyses, the four assumptions for linear regression, linearity, homoscedasticity, multicollinearity, and normality, were checked and met. First, normality and linearity for all relationships were assessed by examining the Normal P-P Plots. Data was linear and only small deviations from the normality line were noted. Second, to test homoscedasticity residuals were plotted against the standardized predicted values. Results from the scatterplot revealed the assumption of homoscedasticity was met. Third, multicollinearity was examined using variance inflation factors. All the variance inflation factors were low (range 1.00–1.213) indicating that the assumption of no multicollinearity was met. Finally, correlations between sociodemographic characteristics and change in anxiety, depression, and self-compassion scores were computed to inform any statistical controls needed within the model, however no correlations were significant and thus demographic correlations were not controlled for within the linear regressions.

Linear regressions were used to determine how forum engagement impacted with change in mental health pre- to post-intervention (Table 4). Pre-intervention mental health scores were

controlled for within the linear regression models. Linear regressions revealed time spent on the forum did not significantly predict change in depressive symptoms ( $\beta = -.467$ ,  $t = -.992$ ,  $p = .326$ ), anxiety symptoms ( $\beta = -.912$ ,  $t = -1.704$ ,  $p = .094$ ), or self-compassion scores ( $\beta = .015$ ,  $t = .243$ ,  $p = .809$ ). Similarly, number of posts made on forum were not a significant predictor of change in depressive symptoms ( $\beta = -.278$ ,  $t = -.580$ ,  $p = .564$ ), anxiety symptoms ( $\beta = -.589$ ,  $t = -1.070$ ,  $p = .290$ ), or self-compassion scores ( $\beta = .225$ ,  $t = .297$ ,  $p = .768$ ).

### **Qualitative Results**

Among the participants who completed the BEAM program ( $N = 69$ ), 56 (81.16%) provided responses to the open-ended questions in the post-intervention questionnaire. The average word count of participants' answers to the open-ended questions was 19 words. The remaining participants left the text boxes blank. Participants who completed the questionnaire spent significantly more time on forum ( $t_{31.14} = -6.285$ ,  $p < 0.001$ ) and posted significantly more on the forum ( $t_{30.52} = -6.342$ ,  $p < 0.001$ ) compared to the participants who did not complete the questionnaire. There were no significant differences in sociodemographic characteristics between those who completed the questionnaire and those who did not. The questions asked included: a) How did using the forum impact you? b) How (if at all) did using the forum affect your mental health? c) In what ways did you feel supported by the forum? d) What, if anything, got in the way of you using the forum? and, e) How (if at all) could the forum be improved to better address your support and mental health needs?. Through thematic analysis of the open-text responses, themes were generated in relation to 1) impact of forum, 2) barriers to forum use and, 3) forum improvements. Themes for each area are presented in Figure 6.

#### ***Impact of Forum***

Participants were asked about how using the forum impacted them. Themes included: connection with others, decreased parenting stress and improved well-being, consolidation of program content, value of the parent coach, and no impact.

**Connection with others.** The first theme to emerge regarding the impact of the forum was around how it allowed participants to connect with other mothers. Participants valued the ability to readily access support and advice from others and help them to recognize they were not alone. One participant wrote, “It gave me an outlet to post/read about other struggles. It was very helpful to see I'm not alone in my feelings. To get feedback was encouraging and I also learned new strategies to help me as a new first-time parent” (Participant #4). Another mother noted, “It was wonderful to see other moms expressing themselves so openly about their struggles. It made me feel seen and understood” (Participant #22)

**Decreased parenting stress and improved well-being.** Many participants shared that the forum helped them with their parenting and improved their well-being. They shared that through connecting with and receiving/giving support to others improved their mental health. Mothers wrote “[the forum] really helped my mental health through knowing I'm not alone in my feelings/thoughts” (Participant #6), “my parenting stress has gone way down. I feel more capable and confident in my parenting skills” (Participant #4), and “ it made me feel less anxious about certain aspects of parenting and anxiety (Participant #53)”

**Consolidation of program content.** Participants also noted that the forum offered a helpful opportunity to talk about BEAM program content. One mother noted the forum was a good way for her to “contemplate on the material and share my own experience” (Participant #23) while another wrote that the forum allowed them to “gain a deeper understanding of course content in an applied setting” (Participant #25).

**Value of parent coach.** Mothers also shared that they valued engaging with the parent coach in the forum and appreciated how supportive parent coaches were. They shared, “it was nice that no matter what I said, a parent coach always responded so I always felt heard one way or another” (Participant #50) and “the parent coaches were very supportive in the forums - their participation was so appreciated” (Participant #53)

**No Impact.** Some participants noted that using the forum did not have any impact on them. Some just shared that it had “no impact” (Participant #5) while others provided additional information and critiques about the forum. Most were around technological issues with participants sharing the forum “didn't work well on my phone” (Participant #27) and “I felt the forum application was not totally user friendly. I didn't notice I had messages from other members until quite late into the program” (Participant #33).

### ***Barriers to Forum Use***

Participants wrote about barriers they faced to engaging in the forum during the BEAM program. Themes included technological challenges and time.

**Technological challenges.** The main barrier to forum use reported by participants were technological issues. Some participants noted they were unable to log into the forum as they “couldn't figure out where it was” (Participant #3). Others said the user experience of the forum was not ideal and that it was difficult to navigate. One mother shared, “I had a very hard time with the format of the forum. I tried to use it and I REALLY wanted to participate but the format would leave me feeling very overwhelmed each time I tried” (Participant #44).

**Time.** Another significant barrier to engaging in the forum that mothers noted was time.

Many shared that due to their busy schedules they did not have the time to use the forum. One shared her main barrier was “time and energy. I had to prioritize what to use my time with, and that was the videos/sitting with materials and attending the zoom meetings” (Participant #18).

### ***Forum Improvements***

**Interface improvements.** Many participants commented on how the forum interface should be improved to improve overall user experience. Several suggestions were made including having the forum be better integrated within the app, having an option for push notifications, an updated more visually appealing platform, and the ability to reply directly to someone’s comment. Mothers shared, “I would prefer it to be easier to see who replied to what and for the convo to appear more organized (like how conversations are on Facebook groups for example) (Participant #45)” and “More user friendly/opening within the app not taking to safari may have brought on more participation for me” (Participant #33).

**More structure.** Finally, some participants noted that it would have been helpful for the forum to be more structured. They expressed that having more directed questions to get conversations started would be helpful. Mothers wrote that they would like “More activity from the clinical coaches/facilitators” (Participant #53) and “more guidance from coaches. It felt kind of hard to follow and unstructured so I didn't know how to participate” (Participant #23).

### **Discussion**

This study aimed to explore predictors and impacts of engagement in the BEAM forum. In the present study mothers with young children received access to the peer social support forum for 11 weeks and were encouraged by the clinical and parent coach team to use it as a way to connect and receive support from other mothers in the program. Mothers with young children often do not receive adequate support and the COVID-19 pandemic exacerbated this concern as

access to in person supports and services were extremely limited. Online forums offer a unique avenue for mothers to readily access support from other mothers with similar lived experiences with no required face to face contact. Indeed, previous qualitative research on parenting forums (e.g., Reddit, Baby Centre) highlights parents use online forums to seek support and to feel less isolated (Pierce et al., 2022; Cameron et al., 2022). Yet, no research has examined predictors of engagement in online forum communities, and little is known about the impact that engagement has on maternal mental health. Thus, the present research sought to fill this gap and elucidate these links to obtain more information about *who* tends to access these supports and *how* this support impacts maternal well-being. Notably, forum functionality challenges and limitations of the BEAM forum (i.e., confusing threads, having to login each time, forum opening in a separate browser from the app) must be considered when interpreting the results of the present study.

Existing literature has extensively examined facilitators and barriers to mental health service use among mothers (Bell et al., 2016; Viveiros & Darling, 2018), however no study has examined predictors of forum usage specifically. Commonly experienced barriers to mental health service use include cost of services, access to transportation, time, and proximity (Heaman et al., 2015; Steele et al., 2007). Given that the BEAM is a free mental health app-based program with asynchronous and telehealth options, it was expected that barriers to participation such as cost, and transportation would be mitigated. However, some key barriers to engagement in the program, and the forum specifically, such as time or individual attitudinal factors (e.g., such as fear of stigmatization) were expected to remain. Given this, it was hypothesized that mothers belonging to higher socioeconomic groups would use the forum more frequently. Results provided support for this hypothesis revealing that mothers' education level and household

income were significantly related to engagement in the BEAM forum. That is, those with higher educational backgrounds and household incomes, spent more time on the forum and posted more frequently. This is consistent with previous research demonstrating a link between higher socioeconomic status and greater use of mental health care services (Roy-Byrne et al., 2009). Specifically, those who belong to higher socioeconomic groups report having more time and resources to access services (Sareen et al., 2007) and feel less stigmatized when seeking support from others (Golberstein et al., 2008).

Having more adults in the household also predicted more forum use (i.e., time spent on forum and number of posts made on the forum). I suspect this result may be due to these mothers having more time to spend on the forum because they have additional help within the home and additional assistance with childcare specifically. However, the result is interesting as one may expect that an individual with more adult support in the home would have fewer needs of accessing additional outside supports. Previous research demonstrates single mothers are more likely to engage in support services than married mothers (Wang, 2004), inconsistent with the current result that those with more adults in the household engaged in the forum more.

The impact that pre-intervention mental health symptoms had on forum engagement (i.e., time spent on forum and number of posts made on the forum) was also explored. Neither depression, anxiety, nor self-compassion were associated with forum engagement throughout the BEAM program. This is inconsistent with research demonstrating the link between depression, anxiety, self-compassion, and help seeking-behaviours and behavioural activation generally (Adie et al., 2021; Ekers et al., 2014; Roness et al., 2005; Takagaki et al., 2021). That is, self-compassionate individuals are more likely to engage in behaviours to better their health and well-being whereas individuals with severe depression and/or anxiety may not have the capacity or

activation required to engage in such behaviours. However, it is possible that using the forum is fundamentally different than other types of support or help-seeking behaviours, especially in the present study considering the barriers to using the BEAM forum, and thus forum use was unrelated to pre-intervention mental health symptomology. Similarly, it is also possible that participants did not view the forum as a mechanism to improve their well-being, helping to explain the absence of association between self-compassion and forum engagement.

The associations between time spent on forum and number of posts made on forum with changes in maternal mental health were all non-significant. It was expected that engaging in the forum more frequently would be associated with favorable changes in depression, anxiety, and self-compassion scores given the connection between social support and increased positive psychosocial outcomes (Bedrov & Gable, 2022; Harandi et al., 2017). This was expected because it was anticipated that spending more time on the forum and posting more would allow for greater opportunity to receive support from other mothers, and in turn those higher levels of support would positively influence mental health. However, in the present study many participants did not login to the forum throughout the 11 weeks of the program resulting in significant floor effects in the forum engagement variables. These low levels of forum engagement among a significant number of forum participants likely attenuated the overall effect of forum usage and mental health changes in the current sample.

Although this is the first study to quantitatively examine how forum use impacted maternal mental health, the findings are somewhat inconsistent with the qualitative portion of the current research. Qualitative themes derived from the open-ended text responses showed that participants valued the support gained from the forum and that this support improved their mental health. Further, other qualitative research demonstrates that being involved in an online

social support community provides valued social support for mothers and in turn improves maternal well-being (Mcsorley et al., 2022; Price et al., 2018; Simpson et al., 2023). There are several possible explanations for the discrepancy between the quantitative and qualitative results in the current study. First, it is possible that mothers perceive forum communities to be supportive and helpful, however that engaging in online communities does not provide enough social support in itself to mediate depression, anxiety, or self-compassion. Indeed, some research shows that social support is only one factor that is part of a larger pathway contributing to mental health (e.g., depression) and that although social support is beneficial, it is not enough to meaningfully impact mental health symptomology (Reid & Taylor, 2015). This may be even stronger when considering that support received through the BEAM forum was entirely virtual. Research shows digital programs are most effective when they involve some type of synchronous engagement and the ability to connect face to face, virtually (Flannery et al., 2021). Additionally, some mothers note that online social support is beneficial to their mental health while others state they do not believe it offers them the same benefits as in person social supports (Ollivier et al., 2021). Thus, it is possible that mothers did not perceive the BEAM forum to be supportive or that the support solely received through the BEAM forum, was not sufficient for meaningful mental health changes. Second, it is possible forums could lead to significant change in mental health symptomology, however participants in the present study did not engage in the forum enough to see such change (i.e., engaging 10 minutes per week is not enough engagement to lead to clinically significant changes in mental health). Third, forums may lead to meaningful changes in mental health, the BEAM forum just did not given the significant challenges and limitations to its functionality. Thus, more research is needed to clarify the elucidate the impact of forum use on mental health and help explain the mixed findings in the current study.

The qualitative analysis in the current research provided additional information on participant experiences using the BEAM forum, providing additive information that helps to contextualize the results of the quantitative analyses. Main themes were generated in relation to how using the forum impacted participants (themes: connection with others, decreased parenting stress and improved well-being, consolidation of program content, value of the parent coach, no impact), what got in the way of forum use (themes: technological challenges time), and how the forum could be improved were generated (themes: interface improvements, more structure). Themes are consistent with other qualitative research examining maternal experiences using online forum communities. Mothers have noted that forum communities provide a sense of community, social support, exchange of information about parenting, and obtain advice during the stressful transition to parenthood (Stana & Miller, 2019; Teaford et al., 2019). Additional research reveals online forums offer mothers significant emotional (e.g., sharing experiences, empathy), informational (e.g., providing information about parenting, mental health), and instrumental (e.g., practical assistance) support (Evans et al., 2012). A preference for the online forum to be monitored has also been noted (Teaford et al., 2019), aligning with the current findings that the participants in BEAM valued the role of the parent coach in the forum. Lastly, the finding that the forum did not have an impact on some participant could be attributed to some people preferring in person supports and connection (Ollivier et al., 2021) or the technological challenges participants experienced using the forum.

Indeed, the main reported barrier to forum use were technological challenges. Some participants said that they were unable to figure out how to access the forum while others found the forum difficult to navigate and confusing. These barriers are consistent with qualitative participant feedback obtained from the BEAM pilot trial (Simpson et al., 2023), however due to

the considerable financial investments required to update the forum interface and infrastructure, technological and functionality updates were not made to the BEAM forum for the present RCT. Key suggestions to improve user experience include: the ability to reply directly to someone's comment, push notifications, and a more organized platform. Despite the limited budget of the BEAM RCT, results demonstrate a critical need to improve forum usability and mitigate technological issues to improve overall experience for participants.

### **Strengths and Limitations**

The present study has notable strengths that are important to consider. First, to my knowledge the current research is the first study to examine predictors of engagement in online social support forums and to follow participants over time to examine how engagement in these communities impacts maternal mental health. The current research fills this significant gap in the literature and contributes to the growing understanding of forum use among mothers with young children. Second, employing a mixed methods approach and using both quantitative and qualitative methods to examine predictors and impacts of forum use provides a deeper and more nuanced understanding of forum use. Using two forms of data collection helped to mitigate the potential of missing key data or information which can often occur if only one form of data collection is used. Lastly, the analysis of qualitative data in the present study was rigorous and robust. All data was double coded by coders who were trained by an expert in qualitative analysis to ensure rigorous and reliable results.

Along with the strengths mentioned, the present study has limitations that should be considered in interpreting the results. First, as noted, due to budgetary constraints the BEAM forum is thought to be a 'minimum viable product'. The research team aimed to improve the forum based on user-experiences and preferences; however, the current functionality of the

forum may have impacted predictors and impacts of forum engagement in the present study.

Regardless, this research still provides novel preliminary information regarding how forum use impacts maternal mental health. Second, participants did not engage in the forum as frequently as what was anticipated. It was expected that participants would spend more time on the forum and post more often, however significant floor effects were observed and many participants had very limited or no engagement on the forum. It is possible that participants did not engage in the forum enough to see quantitative changes in their mental health pre- to post-intervention.

Additionally, it is possible that more sophisticated analyses are needed to examine the impacts of forum engagement on mental health. Our teams' preliminary consultations with e-health experts suggest that looking at profiles of user engagement may be a more appropriate method of examining participant engagement data within a multi-component program. Third, multiple correlations were run in the present study increasing the chance of a type one

. Although, this research was exploratory in nature and thus at this developmental stage I sought to identify all possible factors that may be associated with forum use and use these preliminary data to guide replications in the future. Finally, perceived support associated with forum usage was not measured in the present study. It is possible that engaging in the forum (i.e., spending time on the forum and posting on the forum) was not perceived to be supportive by mothers and thus does not equate to a measure of social support. However, the present study qualitative data revealed participants largely perceived the forum as supportive.

### **Implications and Future Directions**

The present research addresses the lack of literature examining predictors and impacts of online forum use in mothers. Many populations use online forums, including mothers, but little is known about the impacts this forum usage has on maternal mental health. Quantitative analyses

in the present study revealed that neither time spent on forum or number of posts made on forum throughout an 11-week period were associated with significant changes in maternal depression, anxiety, or self-compassion. Conversely, qualitative analyses revealed the forum was supportive to parents and made a meaningful difference on their health and well-being. Given these mixed findings combined with the limitations regarding the functionality of the current BEAM forum it would be impetuous to determine forum usage indeed has no impact on maternal mental health. Future research should examine impacts of forum use within a fully functioning forum platform that has incorporated participant feedback regarding user experience. Further, it is recommended that future research includes measures around perceived support associated with forum usage in addition to forum engagement frequency data. This additional research would better inform considerations regarding the value and practice of including forums within online mental health programming for mothers with young children.

### References

- Abshire, M., Russell, S. D., Davidson, P. M., Budhathoki, C., Han, H.-R., Grady, K. L., Desai, S., & Dennison Himmelfarb, C. (2018). Social Support Moderates the Relationship Between Perceived Stress and Quality of Life in Patients With a Left Ventricular Assist Device. *Journal of Cardiovascular Nursing, 33*(5), E1.  
<https://doi.org/10.1097/JCN.0000000000000487>
- Adie, T., Steindl, S. R., Kirby, J. N., Kane, R. T., & Mazzucchelli, T. G. (2021). The Relationship Between Self-Compassion and Depressive Symptoms: Avoidance and Activation as Mediators. *Mindfulness, 12*(7), 1748–1756. <https://doi.org/10.1007/s12671-021-01637-1>
- Amone-P'Olak, K., Ormel, J., Oldehinkel, A. J., Reijneveld, S. A., Verhulst, F. C., & Burger, H. (2010). Socioeconomic Position Predicts Specialty Mental Health Service Use Independent of Clinical Severity: The TRAILS Study. *Journal of the American Academy of Child & Adolescent Psychiatry, 49*(7), 647–655.  
<https://doi.org/10.1016/j.jaac.2010.03.007>
- Aktan, N. M. (2012). Social Support and Anxiety in Pregnant and Postpartum Women: A Secondary Analysis. *Clinical Nursing Research, 21*(2), 183–194.  
<https://doi.org/10.1177/1054773811426350>
- Baddeley, J. L., Pennebaker, J. W., & Beevers, C. G. (2013). Everyday Social Behavior During a Major Depressive Episode. *Social Psychological and Personality Science, 4*(4), 445–452.  
<https://doi.org/10.1177/1948550612461654>

- Bal, Z., Solmaz, M., Adali Aker, D., Akin, E., & Kose, S. (2017). Temperament and Character Dimensions of Personality in Patients with Generalized Anxiety Disorder. *Journal of Mood Disorders*, 1. <https://doi.org/10.5455/jmood.20170214015231>
- Barlow, D. H., Farchione, T. J., Bullis, J. R., Gallagher, M. W., Murray-Latin, H., Sauer-Zavala, S., Bentley, K. H., Thompson-Hollands, J., Conklin, L. R., Boswell, J. F., Ametaj, A., Carl, J. R., Boettcher, H. T., & Cassiello-Robbins, C. (2017). The Unified Protocol for Transdiagnostic Treatment of Emotional Disorders Compared With Diagnosis-Specific Protocols for Anxiety Disorders: A Randomized Clinical Trial. *JAMA Psychiatry*, 74(9), 875–884. <https://doi.org/10.1001/jamapsychiatry.2017.2164>
- Bauer, R., Bauer, M., Spiessl, H., & Kagerbauer, T. (2013). Cyber-support: An analysis of online self-help forums (online self-help forums in bipolar disorder. *Nordic Journal of Psychiatry*, 67(3), 185–190. <https://doi.org/10.3109/08039488.2012.700734>
- Baum, L. S. (2004). Internet parent support groups for primary caregivers of a child with special health care needs. *Pediatric Nursing*, 30(5), 381–401.
- Baxter, J., Hewitt, B., & Haynes, M. (2008). Life course transitions and housework: Marriage, parenthood, and time on housework. *Journal of Marriage and Family*, 70(2), 259–272. <https://doi.org/10.1111/j.1741-3737.2008.00479.x>
- Beck, C. (2001). Predictors of postpartum depression: An update. *Nursing Research*, 50(5), 275–285. <https://doi.org/10.1097/00006199-200109000-00004>
- Bedrov, A., & Gable, S. L. (2022). Thriving together: The benefits of women’s social ties for physical, psychological and relationship health. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 378(1868), 20210441. <https://doi.org/10.1098/rstb.2021.0441>

- Bell, L., Feeley, N., Hayton, B., Zelkowitz, P., Tait, M., & Desindes, S. (2016). Barriers and Facilitators to the Use of Mental Health Services by Women With Elevated Symptoms of Depression and Their Partners. *Issues in Mental Health Nursing, 37*(9), 651–659. <https://doi.org/10.1080/01612840.2016.1180724>
- Bernard, K., Nissim, G., Vaccaro, S., Harris, J. L., Lindhiem, O. (2018). Association between maternal depression and maternal sensitivity from birth to 12 months: A meta-analysis. *Attachment & Human Development, 20*(6), 578–599. <https://doi.org/10.1080/14616734.2018.1430839>
- Billings, A., & Moos, R. (1982). Social support and functioning among community and clinical groups: A panel model. *Journal of Behavioral Medicine, 5*(3), 295–311. <https://doi.org/10.1007/BF00846157>
- Brady, E., & Guerin, S. (2010). “Not the romantic, all happy, cooey coo experience”: A qualitative analysis of interactions on an Irish parenting website. *Family Relations, 59*(1), 14–27. <https://doi.org/10.1111/j.1741-3729.2009.00582.x>
- Braun, V., Clarke, V., Hayfield, N., & Terry, G. (2019). Thematic analysis. In P. Liamputtong (Eds.), *Handbook of research methods in health social sciences* (pp. 843–860). Springer Singapore.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*, 77–101. <https://doi.org/10.1191/1478088706qp063oa>.
- Braun, V., & Clarke, V. (2013). *Successful qualitative research: A practical guide for beginners*. Thousand Oaks.
- Breines, J. G., & Chen, S. (2012). Self-compassion increases self-improvement motivation. *Personality and Social Psychology Bulletin, 38*(9), 1133–1143. <https://doi.org/>

10.1177/0146167212445599

- Brown, J. D., Harris, S. K., Woods, E. R., Buman, M. P., & Cox, J. E. (2012). Longitudinal study of depressive symptoms and social support in adolescent mothers. *Maternal and Child Health Journal, 16*(4), 894–902. <https://doi.org/10.1007/s10995-011-0814-9>
- Cameron, E. E., Joyce, K. M., Delaquis, C. P., Reynolds, K., Protudjer, J. L. P., & Roos, L. E. (2020). Maternal psychological distress & mental health service use during the COVID-19 pandemic. *Journal of Affective Disorders, 276*, 765–774. <https://doi.org/10.1016/j.jad.2020.07.081>
- Cameron, E. E., Simpson, K. M., Bowes, J., Pierce, S., Penner, K. E., Beyak, A., Gomez, I., Reynolds, K., & Roos, L. E. (2022, November 29). A qualitative forum analysis of fathers' stressors and support seeking behaviour during the COVID-19 pandemic. <https://doi.org/10.31234/osf.io/h2vn7>
- Chivers, B., Garad, R., Boyle, J., Skouteris, H., Teede, H., & Harrison, C. (2020). Perinatal distress during COVID-19: Thematic analysis of an online parenting forum. *Journal of Medical Internet Research, 22*(9). <https://doi.org/10.2196/22002>
- Corrigan, C. P., Kwasky, A. N., & Groh, C. J. (2015). Social support, postpartum depression, and professional assistance: A survey of mothers in the midwestern United States. *The Journal of Perinatal Education, 24*(1), 48–60. <https://doi.org/10.1891/1058-1243.24.1.48>
- Cruwys, T., Haslam, S. A., Dingle, G. A., Haslam, C., & Jetten, J. (2014). Depression and Social Identity: An Integrative Review. *Personality and Social Psychology Review, 18*(3), 215–238. <https://doi.org/10.1177/1088868314523839>
- Cutrona, C. (1984). Social support and stress in the transition to parenthood. *Journal of Abnormal Psychology, 93*(4), 378–390. <https://doi.org/10.1037/0021-843X.93.4.378>

- Damaraju, M. (2018). A Meta-Analysis: A Functional Neuroanatomical Comparison of Self-Esteem-related and Postpartum Depression-related Processing. *Honors Theses*.  
<https://digitalworks.union.edu/theses/1592>
- Demitras, O., Özdevecioglu, M., & Capcar, N. (2015). The relationship between cognitive emotion regulation and job stress: Moderating role of social support. *Asian Social Science*, *11*(12), 168–173. <https://doi.org/10.5539/ass.v11n12p168>
- Dimidjian, S., Martell, C. R., Addis, M. E., & Herman-Dunn, R. (2008). Behavioral activation for depression. In *Clinical handbook of psychological disorders: A step-by-step treatment manual, 4th ed* (pp. 328–364). The Guilford Press.
- Dobson, K. S., & Dozois, D. J. A. (2008). *Risk factors in depression*. Elsevier.
- Doty, J., & Dworkin, J. (2014). Online social support for parents: A critical review. *Marriage & Family Review*, *50*(2), 174–198. <https://doi.org/10.1080/01494929.2013.834027>
- Druss, B. G. (2020). Addressing the COVID-19 pandemic in populations with serious mental illness. *JAMA Psychiatry*, *77*(9), 891–892.  
<https://doi.org/10.1001/jamapsychiatry.2020.0894>
- Eisenberger, N. I., Taylor, S. E., Gable, S. L., Hilmert, C. J., & Lieberman, M. D. (2007). Neural pathways link social support to attenuated neuroendocrine stress responses. *NeuroImage*, *35*(4), 1601–1612. <https://doi.org/10.1016/j.neuroimage.2007.01.038>
- Ekers, D., Webster, L., Straten, A. V., Cuijpers, P., Richards, D., & Gilbody, S. (2014). Behavioural Activation for Depression; An Update of Meta-Analysis of Effectiveness and Sub Group Analysis. *PLOS ONE*, *9*(6), e100100.  
<https://doi.org/10.1371/journal.pone.0100100>

- Evans, M., Donelle, L., & Hume-Loveland, L. (2012). Social support and online postpartum depression discussion groups: A content analysis. *Patient Education and Counseling*, 87(3), 405–410. <https://doi.org/10.1016/j.pec.2011.09.011>
- Fairbrother, N., Janssen, P., Antony, M. M., Tucker, E., & Young, A. H. (2016). Perinatal anxiety disorder prevalence and incidence. *Journal of Affective Disorders*, 200, 148–155. <https://doi.org/10.1016/j.jad.2015.12.082>
- Farchione, T. J., Fairholme, C. P., Ellard, K. K., Boisseau, C. L., Thompson-Hollands, J., Carl, J. R., Gallagher, M. W., & Barlow, D. H. (2012). Unified Protocol for Transdiagnostic Treatment of Emotional Disorders: A Randomized Controlled Trial. *Behavior Therapy*, 43(3), 666–678. <https://doi.org/10.1016/j.beth.2012.01.001>
- Farmer, A. Y., & Lee, S. K. (2011). The effects of parenting stress, perceived mastery, and maternal depression on parent child interaction. *Journal of Social Service Research*, 37(5), 516–525. <https://doi.org/10.1080/01488376.2011.607367>
- Feeney, B., & Collins, N. (2015). A new look at social support. *Personality and Social Psychology Review*, 19(2), 113–147. <https://doi.org/10.1177/1088868314544222>
- Field, A. (2017). *Discovering statistics using IBM SPSS statistics: North American edition*. New Delhi, India: SAGE Publications, Inc.
- Flannery, J. E., Penner-Goeke, L., Xie, E. B., Prince, D., Simpson, K. M., Callaghan, B., & Roos, L. E. (2021, January 15). Digital Parent Training RCT Meta-Analysis and Systematic Review. <https://doi.org/10.31234/osf.io/cpd9b>
- Fowles, E. R., Cheng, H., & Mills, S. (2012). Postpartum health promotion interventions: A systematic review. *Nursing Research*, 61(4), 269–282. <https://doi.org/10.1097/NNR.0b013e3182556d29>

- Gariépy, G., Honkaniemi, H., & Quesnel-Vallée, A. (2016). Social support and protection from depression: Systematic review of current findings in Western countries. *The British Journal of Psychiatry*, 209, 284–293. <https://doi.org/10.1192/bjp.bp.115.169094>
- Golberstein, E., Eisenberg, D., & Gollust, S. E. (2008). Perceived Stigma and Mental Health Care Seeking. *Psychiatric Services*, 59(4), 392–399. <https://doi.org/10.1176/ps.2008.59.4.392>
- Golmakani, N., Rahmati, R., Shaghghi, F., Safinejad, H., Kamali, Z., & Mohebbi-Dehnavi, Z. (2020). Investigating the relationship between social support and self-compassion by improving the adequacy of prenatal care. *Journal of Education and Health Promotion*, 9, 340. [https://doi.org/10.4103/jehp.jehp\\_308\\_20](https://doi.org/10.4103/jehp.jehp_308_20)
- Harandi, T. F., Taghinasab, M. M., & Nayeri, T. D. (2017). The correlation of social support with mental health: A meta-analysis. *Electronic Physician*, 9(9), 5212–5222. <https://doi.org/10.19082/5212>
- Hall, W., & Irvine, V. (2009). E-communication among mothers of infants and toddlers in a community based cohort: A content analysis. *Journal of Advanced Nursing*, 65, 175–183. 107. <https://doi.org/10.1111/j.1365-2648.2008.04856.x>
- Heaman, M. I., Sword, W., Elliott, L., Moffatt, M., Helewa, M. E., Morris, H., Gregory, P., Tjaden, L., & Cook, C. (2015). Barriers and facilitators related to use of prenatal care by inner-city women: Perceptions of health care providers. *BMC Pregnancy and Childbirth*, 15(1), 2. <https://doi.org/10.1186/s12884-015-0431-5>
- IBMCorp. (2020). *IBM Statistics for Macintosh, Version 27.0*. In IBMCorp.

- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine, 16*(9), 606–613.  
<https://doi.org/10.1046/j.1525-1497.2001.016009606.x>
- Lahey, B., & Cohen, S. (2000). *Social support theory and measurement*. In S. Cohen, L. G. Underwood, & B. H. Gottlieb (Eds.), *Social support measurement and intervention: A guide for health and social scientists* (p. 29–52). Oxford University Press.
- Lambert, M. J., & Harmon, K. L. (2018). The merits of implementing routine outcome monitoring in clinical practice. *Clinical Psychology: Science and Practice, 25*(4), e12268.  
<https://doi.org/10.1016/j.jmwh.2006.02.008>
- Leach, L. S., Poyser, C., & Fairweather-schmidt, K. (2017). Maternal perinatal anxiety: A review of prevalence and correlates. *Clinical Psychologist, 21*(1), 4–19.  
<https://doi.org/10.1111/cp.12058>
- Leahy-Warren, P., McCarthy, G., & Corcoran, P. (2011). First-time mothers: Social support, maternal parental self-efficacy and postnatal depression. *Journal of Clinical Nursing, 21*, 388–397. <https://doi.org/10.1111/j.1365-2702.2011.03701.x>
- Lebel, C., MacKinnon, A., Bagshawe, M., Tomfohr-Madsen, L., & Giesbrecht, G. (2020). Elevated depression and anxiety symptoms among pregnant individuals during the COVID-19 pandemic. *Journal of Affective Disorders, 277*, 5–13.  
<https://doi.org/10.1016/j.jad.2020.07.126>
- Letourneau, N., Duffett-Leger, L., Stewart, M., Hegadoren, K., Dennis, C., Rinaldi, C., Stoppard, J. (2007). Canadian mothers' perceived support needs during postpartum depression. *Journal of Obstetric, Gynecologic, & Neonatal Nursing, 36*(5), 441–449.  
<https://doi.org/10.1111/j.1552-6909.2007.00174.x>

- Lovejoy, M. C., Graczyk, P. A., O'Hare, E., & Neuman, G. (2000). Maternal depression and parenting behavior: A meta-analytic review. *Clinical psychology review, 20*(5), 561–592. [https://doi.org/10.1016/S0272-7358\(98\)00100-7](https://doi.org/10.1016/S0272-7358(98)00100-7)
- Luykx, J. J., Vinkers, C. H., & Tjebk, J. K. (2020) Psychiatry in times of the coronavirus disease 2019 (COVID-19) pandemic: An imperative for psychiatrists to act now. *JAMA Psychiatry, 77*(11), 1097–1098. <https://doi.org/10.1001/jamapsychiatry.2020.1225>
- MacKinnon, A. L., Simpson, K. M., Salisbury, M. R., Bobula, J., Penner-Goeke, L., Berard, L., Rioux, C., Giesbrecht, G. F., Guiliano, R., Lebel, C., Protudjer, J. L. P., Reynolds, K., Sauer-Zavala, S., Soderstrom, M., Tomfohr-Madsen, L. M., & Roos, L. E. (2022). Building Emotional Awareness and Mental Health (BEAM): A pilot randomized controlled trial of an app-based program for mothers of toddlers. *Frontiers in Psychiatry, 24*(13), 880972. <https://doi.org/10.3389/fpsy.2022.880972>
- Maheux, A., & Price, M. (2016). The indirect effect of social support on post-trauma psychopathology via self-compassion. *Personality and Individual Differences, 88*, 102–107. <https://doi.org/10.1016/j.paid.2015.08.051>
- McCaig, D., Elliott, M. T., Prnjak, K., Walasek, L., & Meyer, C. (2020). Engagement with MyFitnessPal in eating disorders: Qualitative insights from online forums. *The International Journal of Eating Disorders, 53*(3), 404–411. <https://doi.org/10.1002/eat.23205>
- McDaniel, B. T., Coyne, S. M., & Holmes, E. K. (2012). New mothers and media use: Associations between blogging, social networking, and maternal well-being. *Maternal and Child Health Journal, 16*, 1509–1517. <https://doi.org/10.1007/s10995-011-0918-2>

- McNally, R. J. (2001). On the scientific status of cognitive appraisal models of anxiety disorder. *Behaviour Research and Therapy*, *39*(5), 513–521. [https://doi.org/10.1016/S0005-7967\(00\)00073-5](https://doi.org/10.1016/S0005-7967(00)00073-5)
- Mcsorley, L., Deighton-Smith, N., Budds, K., & Wang, X. (2022). “Hang in there mama!”: The role of online parenting forums in maternal mental health. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*. <https://doi.org/10.5817/CP2022-4-11>
- Milgrom, J., Hirshler, Y., Reece, J., Holt, C., & Gemmill, A. W. (2019). Social Support—A Protective Factor for Depressed Perinatal Women? *International Journal of Environmental Research and Public Health*, *16*(8), Article 8. <https://doi.org/10.3390/ijerph16081426>
- Moffitt, R. L., Neumann, D. L., & Williamson, S. P. (2018). Comparing the efficacy of a brief self-esteem and self-compassion intervention for state body dissatisfaction and self-improvement motivation. *Body Image*, *27*, 67–76. <https://doi.org/10.1016/j.bodyim.2018.08.008>
- Montgomery, E., De Backer, K., Easter, A., Magee, L. A., Sandall, J., & Silverio, S. A. (2023). Navigating uncertainty alone: A grounded theory analysis of women’s psycho-social experiences of pregnancy and childbirth during the COVID-19 pandemic in London. *Women and Birth*, *36*(1), e106–e117. <https://doi.org/10.1016/j.wombi.2022.05.002>
- Momen, N., Plana-Ripoll, O., Agerbo, E., Benros, M., Børghlum, A. D., Christensen, M. K., Dalsgaard, S., Degenhardt, L., de Jonge, P., Debost, J. P. G., Fenger-Grøn, M. Gunn, J. M., Iburg, K. M., Kessing, L. V., Kessler, R. C., Laursen, T. M., Lim, C. C. W., Mors, O., Mortensen, P. B., ... McGrath, J. J. (2020). Association between mental disorders and

- subsequent medical conditions. *New England Journal of Medicine*, 382(18), 1721–1731.  
<https://doi.org/10.1056/NEJMoa1915784>
- Moreno, C., Wykes, T., Galderisi, S., Nordentoft, M., Crossley, N., Jones, N., Cannon, M., Correll, C. U., Byrne, L., Carr, S., Chen, E. Y. H., Gorwood, P., Johnson, S., Kärkkäinen, H., Krystal, J. H., Lee, J., Lieberman, J., López-Jaramillo, C., Männikkö, M., ... Arango, C. (2020). How mental health care should change as a consequence of the COVID-19 pandemic. *The Lancet Psychiatry*, 7(9), 813–824. [https://doi.org/10.1016/S2215-0366\(20\)30307-2](https://doi.org/10.1016/S2215-0366(20)30307-2)
- Nicol-Harper, R., Harvey, A. G., & Stein, A. (2007). Interactions between mothers and infants: Impact of maternal anxiety. *Infant Behavior and Development*, 30(1), 161–167.  
<https://doi.org/10.1016/j.infbeh.2006.08.005>
- Neff, K. (2003). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity*, 2(2), 85–101. <https://doi.org/10.1080/15298860309032>
- Neff, K. D. (2011). Self-compassion, self-esteem, and well-being. *Social and Personality Compass*, 5(1), 1–12. <https://doi.org/10.1111/j.1751-9004.2010.00330.x>
- Nelson, S. K., Kushlev, K., & Lyubomirsky, S. (2014). The pains and pleasures of parenting: When, why, and how is parenthood associated with more or less well-being? *Psychological Bulletin*, 140(3), 846–895. <https://doi.org/10.1037/a0035444>
- Ollivier, R., Aston, Dr. M., Price, Dr. S., Sim, Dr. M., Benoit, Dr. B., Joy, Dr. P., Iduye, D., & Nassaji, N. A. (2021). Mental Health & Parental Concerns during COVID-19: The Experiences of New Mothers Amidst Social Isolation. *Midwifery*, 94, 102902.  
<https://doi.org/10.1016/j.midw.2020.102902>

- Ozbay, F., Johnson, D. C., Dimoulas, E., Morgan, C. A., Charney, D., & Southwick, S. (2007). Social support and resilience to stress: From neurobiology to clinical practice. *Psychiatry*, *45*(5), 35–40.
- Packness, A., Halling, A., Simonsen, E., Waldorff, F. B., & Hastrup, L. H. (2019). Are perceived barriers to accessing mental healthcare associated with socioeconomic position among individuals with symptoms of depression? Questionnaire-results from the Lolland-Falster Health Study, a rural Danish population study. *BMJ Open*, *9*(3), e023844. <https://doi.org/10.1136/bmjopen-2018-023844>
- Pallant, J. (2010). *SPSS survival manual: A step by step guide to data analysis using SPSS* (4<sup>th</sup> ed.). Berkshire, England: Open University Press McGraw-Hill.
- Pandey, K. R., Yang, F., Cagney, K. A., Smieliauskas, F., Meltzer, D. O., & Ruhnke, G. W. (2019). The impact of marital status on health care utilization among Medicare beneficiaries. *Medicine*, *98*(12), e14871. <https://doi.org/10.1097/MD.00000000000014871>
- Penninx, B., Milaneschi, Y., Lamers, F., & Vogelzangs, N. (2013). Understanding the somatic consequences of depression: Biological mechanisms and the role of depression symptom profile. *BMC Medicine*, *11*(1), 129–143. <https://doi.org/10.1186/1741-7015-11-129>
- Pierce, S., de Castro Lima, H. L., Jain, B., Reynolds, K., Tomfohr-Madsen, L., & Roos, L. (2022 February, 5). A Unique Role for Social Connection in the COVID-19 Pandemic; A Qualitative Analysis of Parenting Forums. <https://doi.org/https://doi.org/10.31219/osf.io/g63sh>
- Percudani, M., Corradin, M., Moreno, M., Indelicato, A., & Vita, A. (2020). Mental health services in Lombardy during COVID-19 outbreak. *Psychiatry Research*, *288*, 112980–112982. <https://doi.org/10.1016/j.psychres.2020.112980>

- Price, S. L., Aston, M., Monaghan, J., Sim, M., Tomblin Murphy, G., Etowa, J., Pickles, M., Hunter, A., & Little, V. (2018). Maternal Knowing and Social Networks: Understanding First-Time Mothers' Search for Information and Support Through Online and Offline Social Networks. *Qualitative Health Research*, 28(10), 1552–1563.  
<https://doi.org/10.1177/1049732317748314>
- Raes, F., Pommier, E., Neff, K. D., & Van Gucht, D. (2011). Construction and factorial validation of a short form of the Self-Compassion Scale. *Clinical Psychology & Psychotherapy*, 18, 250–255.
- Razurel, C., Kaiser, B., Antonietti, J.-P., Epiney, M., & Sellenet, C. (2017). Relationship between perceived perinatal stress and depressive symptoms, anxiety, and parental self-efficacy in primiparous mothers and the role of social support. *Women & Health*, 57(2), 154–172. <https://doi.org/10.1080/03630242.2016.1157125>
- Rees, S., Channon, S., & Waters, C. S. (2019). The impact of maternal prenatal and postnatal anxiety on children's emotional problems: A systematic review. *European Child & Adolescent Psychiatry*, 28(2), 257–280. <https://doi.org/10.1007/s00787-018-1173-5>
- Reid, K. M., & Taylor, M. G. (2015). Social support, stress, and maternal postpartum depression: A comparison of supportive relationships. *Social Science Research*, 54, 246–262.  
<https://doi.org/10.1016/j.ssresearch.2015.08.009>
- Reinke, J., & Solheim, C. (2015). Online social support experiences of mothers of children with Autism Spectrum Disorder. *Journal of Child and Family Studies*, 24(8), 2364–2373.  
<https://doi.org/10.1007/s10826-014-0039-9>
- Rioux, C., Weedon, S., MacKinnon, A. L., Watts, D., Salisbury, M. R., Penner-Goeke, L., Simpson, K. M., Harrington, J., Tomfohr-Madsen, L. M. & Roos, L. E. (2022).

- Translating the Knowledge Gap Between Researchers and Communication Designers for Improved mHealth Research. SIGDOC '22: The 40th ACM International Conference on Design of Communication. <https://doi.org/10.1145/3513130.3558997>
- Roness, A., Mykletun, A., & Dahl, A. A. (2005). Help-seeking behaviour in patients with anxiety disorder and depression. *Acta Psychiatrica Scandinavica*, *111*(1), 51–58.  
<https://doi.org/10.1111/j.1600-0447.2004.00433.x>
- Roohafza, H. R., Afshar, H., Keshteli, A. H., Mohammadi, N., Feizi, A., Taslimi, M., & Adibi, P. (2014). What's the role of perceived social support and coping styles in depression and anxiety? *Journal of Research in Medical Sciences : The Official Journal of Isfahan University of Medical Sciences*, *19*(10), 944–949.
- Roos, L. E., Kaminski, L., Stienwandt, S., Hunter, S., Giuliano, R., Mota, N., Katz, L. Y., & Zalewski, M. (2023). The Building Regulation in Dual-Generations Program (BRIDGE): A Mixed-Methods Feasibility Pilot of a Parenting Program for Depressed Mothers of Preschoolers, Matched with Dialectical Behavior Therapy Skills. *Child Psychiatry and Human Development*, *54*(1), 34–50. <https://doi.org/10.1007/s10578-021-01219-1>
- Roy-Byrne, P. P., Joesch, J. M., Wang, P. S., & Kessler, R. C. (2009). Low Socioeconomic Status and Mental Health Care Use Among Respondents With Anxiety and Depression in the NCS-R. *Psychiatric Services*, *60*(9), 1190–1197.  
<https://doi.org/10.1176/ps.2009.60.9.1190>
- Sareen, J., Jagdeo, A., Cox, B. J., Clara, I., ten Have, M., Belik, S.-L., de Graaf, R., & Stein, M. B. (2007). Perceived Barriers to Mental Health Service Utilization in the United States, Ontario, and the Netherlands. *Psychiatric Services*, *58*(3), 357–364.  
<https://doi.org/10.1176/ps.2007.58.3.357>

- Schomerus, G., Appel, K., Meffert, P. J., Luppá, M., Andersen, R. M., Grabe, H. J., & Baumeister, S. E. (2013). Personality-related factors as predictors of help-seeking for depression: A population-based study applying the Behavioral Model of Health Services Use. *Social Psychiatry and Psychiatric Epidemiology*, *48*(11), 1809–1817.  
<https://doi.org/10.1007/s00127-012-0643-1>
- Senator, J. (2015). Postpartum depression: Who is checking in with supermom? *Journal of Prenatal & Perinatal Psychology & Health*, *29*(3), 196–218.
- Shorey, S. Y., Ng, E. D., & Chee, C. Y. I. (2021). Anxiety and depressive symptoms of women in the perinatal period during the COVID-19 pandemic: A systematic review and meta-analysis. *Scandinavian Journal of Public Health*, *49*(7), 730–740.  
<https://doi.org/10.1177/14034948211011793>
- Simpson, K. M., Hatherly, K., Belows, M., Reynolds, K., & Roos, L. E. [in prep]. How families coped with COVID:19: Differential experiences based on maternal depression symptomology.
- Simpson, K. M., Freeman, M., Steele-Mitchell, S., Jagnyziak, A., Mackinnon, A., Reynolds, K., Tomfohr-Madsen, L., & Roos, L. E. [in prep]. Participant perspectives of the Building Emotional Awareness and Mental Health mHealth intervention: A qualitative program evaluation.
- Sloan, M., Bosley, M., Blane, M., Holloway, L., Barrere, C., D'Criz, D., Waila, C., Naughton, F., Howard, P., Sutton, S., & Gordon, C. (2021). "But you don't look sick": A qualitative analysis of the LUPUS UK online forum. *Rheumatology International*, *41*(4), 721–732.  
<https://doi.org/10.1007/s00296-020-04726-x>

- Smith, L. E., Potts, H. W. W., Amlôt, R., Fear, N. T., Michie, S., & Rubin, G. J. (2022). Tiered restrictions for COVID-19 in England: Knowledge, motivation and self-reported behaviour. *Public Health*, *204*, 33–39. <https://doi.org/10.1016/j.puhe.2021.12.016>
- Sommerlad, A., Marston, L., Huntley, J., Livingston, G., Lewis, G., Steptoe, A., & Fancourt, D. (2021). Social relationships and depression during COVID-19 lockdown: Longitudinal analysis of the COVID-19 Social Study. *Psychological Medicine*, 1–10. <https://doi.org/10.1017/S0033291721000039>
- Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A Brief Measure for Assessing Generalized Anxiety Disorder: The GAD-7. *Archives of Internal Medicine*, *166*(10), 1092–1097. <https://doi.org/10.1001/archinte.166.10.1092>
- Stana, A., & Miller, A. R. (2019). “Being a mom = having all the feels”: Social support in a postpartum depression online support group. *Atlantic Journal of Communication*, *27*(5), 297–310. <https://doi.org/10.1080/15456870.2019.1616736>
- Starace, F., & Ferrara, M. (2020). COVID-19 disease emergency operational instructions for mental health departments issued by the Italian society of epidemiological psychiatry. *Epidemiology and Psychiatric Sciences*, *29*, 116–119. <https://doi.org/10.1017/S2045796020000372>
- Steele, L., Dewa, C., & Lee, K. (2007). Socioeconomic Status and Self-Reported Barriers to Mental Health Service Use. *The Canadian Journal of Psychiatry*, *52*(3), 201–206. <https://doi.org/10.1177/070674370705200312>
- Stein, A., Pearson, R. M., Goodman, S. H., Rapa, E., Rahman, A., McCallum, M., Howard, L. M., & Pariante, C. M. (2014). Effects of perinatal mental disorders on the fetus and child.

- The Lancet*, 384(9956), 1800–1819. [https://doi-org.uml.idm.oclc.org/10.1016/S0140-6736\(14\)61277-0](https://doi-org.uml.idm.oclc.org/10.1016/S0140-6736(14)61277-0)
- Strange, C., Bennett, E., Tait, M., & Hauck, Y. (2019). A qualitative evaluation of Young Parents Program (YPP) – parent and facilitator perspectives. *Health Promotion Journal of Australia*, 30(3), 402–412. <https://doi.org/10.1002/hpja.228>
- Strange, C., Bremner, A., Fisher, C., Howat, P., & Wood, L. (2015). Mothers' group participation: Associations with social capital, social support, and well-being. *Journal of Advanced Nursing*, 72(1), 85–98.
- Sufredini, F., Catling, C., Zugai, J., & Chang, S. (2022). The effects of social support on depression and anxiety in the perinatal period: A mixed-methods systematic review. *Journal of Affective Disorders*, 318, 119–141. <https://doi.org/10.1016/j.jad.2022.09.005>
- Szkody, E., Stearns, M., Stanhope, L., & McKinney, C. (2021). Stress-Buffering Role of Social Support during COVID-19. *Family Process*, 60(3), 1002–1015. <https://doi.org/10.1111/famp.12618>
- Tabachniak, B., & Fidell, L. (2007) *Using multivariate statistics* (5<sup>th</sup> ed.). Boston, Mass.: Pearson Education, Inc.
- Takagaki, K., Yokoyama, S., & Kambara, K. (2021). Do Self-Compassion Factors Affect Value-Based Behavior Promotion for Adolescents? The Context of Behavioral Activation. *Frontiers in Psychology*, 12. <https://www.frontiersin.org/articles/10.3389/fpsyg.2021.566181>
- Taylor, S. E. (2011). Social support: A review. In H. S. Friedman (Ed.), *The Oxford handbook of health psychology* (pp. 189–214). Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780195342819.013.0009>

- Teaford, D., McNiesh, S., & Goyal, D. (2019). New Mothers' Experiences with Online Postpartum Forums. *MCN: The American Journal of Maternal/Child Nursing*, 44(1), 40. <https://doi.org/10.1097/NMC.0000000000000489>
- Terry, M. L., & Leary, M. R. (2011). Self-compassion, self-regulation, and health. *Self and Identity*, 10(3), 352–362. <https://doi.org/10.1080/15298868.2011.558404>
- Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 9(1), 78–108. <https://doi.org/10.1186/1479-5868-9-78>
- Tomfohr-Madsen, L. M., Racine, N., Giesbrecht, G. F., Lebel, C., & Madigan, S. (2021). Depression and anxiety in pregnancy during COVID-19: A rapid review and meta-analysis. *Psychiatry Research*, 300, 113912. <https://doi.org/10.1016/j.psychres.2021.113912>
- Trifu, S., Vladuti, A., & Popescu, A. (2019). The neuroendocrinological aspects of pregnancy and postpartum depression. *Acta Endocrinologica (Bucharest)*, 15(3), 410–415. <https://doi.org/10.4183/aeb.2019.410>
- Tulli, M., Salami, B., Begashaw, L., Meherali, S., Yohani, S., & Hegadoren, K. (2020). Immigrant Mothers' Perspectives of Barriers and Facilitators in Accessing Mental Health Care for Their Children. *Journal of Transcultural Nursing*, 31(6), 598–605. <https://doi.org/10.1177/1043659620902812>
- Ugarriza, D. N., Douchand Brown, S. E., & Chang-Martinez, C. (2007). Anglo-American mothers and the prevention of postpartum depression. *Issues in Mental Health Nursing*, 28(7), 781–798. <https://doi.org/10.1080/01612840701413624>

- Viveiros, C. J., & Darling, E. K. (2018). Barriers and facilitators of accessing perinatal mental health services: The perspectives of women receiving continuity of care midwifery. *Midwifery*, *65*, 8–15. <https://doi.org/10.1016/j.midw.2018.06.018>
- Xie, R., He, G., Koszycki, D., Walker, M., & Wen, S. (2009). Prenatal social support, postnatal social support, and postpartum depression. *Annals of Epidemiology*, *19*(9), 637–643. <https://doi.org/10.1016/j.annepidem.2009.03.008>
- Wagg, A., Callanan, M., & Hassett, A. (2019). Online social support group use by breastfeeding mothers: A content analysis. *Heliyon*, *5*(3). <https://doi.org/10.1016/j.heliyon.2019.e01245>
- Wang, J. L. (2004). The difference between single and married mothers in the 12-month prevalence of major depressive syndrome, associated factors and mental health service utilization. *Social Psychiatry and Psychiatric Epidemiology*, *39*(1), 26–32. <https://doi.org/10.1007/s00127-004-0699-7>
- Wang, J., Mann, F., Lloyd-Evans, B., Ma, R., & Johnson, S. (2018). Associations between loneliness and perceived social support and outcomes of mental health problems: A systematic review. *BMC Psychiatry*, *18*(156). <https://doi.org/10.1186/s12888-018-1736-5>
- Wang, P., & Yang, H. (2012). Using collaborative filtering to support college students' use of online forum for English learning. *Computers and Education*, *59*(2), 628–637. <https://doi.org/10.1016/j.compedu.2012.02.007>
- Wilson, J., Weiss, A., & Shook, N. (2020). Mindfulness, self-compassion and savoring: Factors that explain the relation between perceived social support and well-being. *Personality and Individual Differences*, *152*, 109568–109577. <https://doi.org/10.1016/j.paid.2019.109568>

- Wells, A., & Carter, K. (1999). Preliminary tests of a cognitive model of generalized anxiety disorder. *Behaviour Research and Therapy*, 37(6), 585–594.  
[https://doi.org/10.1016/S0005-7967\(98\)00156-9](https://doi.org/10.1016/S0005-7967(98)00156-9)
- Woody, C. A., Ferrari, A. J., Siskind, D. J., Whiteford, H. A., & Harris, M. G. (2017). A systematic review and meta-regression of the prevalence and incidence of perinatal depression. *Journal of Affective Disorders*, 219, 86–92.  
<https://doi.org/10.1016/j.jad.2017.05.003>
- World Health Organization. (2008). WHO technical consultation on postnatal and postpartum care. Retrieved from [https://apps.who.int/iris/bitstream/handle/10665/70432/WHO\\_MPS\\_10.03\\_eng.pdf;sequence=1](https://apps.who.int/iris/bitstream/handle/10665/70432/WHO_MPS_10.03_eng.pdf;sequence=1)
- Zanardo, V., Manghina, V., Giliberti, L., Vettore, M., Severino, L., & Straface, G. (2020). Psychological impact of COVID-19 quarantine measures in northeastern Italy on mothers in the immediate postpartum period. *Gynecology & Obstetrics*, 150(2), 184–188.  
<https://doi.org/10.1002/ijgo.13249>
- Zessin, U., Dickhäuser, O., & Garbade, S. (2015). The relationship between self-compassion and well-being: A meta-analysis. *Applied Psychology: Health and Well-Being*, 7(3), 340–364.  
<https://doi.org/10.1111/aphw.120>

**Table 1.** *Participant Demographics*

<b>Baseline characteristics</b>	<b>BEAM (<i>n</i> = 70)</b>
Number of children (%)	
1	41.4
2	32.9
3+	25.7
Age of child (months; M, SD) †	27.36, 8.12
Maternal Age (M, SD)	32.17, 4.85
Household income (%)	
> \$90,001 CAD	38.6
\$60,001 – 90,000 CAD	18.6
\$30,001 – 60,000 CAD	11.4
< \$30,000 CAD	24.3
Missing	7.1
Racial Background (%)	
White	68.6
Indigenous	21.4
Other	9.9
Education (%)	
Less than high school	5.71
High school	17.14
College/Technical school	31.43
Bachelor's degree	32.86
Graduate or professional degree	12.86
Marital Status (%)	
Married/Common Law	74.3
Divorced/Separated	7.2
Single	18.6
Employment status (%)	
On leave	15.7
Unemployed	34.3
Part or full-time work	50.0
Community Type (%)	
Large city/Suburb	60.0
Town or small city	24.6
Rural area	14.5

*Note.* M = Mean. SD = Standard Deviation. CAD = Canadian Dollar.

† Child refers to child that is participating in BEAM

**Table 2.** *Demographics and Forum Engagement Correlations*

Measure	1	2	3	4	5	6	7	8	9
1. Maternal Age	-								
2. # of adults in home	.081	-							
3. # of children	-.083	.082	-						
4. Maternal Education	<b>.344**</b>	<b>.391**</b>	-.099	-					
5. Household income	<b>.338**</b>	<b>.440**</b>	-.140	<b>.555**</b>	-				
6. Marital status	-.098	.199	.001	.111	<b>.400**</b>	-			
7. Maternal employment	-.208	-.134	.137	<b>.332**</b>	<b>.407**</b>	.163	-		
8. Time on forum	<b>.245*</b>	<b>.257*</b>	.081	<b>.267*</b>	<b>.427**</b>	.190	.057	-	
9. # posts on forum	.161	<b>.271*</b>	.180	.148	<b>.419**</b>	.260	.033	<b>.817**</b>	-

*Note:* \* $p \leq .05$ , \*\* $p \leq .01$ .

**Table 3.** *Pre-Intervention Mental Health and Forum Engagement Correlations*

Measure	1	2	3	4	5
1. Depression	-				
2. Anxiety	<b>.482**</b>	-			
3. Self-Compassion	<b>-.289*</b>	<b>-.356**</b>	-		
4. Time on forum	-.131	-.102	-.146	-	
5. # posts on forum	-.109	-.086	-.108	<b>.817**</b>	-

*Note:* \* $p \leq .05$ , \*\* $p \leq .01$

**Table 4.** *Linear Regression Models for Change in Mental Health Pre- to Post-Intervention*

	$\beta$	<i>SE</i>	<i>t</i>	<i>p</i>
<i>Depression</i>				
Time Spent on Forum	-.467	.470	-.992	.326
Number of Posts	-.246	.475	-.519	.606
<i>Anxiety</i>				
Time Spent on Forum	-.912	.535	-1.704	.094
Number of Posts	-.468	.548	-.855	.397
<i>Self-Compassion</i>				
Time Spent on Forum	.182	.749	.243	.809
Number of Posts	.077	.751	.103	.918

Figure 1. Core Components of the BEAM Program

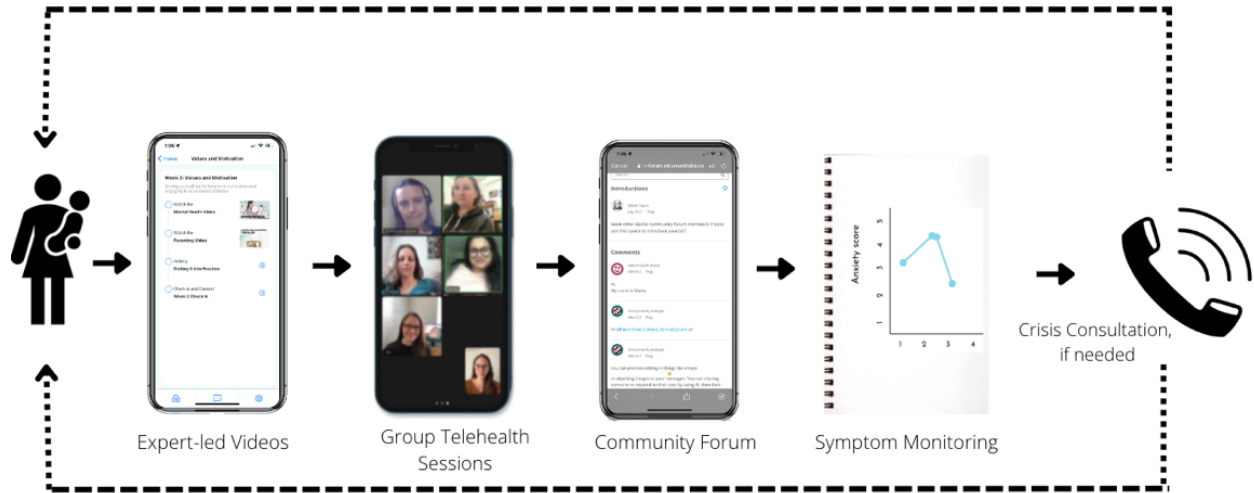
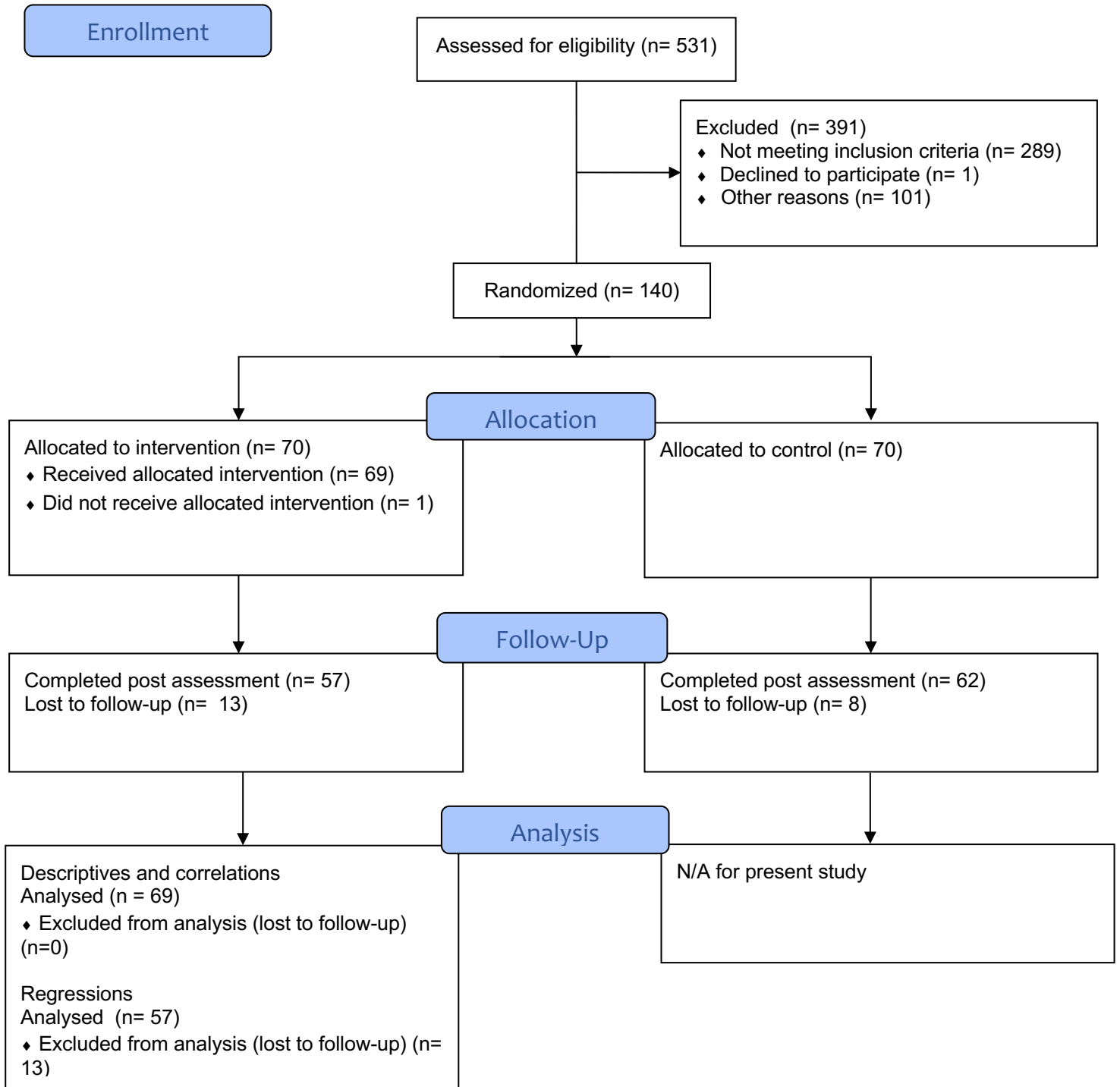


Figure 2. Visuals of the BEAM Forum

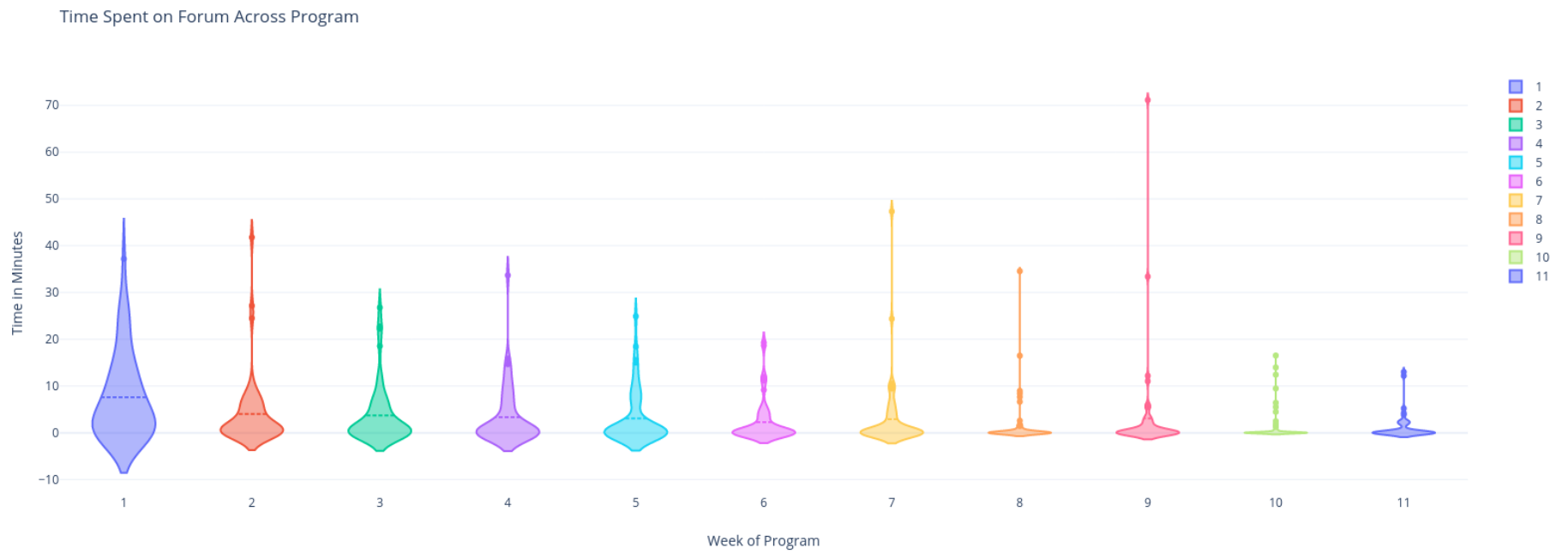
The screenshot shows the top navigation bar in blue with a hamburger menu icon on the left and a user profile icon on the right. Below the bar, the breadcrumb "HOME > SOCIAL SUPPORT" is visible. A search bar with a magnifying glass icon is present. The main content area features a post titled "Indoor high energy activities" with a star and gear icon. The post is by user "lara.penner-goeke@umanitoba.ca" and is dated "February 16". The text of the post asks for indoor activity ideas for young children. At the bottom, there is a "Leave a Comment" section with a rich text editor (including bold, italic, link, and image icons) and a text input field. Below the input field are "Preview" and "Post Comment" buttons.

The screenshot shows a forum thread titled "Daycare" with a star and gear icon. The post is by a user with a profile picture and a redacted name, dated "August 17". The text discusses the user's thoughts on daycare and breastfeeding. Below the post is a "Comments" section with a gear icon. A comment is by user "parentcoach\_noelle" and dated "August 17". The comment shares an experience with daycare and offers advice. The thread continues with a question about home daycare and a final paragraph about breastfeeding at daycares.

**Figure 3.** Participant CONSORT Flow Diagram

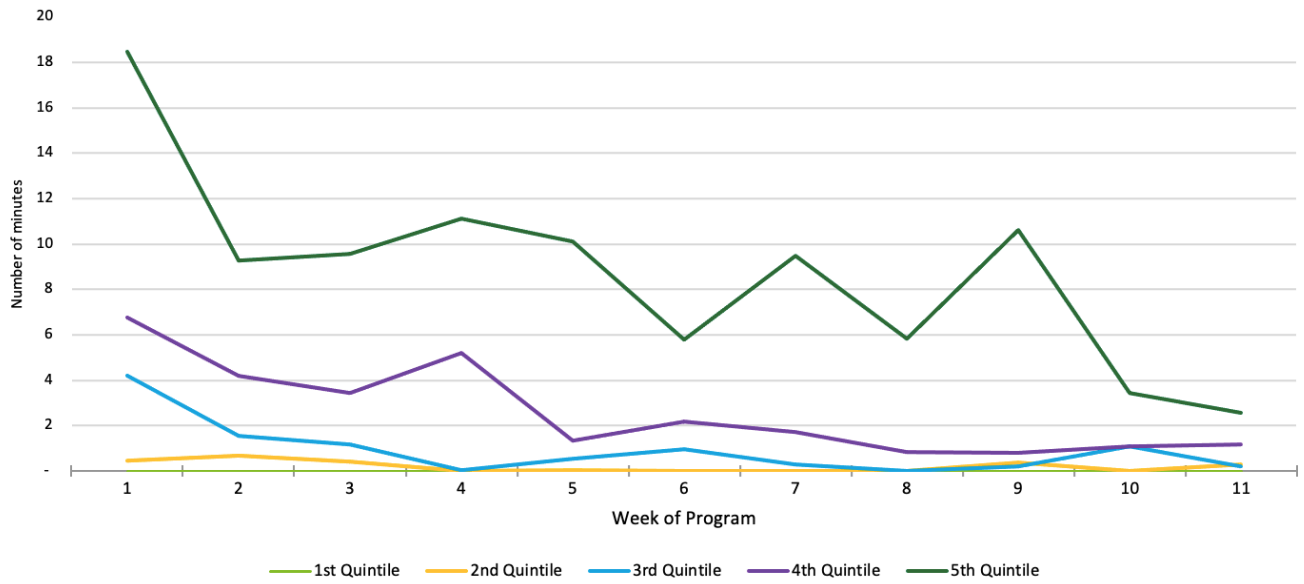


**Figure 4.** *Violin Plot of Forum Engagement*

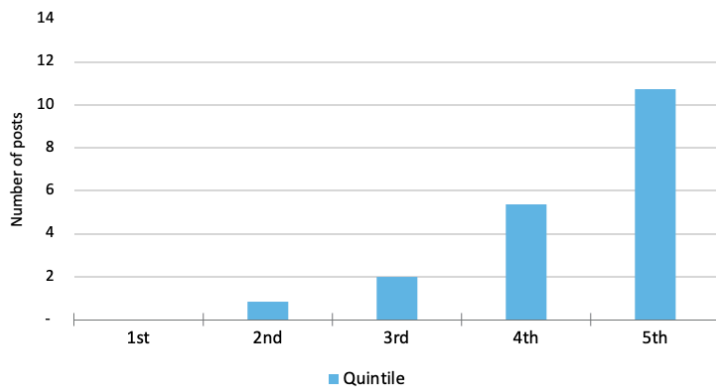


**Figure 5.** *Forum Engagement by Quintile Group*

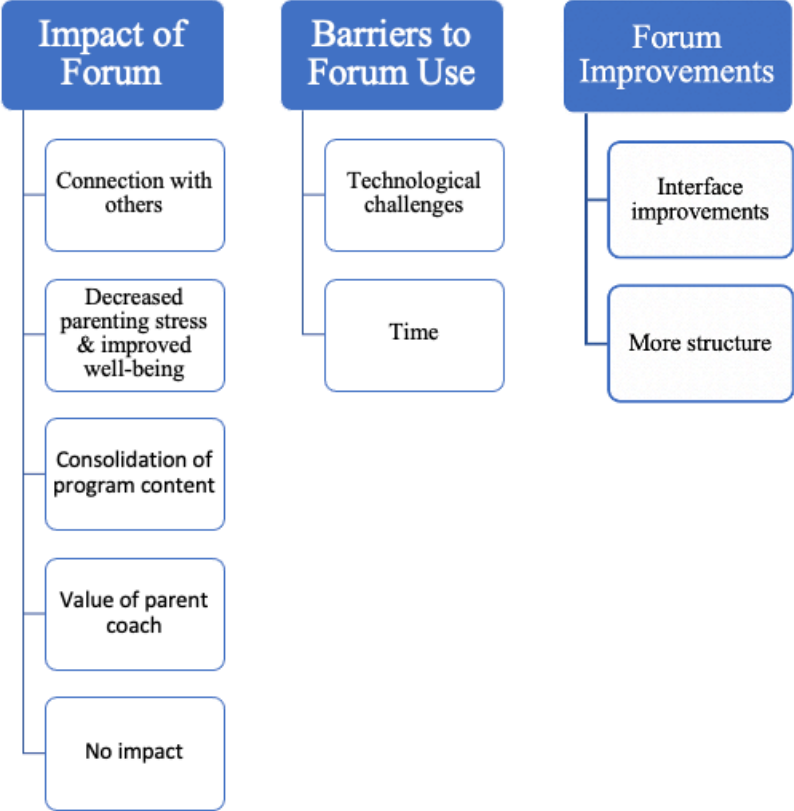
**Time Spent on Forum Across Program**



**Average Posts Across Program**



**Figure 6.** *Map of Themes from Post-intervention Qualitative Responses*



**Appendix A. Sociodemographic Questionnaire****What is your household size (on a regular basis)?:**

# of Adults: \_\_\_\_\_

# of Children: \_\_\_\_\_

Age of your first child?: \_\_\_\_\_

Your age?: \_\_\_\_\_

**What is your legal marital status?**

- a) Married/Common Law
- b) Widowed
- c) Divorced
- d) Single (never married)
- e) Separated
- f) Prefer not to answer

**What is your highest education level?**

- a) Some high-school
- b) High-school diploma
- c) College/technical school
- d) Bachelors Degree
- e) Masters Degree
- f) Professional Degree
- g) PhD
- h) Prefer not to answer

**Which of the following categories best describes your household annual income:**

- a) \$1 - \$10,000
- b) \$10,001 - \$20,000
- c) \$20,001 - \$30,000
- d) \$30,001 - \$40,000
- e) \$40,001 - \$50,000
- f) \$50,001 - \$60,000
- g) \$60,001 - \$70,000
- h) \$70,001 - \$80,000
- i) \$80,001 - \$90,000
- j) \$90,001 - \$100,000
- k) \$100,000+
- l) Prefer not to answer

**What is your current employment status?**

- a) Full-time
- b) Part-time
- c) On some type of leave
- d) Not employed
- e) Prefer not to answer

**What type of community do you live in?**

- a) Large city
- b) Suburb near a large city
- c) Town or small city
- d) Rural area
- e) Prefer not to answer

**Which of the following reflect your background? You may choose more than one.**

- Indigenous (First Nations, Métis, or Inuit)
- Latin American (e.g. Argentina, Mexico, Nicaragua)
- East Asian (e.g. China, Japan, Korea, Taiwan)
- Indo-Caribbean (e.g. Guyanese with origins in India)
- Black Caribbean
- South Asian (e.g. India, Sri Lanka, Pakistan)
- Middle Eastern (e.g. Egypt, Iran, Israel, Saudi Arabia)
- South East Asian (e.g. Vietnam, Malaysia, Philippines)
- White Canadian or White American
- White European (e.g. England, Greece, Sweden, Russia)
- Black Canadian or African-American
- Black African (e.g. Ghana, Kenya, Somalia)
- Other
- Prefer not to answer