

***eConnect*: Interactive Online Delivery of an Attachment-Based Group Intervention**

**by
Lin Bao**

M.A. (Psychology), Simon Fraser University, 2018

B.A. (Psychology and Economics, Hons.), McMaster University, 2011

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Declaration of Committee

Name: Lin Bao

Degree: Doctor of Philosophy (Psychology)

Title: **eConnect: Interactive Online Delivery of an Attachment-Based Group Intervention**

Committee: **Chair: Lara Aknin**
Professor, Psychology

Marlene Moretti
Supervisor
Professor, Psychology

Grace Iarocci
Committee Member
Professor, Psychology

Robert McMahon
Committee Member
Professor, Psychology

Kanna Hayashi
Examiner
Associate Professor, Health Sciences

Amanda Zayde
External Examiner
Assistant Professor, Psychiatry and Behavioral Sciences
Albert Einstein College of Medicine

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Abstract

Mental health problems are prevalent among adolescents and have significant consequences. Yet there continues to be a significant gap in mental health services for families in Canada, especially in rural and small communities. The COVID-19 pandemic increased the need for such services but created additional barriers for families across communities to access mental health services, particularly group-based interventions. *Connect*, an attachment-based, trauma-informed parenting group intervention, has been shown to be effective in improving the mental health and functioning of adolescents and parents and has been widely implemented in an in-person format in British Columbia (BC), Canada. The present study reports on the adaptation of *Connect* for a virtual delivery format (*eConnect*), as well as the implementation and evaluation of *eConnect* across communities in BC during the pandemic through a Theory of Change approach. Results supported the effectiveness of the implementation model. Facilitators and the implementation team successfully developed competency in *eConnect* delivery and reported positive views about their own and their agencies' readiness to continue to deliver the program. Their reports also supported the program's feasibility, acceptability, and sustainability in BC, Canada. Parents' pre- versus post-treatment reports showed significant reductions in internalizing and externalizing problems among their children, their children's attachment anxiety and avoidance, and the use of aggression in parent-child relationships. Improvements in caregiver strain and parental sense of competence were also observed but were smaller than anticipated from prior research, and the reduction in parental depressed mood was not significant. The attenuated and non-significant improvements in parental functioning may be due to the pandemic-related parental stress. While further research, particularly randomized controlled trials, is needed to further investigate the treatment effectiveness of *eConnect*, the present study provides encouraging evidence to support the continued implementation of *eConnect*. The implementation-science-informed approach to adaptation and implementation adopted in the present study also informs future efforts to introduce innovations into complex healthcare systems. Implications of the research findings and future research directions are discussed.

Keywords: attachment; parenting; intervention; adolescents; implementation; adaptation; intervention

Dedication

This dissertation is dedicated to my parents and husband for their unwavering support for my pursuit in clinical psychology.

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Chapter 1.

Introduction

1.1. Mental Health Problems Among Adolescents

Mental health problems are prevalent among adolescents (Georgiades et al., 2019; Merikangas et al., 2010). On average, one in five adolescents around the world experience clinical-level functional impairment associated with symptoms of a mental disorder (Georgiades et al., 2019; Merikangas et al., 2010; Polanczyk et al., 2015). Mental health problems among adolescents are associated with significant short-term and long-term costs for the individual themselves and society (Foster et al., 2005; Kessler, 2012; Malla et al., 2018; Pelham et al., 2007; Ramsawh et al., 2010). Thus, there is a pressing need to widely implement effective, evidence-based interventions designed to address mental health problems among adolescents.

1.2. Barriers to Accessing Mental Health Services

Despite efforts to systematically increase access to mental health services in Canada (Canadian Psychological Association & the Council of Professional Associations of Psychologists, 2022; Darcy, 2019), the gap between service provision and the need for mental health services for youth continues to exist (Comeau et al., 2019; Gorfinkel et al., 2023). A variety of factors have contributed to this mental health service gap, including system-level barriers (e.g., fragmented systems that are difficult to navigate, long wait times, insufficient funding), community-level barriers (e.g., lack of service availability, socioeconomic disadvantages), and individual-level barriers (e.g., stigma, mental health status; Cox, 2017; Kourgiantakis et al., 2023).

Families in rural or small communities often experience more difficulty accessing appropriate mental health services for youth locally (Comeau et al., 2019; Zayed et al., 2016), even though youth in rural or small communities experience similar or higher levels of mental health problems compared to youth in urban communities (Georgiades et al., 2019; Ghandour et al., 2019). A set of unique and complex contextual challenges led to the heightened difficulty in implementing and sustaining mental health services,

particularly specialized services, in rural and small communities, such as limited local resources and difficulty recruiting and retaining mental health professionals (Cox, 2017; Kourgiantakis et al., 2023). To increase service access in rural and small communities, healthcare providers have sometimes utilized a fly-in/fly-out or drive-in/drive-out strategy. However, this approach is rarely sustainable and poses significant mental health risks for healthcare workers (Hussain et al., 2015). Innovative technology in online health service delivery has garnered increasing attention as a viable and sustainable method to bridge the mental health service gap in rural and small communities (Moroz et al., 2020).

Additionally, the COVID-19 pandemic and associated public health guidelines posed exceptional challenges for mental health service delivery in urban and rural areas on a global scale. A World Health Organization (WHO) report found that mental health services were severely disrupted during the pandemic due to public health measures such as physical distancing and stay-at-home orders (World Health Organization, 2020). This happened at a time when the need for mental health services was exceptionally high, especially for families with adolescents (Fitzpatrick et al., 2020). Studies found that both parents and their children, especially adolescents, experienced higher levels of mental health problems during the COVID-19 pandemic (Jones et al., 2021; Nearchou et al., 2020; Panda et al., 2020). There were also more reports of familial violence and child maltreatment (Cappa & Jijon, 2021; Public Health Ontario, 2021). Notably, vulnerable adolescents, such as those with pre-existing mental health difficulties, were particularly susceptible to the negative impact of the pandemic (Guessoum et al., 2020). The heightened need for mental health services and significant barriers to in-person service delivery highlighted the critical need for online mental health services across communities to overcome the implementation barriers. This pushed service providers to swiftly adapt their services to an online delivery format (Strudwick et al., 2021).

1.3. The Promise of Online Parenting Interventions

Research has shown that manualized parenting interventions are effective in reducing mental health problems among children and adolescents (Högström et al., 2017; Medlow et al., 2016). However, akin to other mental health services, access to and utilization of effective, evidence-based parenting interventions are generally lacking. A survey of community-based organizations in Canada found that there are geographical gaps in access to parenting programs for parents of adolescents in Canada, particularly

in smaller cities and rural areas (Ruiz-Casares et al., 2015). Additionally, a parent survey in Canada showed that among the parents of school-aged children who consulted with a health professional about their children's behaviour, only 15% attended a parenting program, the majority of which were non-evidence-based programs (Lee et al., 2014). Similar to other mental health services, this gap between the demand and supply of evidence-based parenting interventions existed before the COVID-19 pandemic due to various system-, community-, and individual-level barriers (Lee et al., 2014; Ruiz-Casares et al., 2015; Whittaker & Cowley, 2012), and the gap was further exacerbated by the pandemic.

Providing parenting interventions online may overcome some of the implementation barriers, making parenting programs more accessible (Breitenstein et al., 2014; Hall & Bierman, 2015). This was even more crucial to the accessibility of such services during the pandemic. Results from past research on the effectiveness of online parenting interventions were promising (MacDonell & Prinz, 2017; Nieuwboer et al., 2013). One study that reviewed randomized controlled trials on web-based interventions targeting mental health problems among youth found that parent- or family-focused web-based interventions with varying levels of active parent involvement were generally effective in reducing internalizing and externalizing problems among youth from pre- to post-intervention (MacDonell & Prinz, 2017). Another meta-analysis reported medium effects across parent and child outcomes for web-based parenting interventions aimed at improving parenting competence (Nieuwboer et al., 2013). Notably, in both studies, very few interventions targeted parents of adolescents, even though there are unique parenting challenges during this developmental period (Kobak et al., 2017; MacDonell & Prinz, 2017; Nieuwboer et al., 2013). The few that did target the adolescent population often attempted to address a very specific mental health problem, such as anxiety and substance use disorders, rather than being broadly applicable to a range of mental health problems (MacDonell & Prinz, 2017; Nieuwboer et al., 2013). Even though the COVID-19 pandemic led to the rapid adoption of online service delivery, the gap between parents' service needs and their service utilization remained significant, and the choices of online evidence-based parenting interventions for parents of adolescents continued to be limited (Boldt et al., 2021; Gadermann et al., 2021; Ros-DeMarize et al., 2021). Thus, more research was needed to increase the accessibility of evidence-based

parenting interventions designed to address adolescent mental health problems via an online delivery format.

1.4. eConnect

Connect for Parents and Caregivers (*Connect*) is a 10-week, manualized, attachment-based, trauma-informed group intervention developed specifically for parents and caregivers of pre-adolescents and adolescents who struggle with significant mental health challenges, including both internalizing and externalizing problems (Moretti, 2020). It was designed to promote effective parenting and reduce problem behaviours among youth by strengthening the building blocks of secure attachment, including parental reflective functioning, parental sensitivity, shared partnership and mutuality, and dyadic affect regulation (Moretti et al., 2015). Different from interventions that focus on teaching parents behaviour management and principles, *Connect* focuses on fostering caregivers' empathic understanding of their children's attachment needs (Moretti et al., 2015). The group sessions include both didactic and experiential exercises such as role-plays and reflection exercises (Moretti, 2020). *Connect* has been shown to be efficacious in reducing adolescent internalizing and externalizing problems in waitlist control and randomized clinical trials (Moretti & Obsuth, 2009; Barone et al., 2021), and effective in reducing these problems up to two years after the intervention (Högström et al., 2017). It has also been broadly implemented in many countries, such as Canada, Sweden, Italy, the United States, and Australia. In British Columbia (BC), Canada, *Connect* is a well-established intervention widely implemented across school districts and child and youth mental health service agencies. There is an existing infrastructure in place that not only supports the ongoing provision of *Connect* groups in various regions of the province, but also supports the ongoing training of *Connect* facilitators that enhances the sustainability of the program. Nonetheless, before the pandemic, access to *Connect* in BC was limited in many regions, especially in rural communities and small towns. This was because in addition to the typical implementation challenges, rural and small communities in BC were often subject to challenges such as insufficient number of parents in the community to form a group of adequate size, and a lack of trained *Connect* facilitators at the local mental health agencies. During the pandemic, due to the public health guidelines, in-person *Connect* groups were halted across communities in BC, even though the demand for *Connect* was high. To overcome these challenges and ensure that the

intervention could remain accessible to families across the province, there was a particularly strong and urgent demand to implement *Connect* online.

In the existing literature, the web-based delivery modalities for parenting interventions included self-directed online modules with or without asynchronous practitioner support, as well as online chatrooms, online discussion boards, and videoconferencing (Breitenstein et al., 2014; Hall & Bierman, 2015). Among them, videoconferencing appeared to be best suited to deliver *Connect* online, given the program's focus on experiential activities and emotion-focused learning. Specifically, *Connect* utilizes emotionally evocative learning experiences tailored to the specific needs of parents in the group to promote changes in parents' understanding of their children and themselves and changes in their parenting behaviours. These emotionally engaged activities and interactions are key treatment ingredients of *Connect*, and videoconferencing could better provide a context for this type of emotional engagement to happen in real-time, compared to other online modalities (e.g., online chatroom, self-directed online modules). The real-time verbal and nonverbal communication between group facilitators and parents is also important because it could allow group facilitators to demonstrate the building blocks of attachment security in their relationships with the parents over the course of ten weeks, in parallel with the parents' attempts to engage in similar processes in their relationships with their children outside of the sessions. Specifically, group facilitators could demonstrate sensitivity by being sensitive and responsive to the needs of each parent and the needs of the group. They could demonstrate reflective functioning by reflecting on parents' input and behaviours, as well as guiding them in reflecting on their children and their own thoughts, behaviours, and emotions. They could also demonstrate partnership by building an equal partnership with the parents, sharing their own thoughts and emotions as well as giving parents the space and time to share their thoughts and emotions. Additionally, they could demonstrate affect regulation by modelling emotion regulation during the role-plays, regulating the emotional climate in the group, and supporting parents in managing the difficult emotions they experience. Furthermore, videoconferencing would offer parents the opportunity to interact with each other in real-time, allowing important group processes to occur, similar to in-person groups (Moretti et al., 2015).

The decision to adopt a videoconferencing platform for online delivery of *Connect* was also supported by a recent meta-analysis of home-based videoconferencing support

groups found that participants in these educational and/or social-support-focused online groups reported high levels of bonding and cohesiveness, and participants were also able to convey and receive empathic support from other group members (Banbury et al., 2018). Another review of group-based interventions for adults (including therapy, support groups, skills training, and psychoeducational programs) reported comparable participant satisfaction with the intervention between the videoconferencing and in-person conditions (Gentry et al., 2018). Even though some studies reported slightly lower therapeutic alliance and group cohesion in the videoconferencing groups than in the in-person groups, the ratings were all in the high range, and these differences did not predict differences in intervention outcomes (Gentry et al., 2018). Moreover, the presence of group facilitators and the regularly scheduled group sessions may lead to a higher level of consistency in parents' engagement with the program throughout the course of the treatment, compared to other fully or partially self-guided online delivery modalities (MacDonell & Prinz, 2017). This could then translate into better treatment outcomes (Alberts et al., 2018; Baggett et al., 2017). Past research suggested that guided interventions had lower attrition rates than unguided interventions (Bennett et al., 2020), and more practitioner support helped to increase parents' level of engagement with online programs (Day & Sanders, 2018). Additionally, in studies of behavioural management programs for parents of young children, similar or higher completion rates were reported for parents in the videoconferencing group compared to those in the in-person group (Comer et al., 2017; Kirkman et al., 2016; Tse et al., 2015). Due to these considerations, *eConnect*, the online adaptation of *Connect*, used videoconferencing as the program delivery format.

As the goal of the adaptation was to overcome barriers that prevented attendance in in-person groups, the adaptation focused on modifications of how the program was delivered to address challenges posed by the videoconferencing delivery format rather than modifications to the program content (Castro et al., 2004).

1.5. Scientific Approach to Program Adaptation and Implementation

To enhance *eConnect's* sustainability beyond the scope of the current research project and the pandemic, a co-creation approach was adopted (Ghate, 2016; Goodyear-Smith et al., 2015; Olswang & Prelock, 2015). This approach requires that

researchers partner with practitioners throughout the development and implementation of an intervention, using practitioner experience and knowledge to inform research, thus maximizing the fit between the intervention and the real-world implementation context (Ghate, 2016). This co-creation approach was also shown to be not only effective in enhancing the quality of research but also effective in creating sustainable changes in service delivery (Morgan et al., 2014).

To implement *eConnect* effectively and efficiently, a Theory of Change (ToC) approach was adopted. This approach requires a ToC (i.e., a theory of how and why the specific initiative is expected to bring about the desired changes) to be developed to guide the implementation and evaluation processes (Breuer et al., 2016; Weiss, 1995). ToC has previously been utilized in the development and evaluation of several public health interventions in Canada and around the globe (Breuer et al., 2016; President of the Treasury Board, 2012). It highlights the role of context by attempting to identify and address contextual barriers to implementation as the first step of implementation planning (Mackenzie & Blamey, 2005), and by encouraging researchers to actively consider changes in context that are needed for the initiative to succeed (Proctor et al., 2011). It also helps to improve the transparency of the implementation process, making it easier to evaluate the progress and success of the project (Breuer et al., 2016).

1.6. Research Project Goals

In brief, the present research project aimed to develop an innovative online group intervention, *eConnect*, for families with youth aged 8-18 who struggled with mental health challenges and then implement and evaluate the intervention in BC, Canada. This was accomplished via two studies.

1.6.1. Study 1

Study 1 focused on the development of *eConnect*. This involved adapting *Connect* for a videoconferencing delivery format using a co-creation approach and testing the program's feasibility and acceptability via a pilot group in BC.

I hypothesized that by working with practitioners who were knowledgeable about *Connect* and the BC healthcare system in the adaptation process, the pilot *eConnect*

group could run successfully with a high program completion rate, and the program would be received positively by parents. I also hypothesized that pre- to post-treatment improvements in youth mental health, parent-child relationship, and parental functioning, as reported for in-person *Connect* in prior research, could be observed in the parent reports from the pilot group.

1.6.2. Study 2

Study 2 focused on the broader implementation and evaluation of *eConnect* in BC. This study began with the development of a ToC to guide the implementation and evaluation of *eConnect*. This was in collaboration with the core *Connect* implementation team in BC, consistent with a co-creation approach. The effectiveness of the implementation model would be evaluated using a set of implementation outcome measures, and the effectiveness of the intervention would be evaluated using a set of treatment outcome measures (Banbury et al., 2018; Proctor et al., 2011).

For implementation outcomes, I hypothesized that *eConnect* could be successfully implemented across communities in BC with a high program completion rate, and it would be received positively by the parents. I also hypothesized that the implementation model would be effective in preparing service providers and their agencies to deliver the *eConnect* program, and lead service providers to experience the program as feasible, acceptable, and sustainable to implement in BC (Proctor et al., 2011).

For treatment outcomes, I hypothesized that *eConnect* would lead to significant decreases in internalizing problems and externalizing problems among the children of the parents who attended *eConnect* groups. I hypothesized that *eConnect* would lead to significant improvements in parent-child relationship and interaction, as indicated by decreases in youth attachment anxiety and avoidance and parent-child aggression. I also hypothesized that *eConnect* would lead to significant improvements in parents' functioning, as indicated by an increase in parental sense of competence and decreases in caregiver strains and parental depressed mood.

Chapter 2.

Study 1

2.1. Methods

2.1.1. Procedures

eConnect Development

In BC, the core team responsible for the implementation of the *Connect* program, *Connect* Attachment Programs team (CAP team), is located at Maples Adolescent Treatment Centre (Maples) and operates under the Ministry of Children and Family Development). The CAP team delivers both the training and supervision of community agency staff across the province who are interested in or involved in the implementation of *Connect*. Thus, the CAP team holds special expertise about the intervention as well as the challenges of implementing it in a real-world setting, including those in both urban and rural communities. Given their experience, expertise, and the critical roles they play in the implementation and promotion of *Connect*, I partnered with them to develop *eConnect* in accordance with a co-creation approach.

The development of *eConnect* started before the COVID-19 pandemic, and the program design shifted midway to accommodate pandemic-related restrictions. The initial conceptualization of *eConnect* involved groups of parents meeting at local community centres and joining the group online with the support of a local coordinator at each community centre. We completed two test runs of this model at Maples to identify unanticipated factors that could negatively influence the group experience. During this process, the need for a tech facilitator to support the running of the group was identified. Based on the test runs and discussions thereafter, and in consultation with the best practice guidelines for videoconferencing-based mental health services (American Telemedicine Association, 2009; BC Telehealth (Mental Health) Guidelines Committee, 2014; Chang et al., 2016), a set of modifications to be made to *Connect* was identified. I summarized the modifications using the Framework for Reporting Adaptations and Modifications-Enhanced (FRAME; Stirman et al., 2019) and shared the summary with the CAP team to invite further feedback. Soon after, the COVID-19 pandemic began.

Through extensive discussions, the program design was adjusted to remove in-person components, allowing all parents and facilitators to join online from separate locations. Of note, the final program design retained the use of a tech facilitator, allowing the two group facilitators to focus on facilitating group processes and discussions while sensitively attuning and responding to parents' affect. The role of the local coordinator was eliminated as no in-person group gathering would occur.

With the updated design, 10 mock runs of *eConnect* sessions were conducted, with one member of the CAP team and one member of the research team as the group facilitators, and I as the tech facilitator for the group. Service providers in BC and other provinces with and without prior experience in *Connect* were invited to act as parents in these mock sessions. Additionally, national and international experts on *Connect* were invited to participate in the mock sessions as silent observers. The facilitators, participants of the group sessions, and the silent observers were invited to openly share their experiences as a group at the end of each mock session, and additional modifications were made as appropriate based on the feedback. A guide for the *eConnect* program was created as an adjunct to the *Connect* treatment manual for *eConnect* facilitators. Additional program materials were created to support the promotion and operation of *eConnect* groups (e.g., checklist for facilitator setup, handouts for parents, tech handbook). The summary of modifications was updated at each stage to document all aspects of modifications made to *Connect* to create *eConnect*.

Pilot Group

Procedures

To assess *eConnect*'s feasibility and acceptability, a pilot group was completed in BC, with two members of the CAP team as group facilitators and me as the tech facilitator. The group ran for 10 weeks from July 2020 to September 2020. To ensure program fidelity, group sessions were recorded with consent from the parents and the facilitators. Each recorded session was reviewed by Dr. Marlene Moretti, the program developer of *Connect*. The three facilitators completed weekly supervision sessions with Dr. Moretti to ensure treatment adherence. Challenges and experiences in running the group were discussed amongst the CAP team during weekly clinical meetings. The

summary of modifications and relevant program materials were updated as appropriate based on group experience and post-group team discussions.

Parents of teens with emotional or behavioural problems were referred to the pilot *eConnect* group through Maples and other community mental health agencies. Nine parents from six families took part in the group. During the pre-group welcome to *eConnect* session with parents from each household, I introduced the research study to the parents and answered their questions. Research consent forms were made available to the parents who wished to participate in the study. Parents who consented to take part in the study were invited to complete a research questionnaire before session 1 of the group (Pre-group; T1) and within 40 days after the group's completion (Post-group; T2). When two parents from the same household participated in the group, only one chose to participate in the study. All self-report measures were completed online using the Qualtrics platform. At each time point, parents who completed or partially completed the questionnaire received a \$25 honorarium in the form of an e-gift card of their choice via email.

All research protocols and procedures received approval from [blinded for review] University Office of Research Ethics (#2011s0284).

2.1.2. Participants

Six parents from the pilot group consented and participated in the study (all female; Mean age = 44.5; 5 birth parents, 1 kinship caregiver; 5 completed both T1 and T2, 1 T1 only). Most parents endorsed white ethnicity (3 white, 1 Asian, 2 endorsed both white and indigenous). Annual family income was \$50,000 or lower for two families. Parents' education ranged from some high school to Master's degree. They resided in large (4), medium (1), and small (1) urban centres (Statistics Canada, 2018). On average, they were taking care of 1.5 children at home. Before the *eConnect* group, all parents were at least somewhat familiar with videoconferencing (2 somewhat, 2 moderately, 2 extremely).

Parents reported on their children's age ($M = 14.3$) and gender (5 female, 1 male; Coded from self-reports of gender identification). Youth ethnicity composition was the same as the parents. All were living with birth parents.

2.1.3. Measures

Previously validated measures were adapted based on *eConnect*'s program characteristics to assess the program's feasibility and acceptability, consistent with the recommended assessment approach for implementation research (Smith et al., 2020). Due to the small sample size, adapted measures were only interpreted on an item level, and the reliability of the measures was not assessed in Study 1.

Videoconferencing Experience Questionnaire – Parent Version (VEQ-P)

The VEQ-P is an 11-item self-report questionnaire administered at T2 and adapted from the Telehealth Usability Questionnaire (TUQ; Parmanto et al., 2016). The TUQ, developed to examine the usability of telehealth platforms, was shown to have good content validity and internal consistency. Adapted from the TUQ's Interface Quality, Interaction Quality, Reliability, and Ease of Use and Learnability subscales, VEQ-P was created to assess parents' experience using a videoconferencing platform during their *eConnect* group (e.g., "I felt comfortable with the videoconferencing group format"). Each item was rated on a 7-point scale (1 "Strongly disagree"; 7 "Strongly agree").

Parental Program Acceptability Questionnaire (PPAQ)

The PPAQ used for the pilot group was a 4-item self-report questionnaire administered at T2. Adapted from TUQ's Satisfaction and Future Use subscale (Parmanto et al., 2016), the PPAQ was created to measure the acceptability of *eConnect* for parents who attended the group by assessing both their satisfaction with the program and their willingness to recommend it to others (e.g., "I would recommend the Connect program to other families"). Each item was rated on a 7-point scale (1 "Strongly disagree"; 7 "Strongly agree").

Technical Challenge Questionnaire – Parent Version (TCQ-P)

The TCQ-P is a 7-item self-report questionnaire developed for *eConnect* and administered at T2. Parents were asked to rate the frequency of technical challenges they experienced during *eConnect* (1 item). They were also asked to rate the impact these challenges had on their ability, motivation, and willingness to participate in the

group (6 items; rated on a 5-point scale: 0 “Not at all” to 4 “To an extremely large extent”).

Caregiver Attendance Form

After the last group session, the attendance form was obtained from the facilitators and coded for research purposes. Only the attendance of parents who consented to participate in the research study was coded. The attendance rate was calculated based on parents’ attendance across the nine core sessions that introduced the nine attachment principles. Parents were considered to have completed the program if they attended 70% of the sessions or more (i.e., 6 or more sessions).

Brief Child and Family Phone Interview (BCFPI)

The BCFPI is a 36-item standardized self-report measure that assesses emotional and behaviour problems among children and adolescents referred for mental health services, as rated by the parents (Cunningham et al., 2000). It has been shown to have fair to excellent criterion validity (Andersson et al., 2018), good test-retest reliability (Boyle et al., 2009), acceptable internal consistency, and good concurrent validity (Cook et al., 2013) in screening for major psychiatric disorders. Externalizing Problems composite scores were generated based on the Regulation of Attention (ADHD) subscale (e.g., “fails to finish things they start”), Cooperativeness (ODD) subscale (e.g., “argues a lot with adults”), and Conduct Problems (CD) subscale (e.g., “steal things at home”). Internalizing Problems composite scores were generated based on the Separation Anxiety (SAD) subscale (e.g., “worries that bad things will happen to loved ones”), Managing Anxiety (GAD) subscale (e.g., “worries about doing better at things”), Managing Mood (MDD) subscale (e.g., “has no interest in their usual activities”). Parents rated the frequency of their children’s behaviours within the past 6 months at T1 and the past 2 weeks at T2. BCFPI also includes 6 items that assess parental depressed mood (e.g., “you felt depressed”) within the past 2 weeks. T-scores were used in the current study.

Parenting Sense of Competence Scale (PSOC)

The PSOC is a 17-item self-report measure that assesses parents’ sense of competence in their parenting (Johnston & Mash, 1989). It was shown to have good content validity and internal consistency (Ohan et al., 2000) and it is one of the most

frequently utilized tools in parenting assessment (Jones & Prinz, 2005). Two subscales could be derived: Parental Sense of Satisfaction (e.g., “being a parent makes me tense and anxious”) and Parental Sense of Efficacy (e.g., “Being a parent is manageable, and any problems are easily solved”). Parents rated their agreement with each item on a 6-point scale (1 “Strongly disagree”; 6 “Strongly agree”) based on the past 6 months at T1 and the past 2 weeks at T2.

Caregiver Strain Questionnaire (CGSQ)

The CGSQ is a 21-item self-report measure that assesses perceived strains experienced by parents of youth with mental health problems (Brannan et al., 1997). It has been shown to have good internal consistency and convergent validity (Brannan et al., 1997). Three subscales could be derived: Objective Strain (e.g., missing work, financial strain), Subjective Externalizing Strain (e.g., anger, embarrassment), and Subjective Internalizing Strain (e.g., anxiety, fatigue). Parents rated their agreement with each item on a 5-point scale (1 “Not at all”; 5 “Very much”) based on the past 6 months at T1 and the past 2 weeks at T2.

Revised Conflict Tactic Scale (CTS2)

The CTS2 is a 44-item self-report measure widely used to assess violence and aggression within relationships (Straus et al., 1996). It has been shown to have good internal consistency, contrast validity, and discriminant validity (Straus et al., 1996). Two subscales were adapted to measure aggression from parents to youth and from youth to parents: Physical Aggression (7 items; e.g., “slapped”) and Psychological Aggression (9 items; e.g., “said something to spite”). A Total Aggression score was calculated as the mean of the two subscale scores. Parents rated the frequency of the behaviours on a 4-point scale (1 “Never”; 4 “Always”) over the past 6 months at T1 and the past 2 weeks at T2.

Adolescent Attachment Anxiety and Avoidance Inventory (AAAI)

The AAAI is a 16-item self-report measure adapted from the Experiences in Close Relationships (ECR) scale (Brennan et al., 1998). It measures the quality of youth’s attachment to their primary caregivers as rated by the caregivers (Moretti et al., 2015; Moretti & Obsuth, 2009). It was shown to have high internal consistency and content validity (Moretti et al., 2015). Two subscales could be derived: Attachment

Anxiety (e.g., “my child needs a lot of reassurance that they are loved by me”) and Attachment Avoidance (e.g., “whenever we get close, my child pulls back from me”; Moretti & Obsuth, 2009). Parents rated their agreement with each statement on a 7-point scale (1 “Strongly disagree”; 7 “Strongly agree”) based on the past 6 months at T1 and the past 2 weeks at T2.

2.2. Results

2.2.1. eConnect Adaptations

The summary of modifications made to *Connect* to create *eConnect* is shown in Figure 2.1.

<p>WHEN did the modification occur? Pre-implementation stage</p>	<p>WHAT is modified?</p>			<p>At what level of delivery (for whom/ what is the modification made)?</p>					
<p>Where the adaptations planned? Planned/proactive adaptation</p>	<p>Contextual</p> <ul style="list-style-type: none"> • Personnel: A tech facilitator role is added. • Setting: Facilitators and parents all join the group via an online videoconferencing platform. • Population: To join the group, parents need to have access to adequate internet and one device with videoconferencing capabilities. When private location is not possible, parents also need to have a pair of earphones or headphones. • Format: Online flip-chart templates were created and made available to facilitators. They are screen shared with parents during the group. • Tech facilitator complete tech orientations with parents from each household in a one-on-one setting before the group starts to prepare them and their device for group and establish group norms. • Parent handouts and program evaluation materials are mailed or emailed to parents. • Tech facilitator is present for all group sessions to address tech challenges that arise, support parents in attending group, navigate an online flip-chart, and record parent responses on the flip-chart. • Group facilitators adopt facilitation strategies to address online group communication challenges (e.g, act more animated during role-play, allow more time for parent response, call on parents by name for response). • Evaluation: Question about experience with the videoconferencing platform and suggested improvements are added to the group feedback form. • Training: Facilitators certified to deliver <i>Connect</i> in-person complete a one-day introduction to <i>eConnect</i> training workshop; Facilitators new to <i>Connect</i> complete a 6-day online training workshop (3.5 hours each day), which combines the original training for <i>Connect</i> with demonstration of and specific training for the <i>eConnect</i> format of program delivery. • Facilitators receive adjunct program materials developed to support online implementation. • Tech facilitators receive individualized training for the role, including a two-hour training session and real-time coaching and support during tech orientations and their first three group sessions. Online training modules on the videoconferencing platform and the use of online flip-charts are also available for tech facilitators. • Supervisors of group facilitators observe the group sessions live when possible as part of the supervision. • Implementation and scale-up activities: Implementation team connect facilitators across agencies and geographical regions to help set up <i>eConnect</i> groups. 			<p>The modifications were made for parents who could not access in-person <i>Connect</i> groups and for organizations that could not deliver such service due to presence of various implementation barriers.</p>					
<p>WHO participated in the decision to modify?</p> <ul style="list-style-type: none"> • Intervention developer • Researchers • Treatment and implementation on team and managerial staff at Maples 				<p>Relationship-fidelity/Core elements?</p> <p>The modifications are fidelity consistent, that is, the core elements of <i>Connect</i> and the functions of it are preserved.</p>					
<p>What was the goal?</p> <p>Increase the accessibility of <i>Connect</i> to help families and service providers overcome attendance and implementation barriers</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #cccccc;"> <th data-bbox="422 992 785 1024">REASONS: Sociopolitical</th> <th data-bbox="785 992 1472 1024">Organization/Setting</th> <th data-bbox="1472 992 1864 1024">Recipients</th> </tr> </thead> <tbody> <tr> <td data-bbox="422 1024 785 1312"> <ul style="list-style-type: none"> • During the COVID-19 pandemic, the public health guidelines such as stay-at-home orders and social distancing requirements made in-person gathering difficult, particularly with regard to groups. • Mental health services in certain communities (e.g., rural and small communities) have traditionally been under-funded. </td> <td data-bbox="785 1024 1472 1312"> <ul style="list-style-type: none"> • Mental health service provision was severely disrupted during COVID-19, and service providers in BC had a strong and urgent demand for online service alternatives. • Organizational policies put in place during COVID-19 made it difficult for groups to be held in-person in a private indoor setting. • Rural and small communities have unique implementation barriers for in-person group programs (e.g., high turnover in staff; small pool of qualified professionals for recruitment; small number of parents with similar service needs; drive-in drive-out/ fly-in fly-out service provision strategy lacks sustainability, inclement weather, dangerous driving conditions). </td> <td data-bbox="1472 1024 1864 1312"> <ul style="list-style-type: none"> • Mental health services were particularly difficult for parents in BC to access during COVID-19, even though demand for such services were particularly high among stressed parents. • Parents in rural and small communities may not be able or willing to travel to nearby cities for in-person groups even when such groups are available. </td> </tr> </tbody> </table>			REASONS: Sociopolitical	Organization/Setting	Recipients	<ul style="list-style-type: none"> • During the COVID-19 pandemic, the public health guidelines such as stay-at-home orders and social distancing requirements made in-person gathering difficult, particularly with regard to groups. • Mental health services in certain communities (e.g., rural and small communities) have traditionally been under-funded. 	<ul style="list-style-type: none"> • Mental health service provision was severely disrupted during COVID-19, and service providers in BC had a strong and urgent demand for online service alternatives. • Organizational policies put in place during COVID-19 made it difficult for groups to be held in-person in a private indoor setting. • Rural and small communities have unique implementation barriers for in-person group programs (e.g., high turnover in staff; small pool of qualified professionals for recruitment; small number of parents with similar service needs; drive-in drive-out/ fly-in fly-out service provision strategy lacks sustainability, inclement weather, dangerous driving conditions). 	<ul style="list-style-type: none"> • Mental health services were particularly difficult for parents in BC to access during COVID-19, even though demand for such services were particularly high among stressed parents. • Parents in rural and small communities may not be able or willing to travel to nearby cities for in-person groups even when such groups are available.
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Figure 2.1 Summary of program modifications.

2.2.2. Feasibility and Acceptability Outcomes

Technical Challenges

At T2, 5 parents completed the TCQ-P. Technical challenges were limited (2 never experienced any, 1 rarely, 1 sometimes). Among the two parents who experienced technical challenges, one reported some impact on their ability to join the group, but neither reported impacts on their motivation or willingness to attend or participate in the group.

Experience with Videoconferencing Platform

At T2, 5 parents completed the VEQ-P. All parents agreed or strongly agreed that the videoconferencing platform was simple, easy to learn, and easy to understand, and they got used to it quickly. All parents at least somewhat agreed that the way they interacted with the platform was pleasant and that they liked using it. All parents agreed or strongly agreed that they liked the way the program was delivered online, even though 1 parent reported feeling uncomfortable with the videoconferencing group format. Four parents agreed or strongly agreed that they could easily communicate with others in the group, they were able to express themselves effectively, and they were able to see others' non-verbal language. One parent somewhat agreed with these statements.

Group Attendance

All 6 parents completed the program (average attendance of 8.3 sessions).

Program Acceptability

At T2, 5 parents completed the PPAQ. All parents agreed or strongly agreed that they would recommend *eConnect* to other families and that they were satisfied with *eConnect* overall. All parents at least somewhat agreed that videoconferencing is an acceptable way to receive group-based mental health services (4 agreed/strongly agreed, 1 somewhat agreed). Most parents at least somewhat agreed that *eConnect* met a service need of theirs that was not adequately met previously (3 agreed/strongly agreed, 1 somewhat agreed, 1 neutral).

2.2.3. Treatment Outcomes

The descriptive statistics of the treatment outcome measures are shown in Table 2.1. With a sample size of 6, there was insufficient power to detect a medium effect size ($d = 0.5$; $\alpha = 0.05$; two-tailed paired sample t-test; $Power = 0.17$). As such, paired sample t-tests were not performed. However, the observed changes in the scores from pre- to post-group were generally in the expected directions, especially with respect to reductions in youth internalizing problems, caregiver strain, and parental depressed mood.

Table 2.1 Descriptive statistics of the pilot group's treatment outcomes.

Outcomes	Timepoint	Mean	SD	Minimum	Maximum	N
BCFPI – INT	T1	74.62	15.57	54.21	96.78	6
	T2	59.76	12.65	44.47	72.64	5
BCFPI – EXT	T1	75.99	15.43	60.69	94.91	6
	T2	72.16	22.94	50.17	102.80	5
PSOC – SAT	T1	34.33	5.75	28.00	42.00	6
	T2	36.00	5.34	30.00	42.00	5
PSOC – EFF	T1	24.17	5.34	16.00	31.00	6
	T2	26.20	4.97	20.00	33.00	5
CGSQ – OBJ	T1	2.55	1.00	1.45	3.73	6
	T2	1.85	0.76	1.00	3.00	5
CGSQ – SUBEXT	T1	2.04	0.64	1.25	3.00	6
	T2	1.85	0.78	1.00	3.00	5
CGSQ – SUBINT	T1	3.03	0.70	2.17	4.17	6
	T2	2.77	0.80	1.67	3.83	5
BCFPI – Parent mood	T1	71.05	15.81	48.01	93.02	6
	T2	64.73	20.89	41.58	89.81	5
CTS2 – TOL: Youth to Parent	T1	1.90	0.73	1.17	2.94	6
	T2	1.78	0.76	1.00	2.61	5
CTS2 – PHY: Youth to Parent	T1	1.43	0.56	1.00	2.43	6
	T2	1.46	0.51	1.00	2.00	5
CTS2 – PSY: Youth to Parent	T1	2.37	0.97	1.22	3.44	6
	T2	2.11	1.04	1.00	3.22	5
CTS2 – TOL: Parent to Youth	T1	1.19	0.14	1.00	1.33	6
	T2	1.24	0.36	1.00	1.87	5
CTS2 – PHY: Parent to Youth	T1	1.00	0.00	1.00	1.00	6
	T2	1.06	0.13	1.00	1.29	5
CTS2 – PSY: Parent to Youth	T1	1.39	0.29	1.00	1.67	6
	T2	1.42	0.58	1.00	2.44	5

Outcomes	Timepoint	Mean	SD	Minimum	Maximum	N
AAAAI – ANX	T1	2.81	0.81	1.43	3.57	6
	T2	2.60	1.14	1.43	4.00	5
AAAAI – AVO	T1	3.30	0.92	1.78	4.33	6
	T2	3.44	1.42	1.78	5.67	5

Notes: T1: Pre-group; T2: Post-group; BCFPI: Brief Child and Family Phone Interview; INT: Youth internalizing problem subscale; EXT: Youth externalizing problem subscale; PSOC: Parental Sense of Competence Scale; SAT: Sense of satisfaction subscale; EFF: Sense of efficacy subscale; CGSQ: Caregiver Strain Questionnaire; OBJ: Objective strain subscale; SUBEXT: Subjective externalizing strain subscale; SUBINT: Subjective internalizing strain subscale; CTS2: Revised Conflict Tactic Scale; TOL: Total aggression scale; PHY: Physical aggression subscale; PSY: Psychological aggression subscale; AAAAI: Adolescent-Parent Attachment Inventory; ANX: Attachment anxiety scale; AVO: Attachment avoidance scale.

2.3. Discussion

Like other attachment-based interventions for younger children adapted for online delivery during the COVID-19 pandemic (Gray et al., 2022; Roben et al., 2021; Schein et al., 2022), the adaptation of *Connect* for an online delivery format with fidelity was successful. *eConnect* was able to retain all program components, as well as the program’s focus on promoting parental reflective function through real-time emotionally evocative interactions and activities. Results from the pilot group suggested that *eConnect* was feasible to implement, as evidenced by a lack of technical challenges that significantly interfered with parents’ group experience, as well as by the exceptionally high program completion rate (100%). Program acceptability among the parents was high, and the pattern of findings suggested positive changes in youth mental health and parental functioning. These results were promising and pointed to the need for a broader implementation of *eConnect* to more formally evaluate its effectiveness and to help to meet the urgent need for mental health services during the COVID-19 pandemic.

Chapter 3.

Study 2

3.1. Methods

3.1.1. Procedures

Theory of Change (ToC) Development

A ToC was developed to guide the implementation and evaluation of *eConnect* in BC, following the steps suggested by Vogel (2012) and in consultation with the CAP team via weekly consultation and discussions during clinical meetings.

ToC Development – Step 1: Situation Analysis

I engaged in open-ended discussions with the CAP team about the contextual factors on an individual (e.g., facilitator knowledge and competence), organizational (e.g., agency mandate during COVID-19, availability of resources), and system level (e.g., internet infrastructure and access across communities) that might hinder or facilitate the success of the *eConnect* initiative. Steps that could be taken to overcome the barriers or minimize their impact on the initiative were discussed.

ToC Development – Step 2: Outcome Mapping

The intended ultimate impact of the *eConnect* initiative (i.e., the real-life changes that the initiative seeks to achieve but might not be able to fully achieve as a stand-alone project) was first identified (Dhillon & Vaca, 2018). Then a series of outcomes (i.e., changes) that needed to occur for the initiative to contribute to the ultimate impact was mapped out in a backwards manner (from long-term to short-term; Dhillon & Vaca, 2018). Outcomes on an individual, organizational, and/or system level that were measurable and realistically achievable within the context of this study were considered (De Silva et al., 2014). A ToC map was created to visually represent the causal links between the outcomes and the ultimate impact (Rogers, 2014).

ToC Development – Step 3: Activities and Resources

Activities or strategies that needed to take place and the resources that were available or needed to generate the outcomes were identified in the ToC map (Dhillon & Vaca, 2018; Funnell & Rogers, 2011).

ToC Development – Step 4: Making Assumptions Explicit

Key assumptions behind the causal links in the ToC map were explicitly identified (Funnell & Rogers, 2011; Vogel, 2012). The assumptions could be regarding the individuals involved, the intervention itself, the mental health agencies, or the mental health system as a whole.

ToC Development – Step 5: Operationalizing the Outcomes

To evaluate the project, the implementation and treatment outcomes in the ToC map were operationalized with quantitative indicators (De Silva et al., 2014; Dhillon & Vaca, 2018).

The finalized ToC map was shared with the CAP team and was used to guide the broad implementation and evaluation of *eConnect* in BC.

ToC-guided Implementation in BC

Service Provider Training and Recruitment

The creation of *eConnect* was announced to community mental health agencies in BC to generate interest in *eConnect* training and implementation. Clinicians with no prior experience with *Connect* were required to complete a 6-day online training workshop on *eConnect* (3.5 hours each day); those who were trained or certified in in-person *Connect* were required to complete a one-full-day workshop. All workshops were hosted by the CAP team as part of their standard provincial *Connect* training services.

After the workshop, facilitators interested in running an *eConnect* group formed a team of three (two group facilitators and one tech facilitator) to run a group. *eConnect*-related program materials and two self-guided online tech training modules were made available to them. Tech facilitators completed an additional two-hour one-on-one training session with me and received live coaching during pre-group tech orientations with parents and during group sessions to develop competency in the role.

To ensure program fidelity, supervision was provided to group facilitators during their first *eConnect* group. Specifically, a certified *eConnect* supervisor from the CAP team joined the group sessions live as a silent observer and then completed a one-hour supervision session with the group facilitators each week. When live observation was not possible, the supervisor reviewed a recording of the session. Group facilitators were asked to record the session for self-reflection purposes. They reviewed the recording and completed a session reflection form before each supervision session. Recording consent was obtained by group facilitators from parents as part of the consent for receiving services at their agency. For new facilitators, supervision took place weekly for all 10 weeks of the group; for certified in-person *Connect* facilitators, supervision took place for a subset of group sessions (approximately 3). Those who completed supervision and were able to deliver the program with fidelity received *eConnect* facilitator certification. Challenges that arose during *eConnect* groups were brought up and discussed during weekly clinical meetings at Maples.

Before the facilitators launched their first *eConnect* group, I reached out to them to explain the research study and answered their questions. A research assistant from the Adolescent Health Lab at Simon Fraser University (SFU) then followed up with the facilitators to obtain informed consent for the study. Those who consented to take part in the study were invited to complete the research questionnaire at T1 and T2 for their first *eConnect* group.

At the end of the research project, I also reached out to all members of the CAP team to obtain their consent to complete a questionnaire package on the implementation prospect of *eConnect* in BC. The developer of *Connect*, Dr. Marlene Moretti, was excluded from this request due to a conflict of interest. Team members who consented to take part in the study were invited to complete the questionnaires online.

Parent Recruitment

Facilitators recruited parents of adolescents with emotional or behavioural problems for their *eConnect* groups from their own agency's client pool as well as via community referrals. Within the context of this study, 37 *eConnect* groups were launched and completed in BC from November 2020 to January 2022.

Parents in each *eConnect* group were introduced to the research study by the facilitators of the group. When a parent expressed interest to participate in the study, their contact information was shared with the SFU research team with their consent. A research assistant then followed up with the parent to explain the research project and answer their questions. The parents who consented to participate in the study were invited to complete a research questionnaire at T1 and T2. At each time point, parents who completed or partially completed the questionnaire received a \$20 honorarium in the form of an e-gift card of their choice via email. One honorarium was made available for each household. When multiple parents from the same household wanted to participate in the study despite the limitation in honorariums, both were invited to complete the research questionnaire, but only one parent's data was used in the present study to prevent dependency in the data.

All research protocols and procedures received approval from [blinded for review] University Office of Research Ethics [#20200401].

3.1.2. Participants

Parents

Of the 258 parents who took part in *eConnect* groups and were invited to participate in the study, 195 (75.6%) chose to consent and participate in the study. Of the 63 who chose not to participate, 20 withdrew due to having a partner who was already participating in the study on behalf of the family, 5 declined due to a lack of time, 10 declined because of early withdrawal from the group, and 28 declined due to a lack of interest or other reasons. Among the 195 parents who participated, only birth parents were included in the present sample ($N = 179$). This was because the sample sizes for alternative caregivers were too small (Adoptive: $N = 8$; Stepparent: $N = 3$; Foster or kinship parent: $N = 5$) to conduct adequate group-based analyses, and merging the groups was deemed inappropriate due to the differential natures of these parent-child relationships. Six parents were further excluded to avoid dependency in the data, retaining one parent's response when two parents from the same household completed the study measures. A series of factors were considered in sequence when data from two parents was available. We selected: 1) the parent who completed more program sessions; 2) if equal, then the parent who more fully completed the study questionnaire

package; 3) if equal, then the mother of the child over the father; 4) if equal, then the parent who spent more time with the child per day. One additional parent was excluded because their child was outside of the age range for the intervention (7 years old), and another parent was excluded due to insufficient data for analyses (only answered limited T1 demographic questions before withdrawing from the study).

The final sample for the present study included 171 birth parents (81.9% completed both T1 and T2; 14.6% T1 only; 3.5% T2 only). Parent or youth gender, age, or ethnicity, parent residential region or education level, or family income did not vary significantly based on survey completion status. Most parents were female (88.9% females, 11.1% males; Age range: 28-60; Mean age = 43.6). Most parents endorsed white ethnicity (75.4% white, 8.2% Indigenous, 9.9% Asian, 2.9% Latinx, 1.2% black, 1.2% other, 6.4% not reported; Multiple parents endorsed more than one ethnicity). Annual income for over one-third of families (39.2%) was \$40,000 or lower, and 45.0% reported that they barely or did not have enough money to cover their living expenses. Parent education included some primary/elementary school (0.6%), some high school or equivalent (5.3%), high school diploma or equivalent (10.5%), apprenticeship or other trades certificate (6.4%), some college/university (18.1%), college diploma (32.2%), Bachelor's Degree (8.2%), some postgraduate (7.6%), and Master's Degree (7.6%); 3.5% did not report their education. Most parents had a job (67.8%), 4.7% were on disability or on leave, 24.0% were not employed, and 3.5% did not report. Approximately half of the parents resided in large urban centres (55.0% large, 20.5% medium, 24.0% small, 0.6% rural). On average, parents were taking care of 1.9 children at home. A slight majority of the 146 parents who reported their familiarity with videoconferencing before *eConnect* were at least moderately familiar with it (59.6% moderately or extremely, 15.1% somewhat, 8.2% slightly, 17.1% not at all).

Parents reported on their children's age (Range: 8-18; $M = 13.2$), gender (54.4% female, 36.3% male, 9.4% other gender); ethnicity (77.2% white; 12.9% Indigenous; 12.3% Asian; 9.4% other ethnicity; 7.6% not reported; Multiple endorsed more than one ethnicity for the youth). At T1, 86.5% of the youth were living with their birth parents and 9.4% had other living arrangements (4.1% not reported).

eConnect Group Facilitators

Of the 61 group facilitators who facilitated *eConnect* groups, 56 (91.8%) chose to participate in this study (94.6% completed both T1 and T2, 5.4% T1 only) and 5 declined due to a lack of interest. The present study reported on data collected before and after the facilitators' first *eConnect* group, and thus the data reflected their experience in 31 of the 37 groups that took place.

Group facilitators reported on their age (Range: 24 – 65; $M = 41.9$) and gender (87.5% females; 12.5% males). Most endorsed white ethnicity (78.6% white, 16.1% Asian, 5.4% Indigenous, 3.6% other, 1.8% not reported; multiple endorsed more than one ethnicity). Most group facilitators had professional training in psychology or social work (76.8%); others were trained in affiliated disciplines (e.g., education and childcare; 23.2%). Group facilitators were experienced in the child and youth mental health field ($M = 9.0$ years). A slight majority were working in large urban centres (51.8% large; 17.9% medium, 30.4% small). Approximately half of the group facilitators were mental health clinicians (48.2% mental health clinicians, 12.5% youth workers, 3.6% managerial staff, 1.8% case managers, 33.9% other roles; 98.2% full-time, 1.8% part-time).

Slightly more group facilitators (53.6%) had previously delivered at least one in-person *Connect* group before *eConnect*; the remaining facilitators (46.4%) were newly trained and delivered *eConnect* under full supervision. Before undertaking *eConnect*, most group facilitators were moderately/extremely familiar (69.6%) or slightly/somewhat familiar (25.0%) with videoconferencing; 5.4% were not familiar with it.

eConnect Tech facilitators

All 22 tech facilitators who supported the delivery of the *eConnect* groups consented and participated in the study, completing questionnaires at both T1 and T2 (77.3% female, 18.2% male, 4.5% agender; Mean age = 40.5; 86.4% white, 4.5% Asian, 4.5% Indigenous, 4.5% black). The present study reported on data collected before and after their first *eConnect* group, and thus the data reflected their experience in 21 of the 37 groups that took place (one group had two alternating tech facilitators).

Most tech facilitators completed advanced training in psychology or social work (81.8%); others had training in affiliated disciplines (e.g., education and childcare; 18.2%). Close to half of the tech facilitators worked in large urban centres (45.5% large,

22.7% medium, 27.3% small, 4.5% rural). Over half were mental health clinicians (54.5% mental health clinicians, 4.5% youth workers, 9.1% managerial staff, 4.5% administrative staff, 27.3% other roles; 72.7% full-time, 27.3% part-time).

A slight majority of the tech facilitators (54.5%) had previously delivered at least one in-person *Connect* group before supporting *eConnect*. Before undertaking *eConnect*, 54.5% were moderately/extremely familiar with videoconferencing and 36.4% were slightly/somewhat familiar; only 18.2% were not familiar.

Implementation Team

All six members of the CAP team who were invited to participate in the study consented (5 females, 1 male; Mean age = 52.4; 5 white, 1 Indigenous). On average, they have been working at Maples for 16.5 years and practicing in the field of child and youth mental health for 25.6 years.

3.1.3. Measures

Parent-Report Measures

Implementation Outcome Measures

The caregiver attendance form, TCQ-P, VEQ-P, and PPAQ used in Study 1 were also adopted in Study 2, except that one item (“Overall, I am satisfied with how the group was delivered online”) was added to PPAQ to specifically assess parents’ satisfaction with the online format. As the VEQ-P and PPAQ were developed for this research project, the factor structure underlying the items was examined to identify subscales, and internal consistency was assessed to examine the subscales’ reliability (Reported in the Results section). The TCQ-P was interpreted on an item level, similar to Study 1.

Treatment Outcome Measures

The same treatment outcome measures used in Study 1 were administered to parents at T1 and T2 in Study 2 (i.e., BCFPI, PSOC, CGSQ, CTS2, AAAAI). Internal consistency of the subscales was acceptable to good. Cronbach’s alphas for the treatment outcome measures, calculated with the current sample, are shown in Table 3.1.

Table 3.1 Cronbach's alphas for the treatment outcome measure subscales.

Measures	Subscales	T1	T2
BCFPI	SAD	0.88	0.87
	GAD	0.90	0.86
	MDD	0.90	0.91
	ADHD	0.86	0.87
	ODD	0.88	0.90
	CD	0.72	0.76
	Parent mood	0.85	0.89
PSOC	SAT	0.82	0.81
	EFF	0.78	0.81
CGSQ	OBJ	0.94	0.93
	SUBEXT	0.76	0.70
	SUBINT	0.89	0.88
CTS2: Youth to Parent	PHY	0.90	0.92
	PSY	0.91	0.90
CTS2: Parent to Youth	PHY	0.62	0.89
	PSY	0.73	0.84
AAAAI	ANX	0.85	0.85
	AVO	0.95	0.94

T1: Pre-group; T2: Post-group; BCFPI: Brief Child and Family Phone Interview; SAD: Separation Anxiety subscale; GAD: Generalized Anxiety subscale; MDD: Depressive Mood subscale; ADHD: Attention Deficit Hyperactivity subscale; ODD: Oppositional Defiant subscale; CD: Conduct Problems subscale; PSOC: Parental Sense of Competence Scale; SAT: Sense of satisfaction subscale; EFF: Sense of efficacy subscale; CGSQ: Caregiver Strain Questionnaire; OBJ: Objective strain subscale; SUBEXT: Subjective externalizing strain subscale; SUBINT: Subjective internalizing strain subscale; CTS2: Revised Conflict Tactic Scale; PHY: Physical aggression subscale; PSY: Psychological aggression subscale; AAAAI: Adolescent-Parent Attachment Inventory; ANX: Attachment anxiety scale; AVO: Attachment avoidance scale.

Service-Provider-Report Measures

Implementation outcome measures for service providers were developed in Study 2 to assess several outcomes outlined in the ToC map. When possible, they were adapted from previously validated measures as appropriate to fit with *eConnect* and the implementation context in BC. For all measures developed for this research project, the factor structure underlying the items was examined to identify subscales, and internal consistency was assessed to examine the subscales' reliability (Reported in the Results section).

Knowledge Questionnaire (KQ)

The KQ was a 4-item self-report questionnaire administered to group facilitators at T1 and T2 and the CAP team at the end of the research project. It was adapted from the Determinants of Implementation Behavior Questionnaire (DIBQ; Huijg et al., 2014). The DIBQ, which assesses determinants of behavioural change, was shown to have adequate internal consistency and discriminant validity (Huijg et al., 2014). Adapted from the Knowledge subscale of the DIBQ, the KQ was created to measure service providers' perceived level of knowledge regarding *eConnect* (e.g., "Objectives of *eConnect* and the roles of all parties involved are clearly defined for me."). Each item was rated on a 7-point scale (1 "Strongly disagree"; 7 "Strongly agree").

Readiness to Implement Questionnaires (RIQ)

The RIQs were a set of self-report measures adapted from the Organizational Readiness for Implementing Change questionnaire (ORIC; Shea et al., 2014). The ORIC, which examines the extent to which members of an organization were psychologically and behaviourally prepared to implement an innovation, was shown to have good content validity and high interrater reliability (Shea et al., 2014).

The pre-group version of RIQ (RIQ-Pre; 7 items) was administered to group facilitators at T1 and designed to measure their readiness to facilitate their upcoming *eConnect* group (e.g., "I believe that I have received adequate training to fulfil my role in this *eConnect* group").

The post-group version of RIQ (RIQ-Post; 7 items) was administered to group facilitators at T2 and designed to measure their readiness to facilitate *eConnect* groups in the future (e.g., "I want to facilitate future *eConnect* groups in my capacity as a group facilitator.").

The organization version of RIQ (RIQ-O; 9 items) was administered to group facilitators at T2 and to the CAP team at the end of the project. It was designed to measure practitioners' perception of their agencies' readiness to continue to implement *eConnect* in the future (e.g., "People who work here want to make *eConnect* groups happen.").

For all versions of RIQ, each item was rated on a 7-point scale (1 “Strongly disagree”; 7 “Strongly agree”).

Technical Challenge Questionnaire – Facilitator Version (TCQ-F)

The TCQ-F was a 6-item self-report questionnaire developed for *eConnect* and administered to *eConnect* facilitators at T2. Facilitators were asked to rate the frequency of technical challenges they experienced during *eConnect* (1 item). They were also asked to rate the impact these challenges had on their facilitation (5 items; e.g., impact on their communication with others in group; rated on a 5-point scale: 0 “Not at all” to 4 “To an extremely large extent”).

Videoconferencing Experience Questionnaire – Facilitator Version (VEQ-F)

VEQ-F was a 12-item self-report questionnaire administered to group facilitators at T2 and adapted from the TUQ’s Interface Quality, Interaction Quality, Reliability, and Ease of Use and Learnability subscales (Parmanto et al., 2016). It was created to assess facilitators’ experience using the videoconferencing platform during their *eConnect* group (e.g., “It is simple to use the videoconferencing platform”). Each item was rated on a 7-point scale (1 “Strongly disagree”; 7 “Strongly agree”).

Service Provider Program Acceptability Questionnaire (SPPAQ)

The SPPAQ was a 15-item self-report measure adapted from the Usage Rating Profile – Intervention Revised (URP-IR; Chafouleas et al., 2011) and the DIBQ (Huijg et al., 2014). The URP-IR, developed to measure factors that could influence the adoption of an intervention, was shown to have good to excellent internal validity, good structural validity, and good usability (Briesch et al., 2013; Lewis et al., 2015). Adapted from the URP-IR’s Acceptability subscale and the DIBQ’s Beliefs about Consequences subscale, the SPPAQ was created to measure the acceptability of *eConnect*, i.e., the extent to which *eConnect* was perceived as palatable and satisfactory by those involved in its implementation (e.g., “The *eConnect* program can improve the services that my organization provides”; Proctor et al., 2011). Each item was rated on a 7-point scale (1 “Strongly disagree”; 7 “Strongly agree”).

The SPPAQ was administered to group facilitators at T2 regarding the acceptability of *eConnect* in the facilitators’ agencies. It was also administered to the

CAP team at the end of the project regarding the acceptability of *eConnect* across mental health agencies in BC.

Program Sustainability Questionnaire (PSQ)

The PSQ was an 8-item self-report questionnaire adapted from the Program Sustainability Assessment Tool (PSAT; Luke et al., 2014). The PSAT, which assesses factors that contribute to the sustainability of public health programs, was shown to have good internal consistency and good usability (Lewis et al., 2015; Luke et al., 2014). The PSQ was created to assess sustainability factors relevant to *eConnect* in the BC healthcare system (e.g., “In my organization, all necessary resources and funding are available to implement *eConnect* groups again in the future”). Participants were asked to rate their agreement with each item on a 7-point scale (1 “To little/no extent”; 7 “To a very great extent”).

The PSQ was administered to group facilitators at T2 regarding the sustainability of *eConnect* in their agencies. It was administered to the CAP team at the end of the project to assess the sustainability of *eConnect* across agencies in BC.

3.1.4. Statistical Analyses

For implementation outcome measures developed for this project (VEQ-P, PPAQ, KQ, RIQ-Pre, RIQ-Post, RIQ-O, VEQ-F, SPPAQ, PSQ), a series of factor analyses were completed to identify subscales that represented core constructs reflected in these measures. Specifically, for each measure, an initial exploratory factor analysis (EFA; Generalized Least Squares solution with varimax rotation) was performed to identify the number of underlying factors to retain. When two items were highly correlated ($r > .80$), one of them was excluded from this EFA (Field, 2013; Criteria for exclusion adopted in sequence: correlated with more items in the measure, weaker face validity, less differentiation from other items in the measure). An eigenvalue of 1 was used as the cut-off score for factors to retain, in accordance with the Kaiser criterion. Additional rounds of EFA were performed as needed, extracting the same number of factors but removing low factor loading items (< 0.4 ; Peterson, 2000; Stevens, 1992) or cross-loading items (high factor loading on more than one factors and less than 0.1 difference between loadings) one at a time each time (Hair, 2019). When only one item loaded onto a factor, this factor was removed. Confirmatory factor analyses (CFA) were

performed to examine model fit. When model fit was not adequately achieved (i.e., root mean square error of approximation [RMSEA] > 0.6, model $\chi^2 \leq 0.05$, or Comparative Fit Index [CFI] < 0.95; Hooper et al., 2008), items with the lowest loadings were removed one by one until the model fit was achieved. Cronbach's alpha for each subscale was reported as a measure of reliability.

For quantitative outcome measures administered at both time points, pre-post changes were estimated using a latent growth curve modelling (LGC) approach that approximates paired sample t-tests in an SEM framework (Voelkle, 2007). Full information maximum likelihood (FIML) was used to account for missing data. All models were "just identified" (i.e., the number of observed parameters was equal to the number of estimated parameters with degrees of freedom = 0), and thus, the model fit could not be assessed. These statistical analyses were performed using Mplus 8.3. Consistent with the previous studies on in-person *Connect* treatment outcomes, effect sizes were calculated using Cohen's d statistic ($d = 0.2$ is small, $d = 0.5$ is medium, $d = 0.8$ is large; Cohen, 1988).

Gender invariance was examined for the treatment outcome analyses. No significant gender differences were found. Thus, gender-based analyses were not reported in this study. Additionally, parents who completed the group and those who did not were included in all analyses to reduce the possible biased selection of the sample.

3.2. Results

3.2.1. Theory of Change (ToC)

The ToC map developed collaboratively with the CAP team is shown in Figure 3.1. Key assumptions behind the causal links in the ToC map (i.e., the arrows) are outlined in Table 3.2. Indicators for outcomes identified in the ToC map are outlined in Table 3.3.

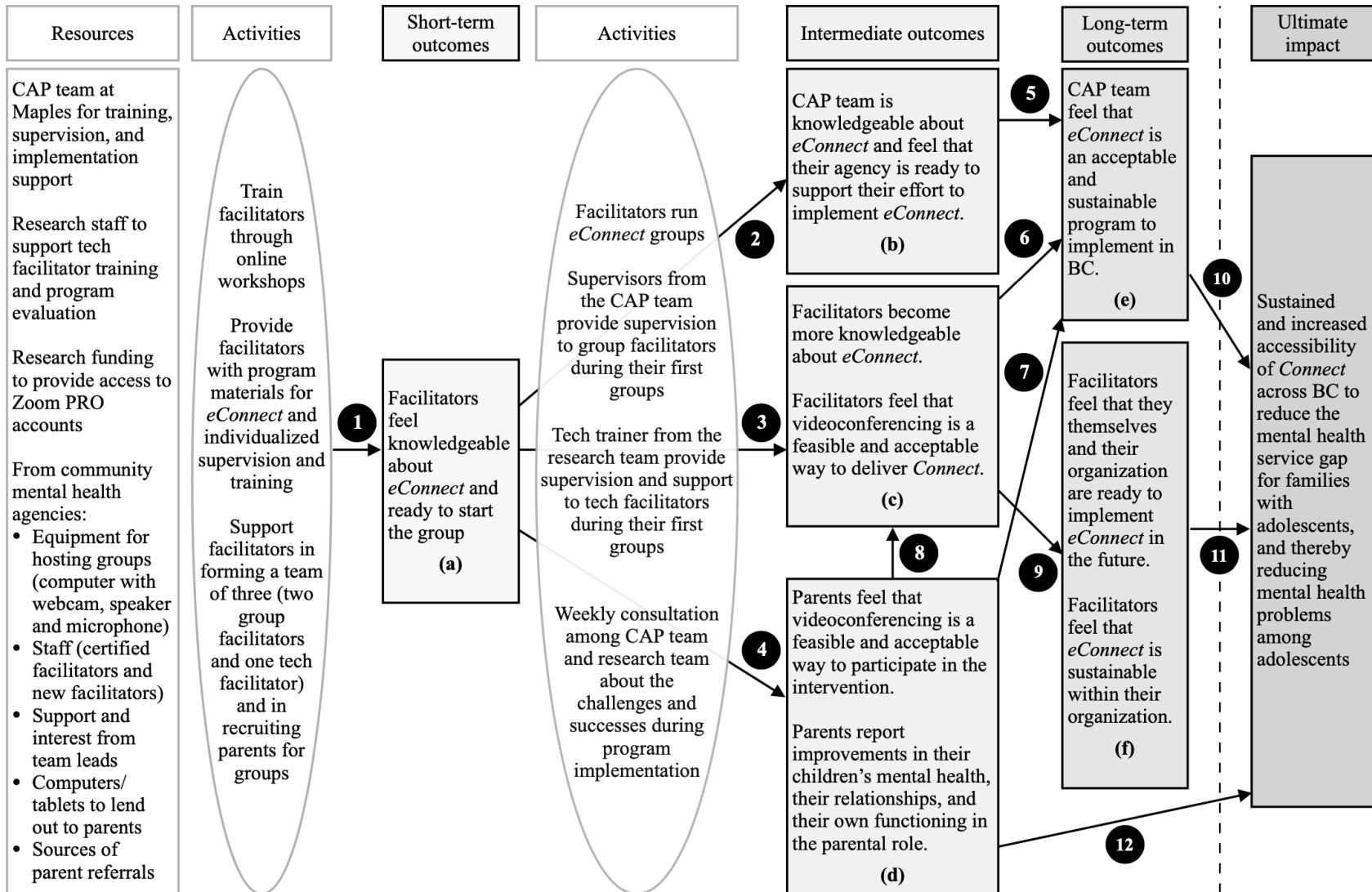


Figure 3.1 The ToC map for the *eConnect* initiative in BC.

Table 3.2 Key assumptions underlying causal links in ToC map.

Causal link number	Key assumptions
1	Training designed for <i>eConnect</i> (e.g., interactive online training workshop for facilitators; individualized tech training for tech facilitators) are effective in preparing facilitators for their upcoming group.
2	By implementing the <i>eConnect</i> program for one year at their agency, the CAP team will have a deeper and clearer understanding of <i>eConnect</i> , and one year of focused <i>eConnect</i> implementation is sufficient in getting buy-ins for the program and preparing their agency for the implementation of <i>eConnect</i> moving forward.
3	Running an <i>eConnect</i> group will allow facilitators to gain a greater understanding of <i>eConnect</i> . <i>eConnect</i> groups will run smoothly, resulting in a satisfying and rewarding experience for facilitators.
4	The <i>eConnect</i> program design and facilitators' support will lead to a satisfactory experience for parents in group. <i>eConnect</i> will offer mental health benefits for youth and parents, similar as in-person <i>Connect</i> .
5	Knowing <i>eConnect</i> well and seeing readiness within their agency will lead CAP team members to be optimistic about the program's long-term prospect in BC.
6	CAP team members will receive positive feedback from facilitators regarding their perception of the program, and this will lead to positive view of the program's long-term prospect.
7	CAP team members will learn about parents' gains in the program through supervision and parent and facilitator feedback. This will lead to positive view of the program's long-term prospect.
8	Facilitators will see or hear about improvements in parent and/or child functioning or improvements in parent-child relationship during group sessions, and this will lead them to value the program.
9	Facilitators' positive experience with <i>eConnect</i> will generate buy-in and lead them to feel optimistic about the program's long-term prospect in their agency.
10	CAP team will continue to be the core implementation team for <i>Connect</i> in BC, and their positive view of the program's sustainability within the province will lead to a push for the ongoing implementation of <i>eConnect</i> .
11	Facilitators' positive view of <i>eConnect</i> 's sustainability in their agency will lead them to run more groups, and their efforts will be supported by their agency's policies and resource allocations.
12	Parents' positive experience with <i>eConnect</i> will lead to more word-of-mouth promotions for <i>eConnect</i> among parents, as well as promotions of <i>eConnect</i> by local community agencies, resulting in ongoing referrals for the program.

Table 3.3 Indicators for outcomes in ToC map.

Outcomes in ToC map	Indicators (Timepoint(s), completers)
(a) Facilitators feel knowledgeable about <i>eConnect</i> and ready to start the group.	KQ (T1, facilitators); RIQ-Pre (T1, facilitators)
(b) CAP team is knowledgeable about <i>eConnect</i> and feel that their agency is ready to support their effort to implement <i>eConnect</i> .	KQ (End of project, CAP team); RIQ-O (End of project, CAP team)
(c) Facilitators become more knowledgeable about <i>eConnect</i> . Facilitators feel that videoconferencing is a feasible and acceptable way to deliver <i>Connect</i> .	KQ (T1 & T2, facilitators) VEQ-F (T2, facilitators); TCQ-F (T2, facilitators); SPPAQ (T2, facilitators)
(d) Parents feel that videoconferencing is a feasible and acceptable way to participate in the intervention. Parents report improvements in their children's mental health, their relationships, and their own functioning in the parental role.	Parent group attendance; VEQ-P (T2, parents); TCQ-P (T2, parents); PPAQ (T2, parents) BCFPI (T1 & T2, parents); CTS2 (T1 & T2, parents); AAAAI (T1 & T2, parents); PSOC (T1 & T2, parents); CGSQ (T1 & T2, parents)
(e) CAP team feel that <i>eConnect</i> is an acceptable and sustainable program to implement in BC.	SPPAQ (End of project, CAP team); PSQ (End of project, CAP team)
(f) Facilitators feel that they themselves and their organization are ready to implement <i>eConnect</i> in the future. Facilitators feel that <i>eConnect</i> is sustainable within their organization.	RIQ-Post (T2, facilitators); RIQ-O (T2, facilitators) PSQ (T2, facilitators)

T1: Pre-group; T2: Post-group; KQ: Knowledge questionnaire; RIQ-Pre: Readiness to Implement Questionnaire – pre-group version; RIQ-O: Readiness to Implement Questionnaire – Organization version; VEQ-F: Videoconferencing Experience Questionnaire – Facilitator version; TCQ-F: Technical Challenge Questionnaire – Facilitator Version; SPPAQ: Service Provider Program Acceptability Questionnaire; VEQ-P: Videoconferencing Experience Questionnaire – Parent version; TCQ-P: Technical Challenge Questionnaire – Parent Version; PPAQ: Parental Program Acceptability Questionnaire; BCFPI: Brief Child and Family Phone Interview; CTS2: Revised Conflict Tactic Scale; AAAAI: Adolescent-Parent Attachment Inventory; PSOC: Parental Sense of Competence Scale; CGSQ: Caregiver Strain Questionnaire; PSQ: Program Sustainability Questionnaire; RIQ-Post: Readiness to Implement Questionnaire – Post-group version.

3.2.2. Implementation Outcomes: Facilitators

Technical Challenges

At T2, 75 (96.2%) facilitators (53 group facilitators, 22 tech facilitators) reported on the frequency of technical challenges experienced in their *eConnect* groups (12.8% never, 59.0% rarely, 24.4% sometimes) A one-way ANOVA test suggested that the frequency of these challenges did not differ significantly based on facilitators' location (rural/small vs. medium vs. large), $F(2, 72) = 1.37, p = 0.262$.

For the 46 group facilitators who did experience technical challenges, the perceived impact of these challenges on their facilitation is presented in Table 3.4. Of note, most of them indicated that the technical challenges had no or limited impact on their group content delivery (87.0%), communication with others in the group (84.8%), monitoring of parent responses (71.7%), fully attending to the group (82.6%), and fully participating in group process and facilitating the group (84.8%).

Table 3.4 Impact of technical challenges on group facilitation (N = 46).

Impacted	Not at all		To some extent		To a moderate extent		To a great extent	
	N	%	N	%	N	%	N	%
Delivery of group content (including role-plays)	29	63.0%	11	23.9%	5	10.9%	1	2.2%
Communication with others in group	16	34.8%	23	50.0%	5	10.9%	2	4.3%
Monitoring parent responses (verbal and non-verbal)	14	30.4%	19	41.3%	9	19.6%	4	8.7%
Fully attending to the group	22	47.8%	16	34.8%	6	13.0%	2	4.3%
Fully participating in the group process and facilitating the group	21	45.7%	18	39.1%	6	13.0%	1	2.2%

Experience with the Videoconferencing Platform

At T2, 53 (94.6%) group facilitators completed the VEQ-F. Two subscales were identified via factor analyses ($\chi^2(13, N = 53) = 12.28, p = 0.505$; $RMSEA = 0.00$; $CFI = 1.00$), including Ease of Use (3 items; $\alpha = 0.818$; reflecting the ease of using the videoconferencing platform) and Quality of Experience (4 items; $\alpha = 0.879$; reflecting the quality of group facilitators' experience facilitating the group on the videoconferencing platform; items presented in Table 3.5). The mean of the relevant item scores formed each subscale score (possible range: 1 – 7; 4: "Neutral").

Ease of Use and Quality of Experience had a mean of 5.72 ($SD = 0.85$) and 4.62 ($SD = 1.34$) respectively, suggesting that, on average, group facilitators found the videoconferencing platform to be easy to use, and they felt positive about the quality of their experience facilitating the group in this format.

Knowledge of eConnect

All group facilitators completed KQ at T1 and 53 (94.6%) completed it at T2. One subscale, Knowledge of *eConnect* (3 items; $\alpha = 0.85$ and 0.91 at T1 and T2 respectively; reflecting group facilitators' knowledge of the *eConnect* program delivery format; items presented in Table 3.5), was identified via factor analyses (T1: $RMSEA = 0.00$; $CFI = 1.00$; T2: $RMSEA = 0.00$; $CFI = 1.00$). The mean of the relevant item scores formed the subscale score (possible range: 1 – 7; 4: “Neutral”).

Knowledge of *eConnect* had a mean of 6.03 ($SD = 0.76$) at T1, which increased significantly to 6.21 ($SD = 0.77$) at T2 ($S_{mean} = 0.19$, $S.E. = 0.09$, $p = 0.038$, $d = 0.28$), indicating that after completing the *eConnect* workshop, facilitators felt knowledgeable about the *eConnect* delivery format, and this was further enhanced after running one *eConnect* group.

Facilitators' Pre-group Readiness to Implement the Group

The RIQ-Pre was completed by all group facilitators at T1. Two subscales were identified via factor analyses ($\chi^2(4, N = 56) = 3.14$, $p = 0.535$; $RMSEA = 0.00$; $CFI = 1.00$), including Implementation Efficacy' (3 items; $\alpha = 0.65$; reflecting facilitators' confidence in their ability to facilitate their upcoming group) and Implementation Commitment (2 items; $\alpha = 0.82$; reflecting facilitators' commitment to the delivery of their upcoming group; items presented in Table 3.5). The mean of the relevant item scores formed each subscale score (possible range: 1 – 7; 4: “Neutral”).

Implementation Efficacy and Implementation Commitment had a mean of 6.24 ($SD = 0.67$) and 6.29 ($SD = 0.72$) respectively, suggesting that before the start of their first *eConnect* group, group facilitators were highly committed to the delivery of their upcoming group and felt confident in their ability to deliver the program online.

Facilitators' Post-group Readiness to Implement Future Groups

The RIQ-Post was completed by 53 (94.6%) group facilitators at T2. One subscale, Future Implementation Readiness (5 items; $\alpha = 0.81$; reflecting group facilitators' self-perceived readiness to deliver *eConnect* in the future; items presented in Table 3.5), was identified via factor analyses ($\chi^2(5, N = 53) = 5.25$; $p = 0.386$; $RMSEA =$

0.03; $CFI = 1.00$). The mean of the relevant item scores formed the subscale score (possible range: 1 – 7; 4: “Neutral”).

Future Implementation Readiness had a mean of 6.08 ($SD = 0.72$), indicating that after completing their first *eConnect* group, group facilitators felt highly prepared to facilitate more *eConnect* groups in the future without supervision.

Organizational Readiness to Implement eConnect

At T2, 53 (94.6%) group facilitators completed the RIQ-O. One subscale, Organizational Readiness (5 items; $\alpha = 0.92$; reflecting group facilitators’ perception of their agency’s readiness to continue to implement *eConnect* in the future; items presented in Table 3.5), was identified via factor analyses ($\chi^2(5, N = 53) = 5.56$; $p = 0.352$; $RMSEA = 0.05$; $CFI = 1.00$). The mean of the relevant item scores formed the subscale score (possible range: 1 – 7; 4: “Neutral”).

Organizational Readiness had a mean of 5.49 ($SD = 0.91$), indicating that by the end of their first *eConnect* group, group facilitators felt positive about their agency’s preparedness to implement *eConnect* in the future.

Program Acceptability

At T2, 52 (92.9%) group facilitators completed the SPPAQ. Two subscales were identified via factor analyses ($\chi^2(8, N = 52) = 5.66$, $p = 0.686$; $RMSEA = 0.00$; $CFI = 1.00$), including Outcome Expectancy (4 items; $\alpha = 0.86$; reflecting facilitators’ expectations regarding the outcomes of implementing *eConnect*) and Recognition (2 items; $\alpha = 0.82$; reflecting the expected recognition of facilitators’ effort in implementing *eConnect*; items presented in Table 3.5). The mean of the relevant item scores formed each subscale score (possible range: 1 – 7; 4: “Neutral”).

Outcome Expectancy and Recognition had a mean of 6.19 ($SD = 0.81$) and 5.38 ($SD = 1.05$) respectively, indicating that on average, group facilitators had highly positive expectations about the benefits of implementing *eConnect* in the future for families, their agencies, and themselves, as well as positive expectations regarding the recognition they could receive for their involvement in the *eConnect* program.

Program Sustainability

At T2, 53 (94.6%) group facilitators completed the PSQ. One subscale, Sustainability (5 items; $\alpha = 0.805$; reflecting factors influential for *eConnect*'s sustainability in the future; items presented in Table 3.5), was identified via factor analyses ($\chi^2(5, N = 53) = 3.66, p = 0.599; RMSEA = 0.00; CFI = 1.00$). The mean of the relevant item scores formed the subscale score (possible range: 1 – 7; 1: “To little/no extent”; 7: “To a very great extent”).

Sustainability had a mean of 5.20 ($SD = 1.11$), indicating that on average facilitators viewed *eConnect* as a sustainable program to implement in their agency moving forward.

Table 3.5 Subscales identified for implementation outcome measures for service providers.

Measure	Time point	Subscale	Item
Videoconferencing Experience Questionnaire – Facilitator version (VEQ-F)	T2	Ease of Use	It is simple to use the videoconferencing platform.
			It is easy to learn to use the videoconferencing platform.
		Quality of Experience	Whenever I make a mistake or encounter an error when using the videoconferencing platform, I can recover easily and quickly.
			I like using the videoconferencing platform.
Knowledge questionnaire (KQ)	T1, T2	Knowledge of eConnect	I feel that I am able to express myself effectively on the videoconferencing platform.
			I feel that I am able to monitor parents' reactions effectively on the videoconferencing platform.
			I think the online version of Connect would be comparable to the in-person version of Connect.
	T1	Implementation Efficacy	I know how Connect is delivered online and what is needed to implement the eConnect version of Connect.
			Objectives of eConnect and the roles of all parties involved are clearly defined for me.
			I know what is expected from the people who are involved in the implementation and running of an eConnect group.
			I am confident that my workplace or my colleagues can support me as I adjust to the demands of this eConnect group.

Measure	Time point	Subscale	Item
Readiness to Implement Questionnaire – pre-group version (RIQ-Pre)		Implementation Commitment	I am confident that the people I work with in this eConnect group can offer me the support I need when I ask for it.
			I believe that I have received adequate training to fulfil my role in this eConnect group.
Readiness to Implement Questionnaire – post-group version (RIQ-Post)	T2	Future Implementation Readiness	I want to facilitate/support the running of this eConnect group in my capacity as a group facilitator.
			I am motivated to facilitate this eConnect group in my capacity as a group facilitator.
			I want to facilitate future eConnect groups in my capacity as a group facilitator.
			I am confident that I can handle the challenges that might arise during the course of future eConnect groups.
			I am confident that I can coordinate tasks so that future eConnect groups can run smoothly.
Readiness to Implement Questionnaire – Organization version (RIQ-O)	T2	Organizational Readiness	I am confident that the people I will work with in future eConnect groups can offer me the support I need when I ask for it.
			I believe that I have received adequate training to fulfil my role in future eConnect groups.
			People who work here are committed to implementing the eConnect program.
			People who work here want to make eConnect groups happen.
			People who work here feel confident that they can handle the challenges that may arise in implementing the eConnect program.
Service Provider Program Acceptability Questionnaire (SPPAQ)	T2	Outcome Expectancy	People who work here are motivated to implement the eConnect program.
			People who work here feel confident that they can manage the politics of implementing the eConnect program.
			For families who have difficulty accessing in-person groups, eConnect groups can effectively address the problems they experience.
			The eConnect program can improve the services that my organization provides.
			The implementation of the eConnect program will be appreciated by families.
			It's rewarding for me to be involved in the implementation of the eConnect program.

Measure	Time point	Subscale	Item
		Recognition	My team or I will get recognition from our colleagues or our organization for our work in the implementation of the eConnect program.
			Our community partners will appreciate my or my team's work in the implementation of the eConnect program.
Program Sustainability Questionnaire (PSQ)	T2	Sustainability	In my organization, all necessary resources and funding are available to implement eConnect groups again in the future.
			Our community and community partners have a vested interest in the success of the eConnect Online program.
			We can count on support from my organization when encountering issues with the implementation of eConnect groups.
			The eConnect program is promoted in a way that generates interest in the community.
			The goals of the implementation of the eConnect program are clearly understood by important stakeholders in my agency and community.

3.2.3. Implementation Outcomes: Parents

Group Attendance

Most parents (86.0%) who attended *eConnect* completed the program (average attendance of 7.4 out of 9 sessions). Parent or youth gender, age, or ethnicity, parent residential region or education level, family income, or any T1 treatment outcome measures did not vary significantly based on parents' program completion status.

Technical Challenges

Of the 146 parents who reported on their group experience at T2, most never (48.6%) or rarely (36.3%) experienced technical challenges during group; 14.4% sometimes and 0.7% always experienced challenges. The frequency of technical challenges did not differ significantly based on parents' location (rural/small vs. medium vs. large), $F(2, 143) = 0.13, p = 0.879$. The perceived impacts of technical challenges on parents' experience in groups are presented in Table 3.6. Among the 75 parents who experienced technical challenges, the majority indicated that these challenges had no or limited impact on their

ability to join the group (89.3%), ability to participate in group conversations (90.7%), desire to keep on attending group (88.0%), desire to talk in group (88.0%), willingness to keep on attending group (89.3%), and willingness to talk in group (89.3%).

Table 3.6 Impact of technical challenges on parents' experience (N = 75).

Impacted	Not at all		To some extent		To a moderate extent		To a great extent		To an extremely large extent		Did not report	
	N	%	N	%	N	%	N	%	N	%	N	%
Ability to join the group sessions	46	61.3%	21	28.0%	3	4.0%	3	4.0%	2	2.7%	0	0.0%
Ability to participate in conversations	41	54.7%	27	36.0%	1	1.3%	5	6.7%	1	1.3%	0	0.0%
Desire to keep on attending group	56	74.7%	10	13.3%	2	2.7%	5	6.7%	2	2.7%	0	0.0%
Desire to talk in group	51	68.9%	15	20.3%	6	8.1%	2	2.7%	0	0.0%	1	1.3%
Willingness to keep on attending group	62	82.7%	5	6.7%	1	1.3%	4	5.3%	3	4.0%	0	0.0%
Willingness to talk in group	57	76.0%	10	13.3%	3	4.0%	4	5.3%	1	1.3%	0	0.0%

Experience with Videoconferencing Platform

At T2, 145 (84.8%) parents completed the VEQ-P. One subscale, Platform Experience (6 items; $\alpha = 0.93$; reflecting parents' experience using the videoconferencing platform; items presented in Table 3.7), was identified via factor analyses ($\chi^2(9, N = 145) = 12.35, p = 0.194$; $RMSEA = 0.05$; $CFI = 1.00$). The mean of the relevant item scores formed each subscale score (possible range: 1 – 7; 4: “Neutral”).

Platform Experience had a mean of 5.89 ($SD = 1.10$), indicating that parents had a positive experience participating in their *eConnect* group using the videoconferencing platform.

Program Acceptability

At T2, 146 (85.4%) parents completed the PPAQ. One subscale, Acceptability (4 items; $\alpha = 0.75$; reflecting the perceived acceptability of *eConnect* to the parents; items presented in Table 3.7), was identified via factor analyses ($\chi^2(2, N = 146) = 0.83, p = 0.661; RMSEA = 0.00; CFI = 1.00$). The mean of the relevant item scores formed the subscale score (possible range: 1 – 7; 4: “Neutral”).

Acceptability had a mean of 5.98 ($SD = 0.83$), indicating that group participants had a satisfactory experience with the program.

Table 3.7 Subscales identified for implementation outcome measures for parents.

Measure	Time point	Subscale	Item
Videoconferencing Experience Questionnaire – Parent version (VEQ-P)	T2	Platform Experience	The way I interact with this videoconferencing platform is pleasant.
			I like using the videoconferencing platform.
			I liked the way the program was delivered.
			I felt comfortable with the videoconferencing group format.
			I could easily communicate with people at other sites using the videoconferencing platform.
Parental Program Acceptability Questionnaire (PPAQ)	T2	Acceptability	I felt I was able to express myself effectively on the videoconferencing platform.
			The <i>eConnect</i> group met a service need of mine that was not adequately met previously.
			Videoconferencing is an acceptable way to receive group-based mental health services.
			I would recommend the <i>Connect</i> program to other families.
			Overall, I am satisfied with how the group was delivered online.

3.2.4. Implementation Outcomes: Implementation Team

Knowledge of eConnect

Implementation team's Knowledge of *eConnect* subscale had a mean of 6.61 ($SD = 0.49$), indicating that by the end of the research project, they felt highly knowledgeable about the *eConnect* delivery format.

Program Acceptability in BC

The team's Outcome Expectancy and Recognition subscales had a mean of 6.54 ($SD = 0.46$) and 5.33 ($SD = 1.03$) respectively, suggesting that by the end of the project, they had highly positive expectations about the benefits of continuing to implement *eConnect* in BC for families, the mental health agencies, and themselves, as well as positive expectations regarding the recognition they could receive for their involvement in the implementation of *eConnect* in BC.

Organizational Readiness to Implement eConnect

The team's Organizational Readiness subscale had a mean of 5.33 ($SD = 0.45$), suggesting that by the end of the project, they were positive about their agency's preparedness to support the implementation of *eConnect* in BC in the future.

Program Sustainability in BC

The team's Sustainability subscale had a mean of 4.80 ($SD = 0.92$), indicating that they were somewhat positive regarding the program's sustainability in BC. Item-level analyses suggested that team members were more positive about the vested interest in *eConnect* on a community level ($Mean = 5.50$; $SD = 1.05$) and the promotional strategies of *eConnect* ($Mean = 5.67$; $SD = 0.82$) than about resource availability ($Mean = 4.17$; $SD = 0.98$), reliability of support in overcoming obstacles ($Mean = 4.17$; $SD = 1.47$), and the understanding of program goals by important stakeholders ($Mean = 4.50$; $SD = 2.07$).

3.2.5. Treatment Outcomes

Descriptive Statistics

Descriptive statistics of treatment outcomes are reported in Table 3.8. The T1 bivariate correlations among the key treatment outcome variables are presented in Table 3.9.

Table 3.8 Descriptive statistics of treatment outcomes.

Outcomes	Timepoint	Mean	SD	Minimum	Maximum	N
BCFPI – INT	T1	69.83	15.54	38.43	108.85	161
	T2	61.95	14.88	36.42	103.43	142
BCFPI – SAD	T1	60.46	17.07	40.18	111.38	161
	T2	55.15	15.26	40.18	99.74	142
BCFPI – GAD	T1	64.79	16.30	35.88	92.47	161
	T2	59.44	14.45	35.88	92.47	142
BCFPI – MDD	T1	72.37	17.83	41.31	104.63	161
	T2	64.06	17.27	41.31	104.63	141
BCFPI – EXT	T1	71.35	12.38	41.50	103.46	162
	T2	66.43	13.21	37.22	111.22	142
BCFPI – ADHD	T1	70.64	11.87	38.98	87.75	162
	T2	67.53	12.76	40.60	87.75	142
BCFPI – ODD	T1	69.09	12.53	36.09	88.89	162
	T2	63.94	13.74	37.61	88.89	142
BCFPI – CD	T1	60.29	23.20	44.90	180.60	163
	T2	55.73	21.38	44.90	226.56	142
PSOC – SAT	T1	32.99	8.03	15.00	54.00	163
	T2	33.78	7.56	13.00	53.00	143
PSOC – EFF	T1	25.59	6.04	11.00	40.00	162
	T2	27.44	5.60	12.00	41.00	143
CGSQ - OBJ	T1	2.45	1.04	1.00	5.00	160
	T2	2.04	0.93	1.00	5.00	141
CGSQ - SUBEXT	T1	2.10	0.85	1.00	5.00	160
	T2	1.95	0.75	1.00	4.25	141
CGSQ - SUBINT	T1	3.41	1.03	1.00	5.00	160
	T2	3.01	1.06	1.00	5.00	141
BCFPI – Parent mood	T1	66.57	16.26	41.58	99.45	164
	T2	65.21	16.88	41.58	99.45	143
CTS2 – TOL: Youth to Parent	T1	1.61	0.53	1.00	3.43	161
	T2	1.41	0.46	1.00	2.97	141
CTS2 – PHY: Youth to Parent	T1	1.30	0.47	1.00	2.86	161
	T2	1.17	0.38	1.00	3.00	142
CTS2 – PSY: Youth to Parent	T1	1.92	0.69	1.00	4.00	161

Outcomes	Timepoint	Mean	SD	Minimum	Maximum	N
	T2	1.65	0.61	1.00	3.44	141
CTS2 – TOL: Parent to Youth	T1	1.20	0.18	1.00	1.95	161
	T2	1.16	0.24	1.00	2.58	141
CTS2 – PHY: Parent to Youth	T1	1.07	0.14	1.00	1.71	161
	T2	1.06	0.21	1.00	2.71	141
CTS2 – PSY: Parent to Youth	T1	1.33	0.28	1.00	2.33	161
	T2	1.25	0.32	1.00	2.78	141
AAAAI - ANX	T1	3.00	1.18	1.00	5.86	162
	T2	2.85	1.19	1.00	6.57	143
AAAAI - AVO	T1	3.17	1.50	1.00	7.00	162
	T2	2.95	1.37	1.00	7.00	143

T1: Pre-group; T2: Post-group; BCFPI: Brief Child and Family Phone Interview; INT: Youth internalizing problem scale; SAD: Separation Anxiety subscale; GAD: Generalized Anxiety subscale; MDD: Depressive Mood subscale; EXT: Youth externalizing problem scale; ADHD: Attention Deficit Hyperactivity subscale; ODD: Oppositional Defiant subscale; CD: Conduct Problems subscale; PSOC: Parental Sense of Competence Scale; SAT: Sense of satisfaction subscale; EFF: Sense of efficacy subscale; CGSQ: Caregiver Strain Questionnaire; OBJ: Objective strain subscale; SUBEXT: Subjective externalizing strain subscale; SUBINT: Subjective internalizing strain subscale; CTS2: Revised Conflict Tactic Scale; TOL: Total aggression scale; PHY: Physical aggression subscale; PSY: Psychological aggression subscale; AAAAI: Adolescent-Parent Attachment Inventory; ANX: Attachment anxiety scale; AVO: Attachment avoidance scale.

Table 3.9 Key treatment outcomes' bivariate correlations at T1.

	INT	EXT	SAT	EFF	OBJ	SUBEXT	SUBINT	P mood	TOL-Y2P	TOL-P2Y	ANX
EXT	0.32** (0.000)										
SAT	-0.15 (0.054)	-0.47** (0.000)									
EFF	-0.07 (0.394)	-0.36** (0.000)	0.49** (0.000)								
OBJ	0.40** (0.000)	0.63** (0.000)	-0.43** (0.000)	-0.24** (0.003)							
SUBEXT	-0.08 (0.319)	0.50** (0.000)	-0.54** (0.000)	-0.47** (0.000)	0.42** (0.000)						
SUBINT	0.37** (0.000)	0.55** (0.000)	-0.48** (0.000)	-0.38** (0.000)	0.73** (0.000)	0.51** (0.000)					
P mood	0.29** (0.000)	0.37** (0.000)	-0.48** (0.000)	-0.28** (0.000)	0.40** (0.000)	0.27** (0.001)	0.46** (0.000)				
TOL-Y2P	0.22** (0.006)	0.69** (0.000)	-0.44** (0.000)	-0.27** (0.001)	0.51** (0.000)	0.49** (0.000)	0.48** (0.000)	0.33** (0.000)			
TOL-P2Y	0.06 (0.442)	0.39** (0.000)	-0.31** (0.000)	-0.29** (0.000)	0.21** (0.008)	0.52** (0.000)	0.32** (0.000)	0.23** (0.003)	0.44** (0.000)		
ANX	0.34** (0.000)	0.20* (0.012)	-0.31** (0.000)	-0.21** (0.008)	0.20* (0.013)	0.23** (0.004)	0.20* (0.010)	0.19* (0.017)	0.18* (0.024)	0.19* (0.016)	
AVO	-0.09 (0.248)	0.30** (0.000)	-0.33** (0.000)	-0.38** (0.000)	0.36** (0.000)	0.43** (0.000)	0.37** (0.000)	0.20* (0.010)	0.28** (0.000)	0.14 (0.084)	0.11 (0.171)

Note: Pearson correlation coefficients are reported in the table, with p-value in the brackets. * $p < 0.05$; ** $p < 0.01$.

INT: Youth internalizing problems; EXT: Youth externalizing problems; SAT: Parental sense of satisfaction; EFF: Parental sense of efficacy; OBJ: Objective strain; SUBEXT: Subjective externalizing strain; SUBINT: Subjective internalizing strain; P mood: Parent mood; TOL: Total aggression; Y2P: Youth to parent; P2Y: Parent to youth; ANX: Youth attachment anxiety; AVO: Youth attachment avoidance.

Pre-Treatment to Post-Treatment Changes

Youth Mental Health

Parent-reported youth internalizing problems decreased significantly from T1 to T2 with a medium effect size, $S_{mean} = -8.37$, $S.E. = 0.95$, $p = 0.000$, $d = 0.74$. Analyses of BCFPI internalizing subscales revealed that the decrease was significant with medium effect sizes for MDD ($S_{mean} = -8.43$, $S.E. = 1.21$, $p = 0.000$, $d = 0.58$) and SAD ($S_{mean} = -5.88$, $S.E. = 0.96$, $p = 0.000$, $d = 0.51$), and significant with a small effect size for GAD ($S_{mean} = -5.78$, $S.E. = 1.02$, $p = 0.000$, $d = 0.48$).

Parent-reported youth externalizing problems decreased significantly from T1 to T2 with a medium effect size, $S_{mean} = -5.18$, $S.E. = 0.78$, $p = 0.000$, $d = 0.57$. Analyses of BCFPI externalizing subscales revealed that the decrease was significant with a medium effect size for ODD ($S_{mean} = -5.43$, $S.E. = 0.85$, $p = 0.000$, $d = 0.53$), and significant with small effect sizes for CD ($S_{mean} = -5.91$, $S.E. = 1.71$, $p = 0.001$, $d = 0.28$) and ADHD ($S_{mean} = -2.96$, $S.E. = 0.89$, $p = 0.001$, $d = 0.28$).

Parental Functioning

The pre-to-post-group increase in parents' sense of efficacy in their parenting role was significant with a small effect size, $S_{mean} = 2.17$, $S.E. = 0.39$, $p = 0.000$, $d = 0.48$. The increase in parents' sense of satisfaction approached significance, $S_{mean} = 1.01$, $S.E. = 0.52$, $p = 0.052$, $d = 0.16$.

For caregiver strain, parents' objective strains associated with youth's mental health problems reduced significantly from T1 to T2 with a medium effect size, $S_{mean} = -0.45$, $S.E. = 0.07$, $p = 0.000$, $d = 0.53$. Their subjective strains reduced significantly with small effect sizes (Externalized: $S_{mean} = -0.19$, $S.E. = 0.05$, $p = 0.000$, $d = 0.31$; Internalized: $S_{mean} = -0.43$, $S.E. = 0.08$, $p = 0.000$, $d = 0.49$).

Contrary to my hypothesis, parents' depressed mood did not change significantly from T1 to T2, $S_{mean} = -1.55$, $S.E. = 1.35$, $p = 0.250$, $d = 0.10$.

Parent-child Relationship

Total aggression from youth to parents reduced significantly from T1 to T2 with a medium effect size, $S_{mean} = -0.23$, $S.E. = 0.04$, $p = 0.000$, $d = 0.52$. Analyses of CTS2 subscales revealed that the reduction was significant with a medium effect size for

psychological aggression, $S_{mean} = -0.29$, $S.E. = 0.05$, $p = 0.000$, $d = 0.54$, and significant with a small effect size for physical aggression, $S_{mean} = -0.16$, $S.E. = 0.04$, $p = 0.000$, $d = 0.37$.

Total aggression from parents to youth reduced significantly from T1 to T2 with a small effect size, $S_{mean} = -0.05$, $S.E. = 0.02$, $p = 0.022$, $d = 0.20$. Analyses of CTS2 subscales revealed that the reduction was significant with a small effect size for psychological aggression, $S_{mean} = -0.09$, $S.E. = 0.03$, $p = 0.005$, $d = 0.24$, but not significant for physical aggression, $S_{mean} = -0.02$, $S.E. = 0.02$, $p = 0.338$, $d = 0.09$. As the mean of parent-to-youth Physical Aggression subscale was low at T1 ($M = 1.07$; Possible range 1-4; 1: "Never"), the limited change could be a result of a floor effect.

Parent-reported youth attachment anxiety and avoidance reduced significantly from T1 to T2 with small effect sizes (Anxiety: $S_{mean} = -0.22$, $S.E. = 0.08$, $p = 0.005$, $d = 0.24$; Avoidance: $S_{mean} = -0.26$, $S.E. = 0.08$, $p = 0.001$, $d = 0.28$).

All treatment outcome results reported above did not change significantly when parents who did not complete the program were excluded from the analyses.

3.3. Discussion

Despite the high and increasing prevalence of adolescent mental health problems, high-quality evidence-based treatments remained hard to access for families, especially in rural and small communities. The COVID-19 pandemic exacerbated barriers to treatment, particularly group-based services, for families across all communities. This happened at a time when the service need was significantly heightened. This unique context formed the backdrop of the present study, which sought to reduce the mental health service gap for families with adolescents in BC, Canada by broadly implementing *eConnect* in the province while evaluating the implementation and treatment outcomes.

3.3.1. Implementation Outcomes

This study adopted a theory of change (ToC) approach in developing the model of implementation for *eConnect* in BC. The study results support the utility of this implementation model in promoting program uptake within communities. Specifically, the

pre-group *eConnect* facilitator training workshop prepared facilitators well for running their first *eConnect* group, as indicated by their high levels of self-rated knowledge about the program and readiness to run their first group in this format. Completing their first *eConnect* group with supervision further enhanced their understanding of *eConnect*, as well as their confidence in their own and their agency's capacity to continue to implement the program moving forward. Additionally, by following the ToC-based model of implementation, the CAP team at the core of the implementation model gained repeated experience in training and supporting practitioners in delivering the program across a range of community settings. This led them to enhance their expertise in the *eConnect* delivery format. The inclusion of *eConnect* training and support in the CAP team's standard provincial service also led to the perceived readiness within their own agency to continue to support the implementation of *eConnect* in BC beyond the scope of the research project, which is consistent with the ultimate goal of the *eConnect* initiative.

Supporting my hypothesis, the results indicated that *eConnect* was highly feasible to implement in BC. Parents and facilitators with a wide range of technical abilities were able to engage in the program, regardless of their locations or the presence of technical challenges. They also reported having a pleasant and positive experience in the online groups. Importantly, an overwhelming majority of parents (86.0%) who took part in an *eConnect* group completed the program. Given that *eConnect* was implemented on a provincial scale across communities of varying sizes and locations, these results provided encouraging evidence for the program's feasibility in BC.

Furthermore, the results supported the acceptability of the *eConnect* program as hypothesized. Parents who attended *eConnect* reported high satisfaction with the program. Facilitators who ran *eConnect* groups, as well as the core implementation team, not only reported seeing the benefits of running the program on multiple levels, but they also expected the experience to be rewarding for themselves in the form of recognition from colleagues and community partners. These positive perceptions were indicators of satisfaction with the program among the service providers, echoing the sentiments expressed by the parents. The high acceptability of *eConnect* among parents and service providers could lead to more awareness and referrals for the program and more motivation by service providers to implement the program, both of which could help

to maintain the momentum of the *eConnect* initiative, supporting the program's integration and uptake among community agencies in BC.

Finally, consistent with my hypothesis, there was evidence to support the sustainability of the *eConnect* program based on both the group facilitators' report and the implementation team's report. Of note, the core implementation team's mean Sustainability score appeared to be more modest than the facilitators' mean score. Item-level analyses suggested that the team felt confident about the program-level factors important for program sustainability (community interest, promotional strategies) but were only moderately confident about the external factors (e.g., resource availability, understanding and backing from key stakeholders) influential for program sustainability. This may reflect the broader system-level constraints present in the BC healthcare system. At the same time, given that *eConnect* is a new service being introduced into a complex healthcare system, gaining strong system-level backing and support would likely take a longer period of implementation as the system adjusts to the demands of the new program. These results pointed to the need for a stronger feedback loop back to decision-makers to enhance the sustainability of the program. This is consistent with suggestions from prior research on effective ways to elicit systemic change in healthcare (Braithwaite, 2018).

3.3.2. Treatment Outcomes

The data from this study provided encouraging evidence to support the treatment effectiveness of *eConnect*. Despite a lack of concurrent in-person *Connect* groups or control groups to compare to due to a variety of factors (e.g., the pilot nature of the study, the COVID-19-related restrictions), comparisons between the *eConnect* treatment outcome evaluation reported in this study and previously published evaluations of in-person *Connect* groups are presented below as approximate indicators of comparability between *eConnect* and in-person *Connect*.

First, the results suggested that *eConnect* led to meaningful and significant pre-to-post group reductions in adolescent emotional and behavioural problems, with effect sizes comparable to those previously reported for in-person *Connect*. Specifically, the medium effect size reduction in youth internalizing problems ($d = 0.74$) appears to be larger but comparable to the range of effect sizes reported in prior studies on in-person

Connect ($d = 0.16$ to 0.63 ; Barone et al., 2020; Barone et al., 2021; Moretti et al., 2015; Moretti & Obsuth, 2009; Osman, Flacking et al., 2017). The medium effect size reduction in youth externalizing problems in the current study ($d = 0.57$) was also consistent with the range of effect sizes reported in previous evaluations of in-person *Connect* ($d = 0.20$ to 0.68 ; Barone et al., 2020; Barone et al., 2021; Moretti et al., 2015; Moretti & Obsuth, 2009; Osman, Flacking et al., 2017). As a treatment program geared towards the reduction of mental health problems among adolescents, these results strongly supported the usefulness of the program in achieving its intended goals.

Second, improvements in parent-child relationships were also observed, and most of them were comparable to prior reports on pre-to-post-group changes in in-person *Connect*. Specifically, the small and significant reductions in youth attachment anxiety and avoidance (anxiety: $d = 0.24$; avoidance: $d = 0.28$) appeared to be relatively similar to what was previously reported for in-person *Connect* (anxiety: $d = 0.09$; avoidance: $d = 0.22$; Moretti et al., 2015), despite them being lower than the control versus treatment group differences reported by Barone and colleagues (2020; anxiety: $d = 0.56$ to 0.88 ; avoidance: $d = 0.35$ - 0.79). The medium effect size reduction in youth aggression towards parents in the present study ($d = 0.52$) was similar to a previous report on in-person *Connect* ($d = 0.74$; Moretti & Obsuth, 2009). However, the small effect size reduction in parents' aggression towards their children ($d = 0.20$) differed from the large reduction noted in prior research ($d = 0.94$, Moretti & Obsuth, 2009).

Third, while some improvements in parental functioning were found in the present study, their magnitudes appeared to be smaller than prior evaluations of in-person *Connect*, and some hypothesized changes were not evident in the present sample. For instance, while there were small to medium effect size reductions in caregiver strain, including parenting-related stressors such as missing work and financial strain (objective strain, $d = 0.53$), feelings of worry and guilt (subjective internalized strain, $d = 0.49$), and anger and embarrassment (subjective externalized strain, $d = 0.31$), the effect sizes were lower than those previously reported for in-person *Connect*, which were in the medium to large range ($d = 0.93$, 0.98 , and 0.70 respectively; Moretti & Obsuth, 2009). Similarly, the medium size increase in parents' sense of efficacy ($d = 0.48$) and the marginal increase in parents' sense of satisfaction in their parenting role ($d = 0.16$) were smaller than the medium to large increases reported for in-person *Connect* ($d = 0.71 - 0.86$ and $d = 0.45 - 0.74$ respectively; Moretti & Obsuth, 2009). Additionally,

parents in the current study did not report a significant reduction in depressed mood ($d = .10$), while small effect size decreases were repeatedly reported in prior evaluations of in-person *Connect* ($d = 0.21-0.33$; Högström et al., 2017; Stattin et al., 2015).

The finding that *eConnect* groups in the present study had limited impact on parents' own functioning compared to in-person *Connect* groups was interesting, especially given parents' high level of satisfaction with the program as well as the largely comparable changes in youth functioning and parent-child relationships between the two formats. Considering that all the *eConnect* groups in the present sample took place during the COVID-19 pandemic, whereas the in-person *Connect* groups reported in prior studies were completed before the pandemic, it is difficult to differentiate the effects of the pandemic and the effects of the change in program delivery format. On the one hand, it is possible that the prolonged and stressful effects of COVID-19 limited parents' ability to benefit as substantially from *eConnect* during the ten weeks of the program as they perhaps could without this stressor. One piece of evidence for this hypothesis is that at pre-treatment, a significant portion of parents reported that the pandemic and pandemic-related public health guidelines contributed to their depressed mood (87.2%), caregiving strain (55.6%), lack of sense of competence as parents (53.4%), and aggressive behaviours towards their children (34.2%). On the other hand, it is possible that the lack of physical closeness and the opportunities for casual social interactions with each other in the *eConnect* groups attenuated the program's capacity to improve parents' own well-being. In order to tease apart the effects of the pandemic and the effects of the online delivery format, further research is needed to evaluate if and how the online format might have negatively impacted the program's effectiveness in improving parents' functioning. This is discussed further in the next chapter.

Chapter 4.

Limitations, Implications, and Future Directions

4.1. Limitations and Future Research

The present research project represented the first effort to adapt the *Connect* program for an online delivery format and evaluate its outcomes. Both the pilot nature of this project and the pandemic context led to some limitations to the study design and sample that could be addressed in future research.

First, the COVID-19 pandemic is an important confounding factor that limited the generalizability of the results. With respect to implementation success, the demands and limitations associated with the pandemic might have led to mental health agencies being more motivated and willing to dedicate the necessary resources to implement *Connect* online, as in-person implementation was not possible. Beyond the pandemic, agencies' priorities, preferences, and resource availability could change, which may affect their willingness and ability to run more *eConnect* groups, impacting the program's long-term acceptability and sustainability as a result. As the public health restrictions loosen, parents' desire for in-person contact could also negatively affect their satisfaction with accessing interventions via an online-only format. With respect to treatment effectiveness, as discussed in Study 2, it is conceivable that the extra stress on families and the social isolation resulting from the pandemic could have had a significant impact on the program's ability to effect change, leading to some of the lower-than-expected program impact, especially with parents' own functioning. To address these pandemic-related impact on the generalizability of the results from the present study, continued evaluation of *eConnect*'s acceptability, sustainability, and treatment effectiveness beyond the pandemic is needed. Particularly, randomized controlled trials (RCTs) comparing the effectiveness of *eConnect* and in-person *Connect* in contrast to a control group beyond the pandemic are needed to formally evaluate the true effectiveness and efficacy of *eConnect*, particularly with respect to the program's ability to improve parents' own well-being. The comparisons of treatment outcomes between *eConnect* and in-person *Connect* discussed in Study 2 should only be viewed as observations to be further investigated formally through these RCTs.

Second, the present study's assessment period is relatively limited. For treatment outcomes, only pre-to-post-group changes were examined. While the changes in parental aggression and parental functioning were less robust than anticipated during this period, parents' continued use of skills learned in the group could lead to further improvements beyond the duration of the group. Prior research suggested that *Connect* could lead to significant changes for families up to two years after the completion of the program (Högström et al., 2017). As such, follow-up studies are needed to investigate the long-term effects of the *eConnect* groups completed during the pandemic. With respect to implementation success evaluation, it should be noted that data from facilitators were largely collected after their first *eConnect* group. It is possible that with the repeated implementation of *eConnect* in their agency, facilitators' perceptions of the program's acceptability and sustainability could change. Thus, follow-up studies could assess these facilitators' view of the program after a longer period of implementation to obtain a more evolved perspective of the fit of the program with the service provider agency and with the needs of the community. Given the changes in COVID-19-related restrictions after the end of this study, follow-up studies with facilitators who delivered *eConnect* at the height of the pandemic could also lead to a better understanding of how changes in the implementation context may impact the adoption and scale-up of the *eConnect* program in BC.

Third, the service providers who participated in Study 2 were limited to front-line program implementors only, including the facilitators who delivered the program and the CAP team at the core of the development and implementation of *eConnect* in BC. This limitation of participants means that the perception of *eConnect* among other important stakeholders (e.g., managers) was only indirectly assessed through the front-line workers' perspectives. Direct reports from a wide range of stakeholders, particularly those critical to the program's funding and operation, could offer valuable and direct insight regarding how *eConnect* was perceived on other levels of the healthcare system. It could also function as an important feedback loop, promoting changes in a complex system such as the healthcare system in the long run (Braithwaite, 2018). Thus, future studies could interview managers, policymakers, and other stakeholders influential to the implementation of *eConnect*, providing information about the program, seeking feedback about their perceptions of and concerns for the program, inviting suggestions, and encouraging participation from these stakeholders in the *eConnect* initiative.

Fourth, the treatment outcome evaluations reported in the present study were limited to parent self-report questionnaires adopted in previous studies on *Connect*. This approach allowed for a balance between the goal of establishing *eConnect*'s feasibility and adoptability and the goal of evaluating the program's helpfulness to families. With the preliminary findings supporting the ongoing implementation and evaluation of *eConnect*, future research should evaluate both parent- and youth-reported outcomes to gain a deeper understanding of the impact of the program. The use of observational or qualitative measures could also offer a more nuanced perspective on the effect of the program on parents and youth, complementing the quantitative self-reports.

Finally, it should be acknowledged that the samples of both studies were predominantly white. As such, the results may not apply to ethnically diverse populations. This underrepresentation of diverse populations in the parents who participated in *eConnect* could be a result of the ongoing difficulty in accessing mental health services among ethnically diverse populations (Chiu et al., 2018; Poitras et al., 2022). It could also be evidence of a need for culturally tailored engagement strategies and programs. Fortunately, *Connect* has been adapted for various cultural groups (e.g., Indigenous populations, Chinese families, and refugees), and the evaluation of the *eConnect* version of these programs is ongoing. Preliminary findings from the *eConnect* groups ran in South Africa (Haffejee & Theron, 2022) and Mexico (Gallegos-Guajardo et al., 2022), and with refugee parents in Sweden who came from Afghanistan, Somalia, and Syria (Osman & Skutin, 2022) have been promising.

4.2. Significance and Implications

This project is an important step in further increasing the accessibility of the *Connect* Attachment Program through online implementation. Despite the confounding pandemic factor and other limitations noted in the prior section, the results supported the viability of implementing attachment-based, process-focused group interventions such as *Connect* in an online format. The availability of the *eConnect* program delivery format opens an exciting new avenue for researchers and community agencies who wish to remove implementation and service access barriers and improve mental health service accessibility. Pending future RCT investigation of the comparability of *eConnect* with in-person *Connect*, the results of the present study provided encouraging evidence that the *eConnect* program could be quite comparable to in-person *Connect* in many important

domains. Thus, in choosing to adopt an online or in-person program format, more weight could be given to the fit of each modality with the local implementation context. Researchers and practitioners are encouraged to attend to a range of individual- (e.g., parents' preference), organization- (e.g., resource availability), community- (e.g., distribution of population with service needs), and system-level (e.g., government policies) factors that could affect the fit of the program with the local context when choosing the best approach to implement *Connect*. For instance, instead of defaulting to offering *Connect* online or in-person, agencies could strategically offer in-person *Connect* groups for parents who could attend and have a preference for in-person, while offering the program in *eConnect* format for parents who are geographically isolated or are bound by competing responsibilities or limited resources to participate in the program more easily. This flexible implementation approach could help to maximize program accessibility and reduce the mental health service gap in their community. On the other hand, agencies with limited resources could choose to heavily leverage the *eConnect* format, as it would allow them to collaborate in the implementation of the program, reducing the resource demand on each agency while enhancing their own capacity to provide an attachment-based intervention in their communities.

The ability to overcome geographical barriers have particularly significant implications for specialized group-based programs designed for populations with unique challenges and needs (e.g., *Connect* for kinship and foster parents, *Connect* for parents of gender diverse youth, non-English versions of *Connect*). Often there are fewer facilitators who could facilitate these programs and the parents are also more geographically dispersed, and thus running the group in person is often tremendously difficult or impossible. The *eConnect* format could help to bring the facilitators and parents together online, making these programs more feasible to implement and more accessible to parents.

A unique aspect of the present study is the intentional utilization of implementation-science-informed strategies and principles, including the adoption of a theory of change (ToC) approach in the implementation of a parenting group intervention, which is the first in this field. ToC allowed for the proactive planning of an implementation model that incorporated formal evaluations of implementation progress and success in addition to the evaluation of treatment outcomes. The assessment of the perception and experience of the service providers involved in the implementation

process has often been overlooked in past research, but this is an important area to assess, especially for newly developed programs. This is because, without positive perceptions from service providers on the program's fit and viability, or adequate readiness for future implementation among the service providers, the effort to implement the program as part of a research project would likely have a very limited impact at a population level beyond the scope of the project. The reported results in this study are promising in this regard. Program feasibility was high, with a higher program completion rate (86.0%) than what was previously reported for in-person *Connect* (77% to 84%; Moretti & Obsuth, 2009; Moretti et al., 2015). Program acceptability was high on a parent, facilitator, and implementation team level, and facilitators and implementation team members had a moderately positive to a positive perception of the program's long-term sustainability. This evidence is a positive indicator of the program's uptake within the BC healthcare system and supported the effectiveness of the implementation model derived from the ToC approach. Future research on new innovations for the healthcare system could also adopt a ToC approach in the development of a plan for implementation to increase efficiency and assess implementation progress and success. This approach would likely be particularly helpful when the implementation of the innovation involves more steps or more sectors of the system, or when there is not a pre-existing mechanism in place to support its ongoing operation (e.g., the *Connect* network of operations headed by the CAP team that existed in BC prior to *eConnect*).

Finally, the success of this project benefited significantly from the adoption of a co-creation approach throughout the program development and implementation processes. This approach emphasized the partnership between researchers and service providers, allowing practitioner insight and feedback to inform both the program design and implementation procedures, maximizing the fit of both the program itself and its rollout process with the real-world context. At the same time, research is embedded within the implementation framework, which allowed for the evaluation of the project on multiple levels. In the present study, this was done through an early and continuous partnership with the CAP team at Maples in developing *eConnect*, making sure that the program is feasible to implement while retaining fidelity, and then incorporating the implementation activities for *eConnect* in the standard provincial service that the CAP team offers, followed by the simultaneous running and evaluation of the program across communities. This approach had positive implications for the broader population in BC,

as families in need of the service could get access to the program during the program development and evaluation stages, and they could also retain access to the program beyond the research project as the agencies with certified facilitators could continue to run *eConnect* groups, and the CAP team could continue to offer *eConnect* training to practitioners, leading to an ongoing supply of facilitators ready to implement *eConnect*. Future studies on the creation and implementation of a new program within the healthcare system would likely benefit from adopting a similar co-creation approach, allowing the program to firmly plant its roots in the community from its inception, narrowing the research-practice gap.

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