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# eConnect: implementation and preliminary evaluation of a virtually delivered attachment-based parenting intervention during COVID-19

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## ABSTRACT

Connect, an attachment-based and trauma-informed parenting group intervention, has been demonstrated to improve adolescent mental health, parental wellbeing, and family functioning. We report on the online adaptation and delivery of Connect (eConnect) and pre-post treatment changes in parent, family and youth functioning in a clinical sample (N= 190) of parents of youth with serious mental health challenges. Consistent with research evaluating in-person Connect, parents reported significant reductions in youth internalizing and externalizing problems, attachment anxiety and avoidance, and aggression toward parents. Parents also reported significant reductions in caregiver strain and aggression toward their child. Unlike prior research, parent depressed mood did not decline, perhaps due to pandemic stressors. Program completion was remarkably high (84.7%), and parents reported high program satisfaction. Uptake by eConnect program facilitators and host agencies was extremely positive, suggesting good potential for sustainability and broadened program accessibility. Randomized clinical trials and implementation within diverse populations are needed.

## KEYWORDS

Attachment; parenting; intervention; adolescents; implementation; intervention

## Introduction

The global prevalence of mental disorders among adolescents ranges from 18% to 25% (Georgiades et al., 2019; Silva et al., 2020). During the COVID-19 pandemic, many adolescents reported even higher levels of mental health problems (Jones et al., 2021; Nearchou et al., 2020; Panda et al., 2020), and reports of familial violence and child maltreatment increased (Cappa & Jijon, 2021; Public Health Ontario, 2021). The prevalence of mental health problems among adolescents prior to COVID-19 and its worsening during the pandemic call attention to the need for accessible and effective interventions for this age group and their families (Fitzpatrick et al., 2020). Yet the pandemic has posed overwhelming challenges for service delivery on a global scale (World Health Organization, 2020), exacerbating the longstanding gap between service provision and the significant

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and often overlooked mental health needs of adolescents (, 2010). Thus, the need for accessible and evidence-based interventions has never been greater.

While many effective attachment-based parenting interventions are available for parents of infants and young children (e.g. Attachment and Biobehavioral Catch-up, Video-Feedback Intervention to promote Positive Parenting and Sensitive Discipline; Gregory et al., 2020; Grube & Liming, 2018; Juffer et al., 2018), few are designed to address the unique challenges that come with parenting youth during the transition of adolescence (Jugovac et al., 2022). *Connect* is a manualized, attachment-based, and trauma-informed group intervention for parents and caregivers of youth ages 8 to 18 years who struggle with clinically significant mental health challenges, including both internalizing and externalizing problems (Moretti, 2020). Each session is delivered by two trained *Connect* facilitators and accommodates 8–16 parents.

Prior to the 10-session program, *Connect* facilitators meet with parents to build trust, promote motivation, and address barriers to program attendance through a semi-structured invitational meeting. The program then begins with a group welcome meeting to build trust within the group and introduce the focus, structure, and process of the program. This is followed by nine weekly sessions, each of which introduces an attachment principle related to attachment, parenting, and adolescent development. Each 90-minute session is designed to target the building blocks of attachment security, including parental reflective function (Slade, 2005), parenting sensitivity, dyadic affect regulation (Moretti et al., 2015) and mutuality in resolving problems (Moretti et al., 2018).

This is achieved through the live delivery of role-plays by the facilitators. The first two role-plays are designed to demonstrate two different parental reactions to challenging youth feelings and behaviours that could lead to heightened strain and distress in parent-child relationships (reactive and dismissing reactions). The reactive parental reactions are emotionally volatile, confrontational, and overtly aggressive, and the dismissing parental reactions are emotionally restricted, dismissing, and covertly aggressive. Parents then work to “rescript” a more responsive and sensitive parental response, which is subsequently portrayed in a third role-play. Each role-play is followed by a sequence of reflective exercises that promote parents’ recognition and compassion for their own and their children’s feelings and thoughts in such situations; increase parents’ awareness and sensitivity to their children’s attachment needs during difficult interactions; encourage parents to step forward to support emotion regulation in the relationship; and shift parents away from prioritizing problem solving and towards working in partnership with their children to move forward in a way that supports the parent-child relationship. At the end of the program, parents provide feedback in a semi-structured feedback group interview and complete a feedback form.

The effectiveness of *Connect* (Level 1 – Supported Program; California Evidence Based Clearinghouse, 2022) has been demonstrated in a series of uncontrolled, waitlist and randomized clinical studies in reducing youth mental health problems, decreasing caregiver stress and depression, and increasing parenting sense of competence, with sustained and further significant improvements for up to two years post-treatment (Barone et al., 2020, 2021; Högstöm et al., 2017; Moretti & Obsuth, 2009; Moretti et al., 2012, 2015; Osman, Flacking, et al., 2017; Osman, Salari, et al., 2017; Ozturk et al., 2019; Pasalich, Craig, et al., 2021; Pasalich, Moretti, et al., 2021; Stattin et al., 2015). Additionally, research has demonstrated that reductions in youth attachment anxiety and avoidance across

treatment are associated with reductions in internalizing and externalizing problems respectively (Moretti et al., 2012, 2015), and youth with the highest level of serious behaviour problems and callous-unemotional features benefit most quickly and most significantly over the course of treatment (Pasalich, Craig, et al., 2021). More information regarding the evidence base of *Connect* can be found on *Connect's* website (Adolescent Health Lab, n.b.).

To overcome the challenges of the COVID-19 pandemic and respond to a high level of need for the program, we accelerated our initiative to adapt *Connect* for an online delivery format. Although most studies have focused on evaluating online programs adopting social-learning approaches and targeting early or middle childhood, meta-analytic reviews show that online and in-person parenting programs are equally effective in improving parent and child outcomes (Floean et al., 2020; Spencer et al., 2020). Additionally, group-based interventions implemented online have been similarly effective as the in-person format (Marton & Kanas, 2016). Buoyed by this research, we aimed to adapt *Connect* with careful attention to preserving program fidelity and group process. Twelve mock sessions were completed with an international team of clinicians and researchers familiar with *Connect* to refine the online delivery format before implementation with families referred for clinical service. For a detailed description of the development process for the adapted program, *eConnect Online* (hereafter referred to as *eConnect*), please refer to Bao (2022).

The number, duration, length, and content of *eConnect* sessions, as well as the group size, remained the same as its in-person counterpart. Adjustments were made to program delivery to retain real-time parent engagement and full group process. First, a videoconferencing delivery format was adopted to ensure that facilitators' emotionally evocative role-plays were impactful and delivered in real-time, supporting reflection and exchange amongst *eConnect* facilitators and parents. Second, a screen-shared virtual flip-chart document was used to write down parents' feelings, thoughts, and reflections in real-time, ensuring that parents could see and reflect on their responses and those of others, and promoting deep and emotionally rich reflections and groups discussions. Third, *eConnect* facilitators received coaching on how to engage sensitively and therapeutically using the online platform, overcoming the challenges posed by the online delivery format to sustain safety, emotional engagement, and therapeutic group process. Fourth, tech support was provided to parents prior to the intervention to set up their device and orient them to the online platform. Tech support was also provided during group, removing the burden of navigating flip-charts, screen sharing and responding to occasional parent requests for tech support. This tech role was often filled by agency staff or trainees interested in learning about *Connect*.

To ensure program fidelity, *eConnect* facilitators completed an online workshop with an emphasis on hands-on practice. They also received supervision based on review of each session's recording until they achieve certification. This was typically achieved after one full program cycle. Facilitators also completed session adherence forms, which were discussed with their *Connect* supervisor on a weekly basis.

The current study was designed as an uncontrolled preliminary trial of the *eConnect* program in a sample of 190 parents of youth (mean age = 13.2 years;  $SD = 2.6$ ) referred for clinical services due to concerns about serious externalizing and internalizing symptoms during the COVID-19 pandemic. Here we report on pre- and post-treatment changes of

parent, youth, and family functioning, which we discuss in relation to previously published results for in-person *Connect*. We also report on the quality and acceptance of the program, as reported by parents and facilitators of the groups, and technical challenges as indicators of program feasibility and acceptability. Finally, we report on *eConnect* facilitators' perceptions of program fit and sustainability.

## Methods

### *Procedures*

Staff from hospitals, community mental health clinics, and specialized school counselling services with advanced training in child mental health or development and/or advanced practice in the field were eligible to complete training, supervision, and certification in the delivery of the *eConnect* program.

Parents of youth aged 8–18 with serious behavioral and mental health problems were referred by community counsellors, therapists, and other frontline staff and provided with program information. Exclusion criteria for enrollment included a child diagnosis of significant intellectual disability ( $IQ < 70$ ), major mental disorder (schizophrenia, bipolar disorder), or acute psychosis. Parents were also required to have access to a computer, tablet, or other device, either their own or through temporary loan from the service agency or research team, that allowed them to join Zoom meetings. For the groups in this study, no parents were excluded based on these criteria.

Once parents were enrolled in the group, they were informed of the opportunity to voluntarily participate in this research study. Access to the intervention was not contingent on their participation. Those who expressed interest in the study were contacted by a university research assistant who shared more information about the study and obtained parents' informed consent. Parents who provided consent were provided with an online questionnaire package pre- (T1), post-treatment (T2). At each time point, parents received a \$20 honorarium for completing the questionnaire package. Of the 268 parents who were informed of the option to participate in the study, 83.6% ( $N = 224$ ) chose to participate. Reasons for non-participation included having a partner who was already participating in the study on behalf of the family (1.1%); early withdraw from the intervention (3.0%); lack of time or interest (12.3%).

*eConnect* facilitators were also contacted by a university research assistant one month before their program start date and informed about the opportunity to voluntarily participate in this study. Facilitators who consented to participation were provided with a questionnaire package to complete at post-treatment (T2). Approximately 7.5% of the facilitators chose not to participate in this study.

All research protocols and procedures received approval from [blinded for review] University Office of Research Ethics [#2011s0284 and #20200401].

## Participants

### Parents and youth

In total 42 *eConnect* groups launched and completed in Canada during the COVID-19 pandemic from 2020 to early 2022; 224 parents enrolled in these groups consented and participated in the program evaluation study on *eConnect*. Only birth parents are included in this study (23 parents excluded). To avoid dependency in the data, when two parents completed the study measure package for their child, responses from only one parent was retained (11 parents excluded). 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; 4) if equal, then the parent who spent more time spend with the child per day. Of the 190 birth parents included in this study, 182 (95.8%) completed measures at pre-treatment (T1) and 164 (86.3%) at post-treatment (T2). Parents who completed measures at either or both time points were retained; parents' ethnicity, gender, age, income, and education did not vary significantly based on their survey completion status. Parents were predominantly white (75.8% white; 9.5% Asian; 8.4% Indigenous, 5.3% other ethnicities; 5.8% mixed ethnicity; 6.8% did not respond). Annual income for almost over one-third of families (36.8%) was \$40,000 or lower, and a 42.1% reported that they barely or did not have enough money to cover their living expenses. Parent education included high school level education or less (15.8%), apprenticeship or other trade certificate (5.8%), and partial or full completion of college or university education (74.2%).

Parents reported on their child's age ( $M = 13.2$  years), gender (55.3% female, 34.7% male, 10.0% other gender); ethnicity (76.8% white; 12.1% Indigenous; 11.6% Asian; 9.5% other ethnicity; multiple ethnicity; 17.4%; 7.9% not reported). At T1, 86.8% of the youth were living with their birth parents and 8.4% had other living arrangements (4.7% not reported).

### *eConnect* program facilitators

Of the 67 group facilitators who delivered *eConnect*, 62 (92.5%) consented to participate in this study and completed questionnaires at T2 (88.7% female; 11.3% male;  $M_{age} = 42.7$ ; 82.3% white; 4.8% Indigenous; 12.9% Asian; 3.2% black; 1.6% not reported). Most group facilitators who participated in this study had completed advanced training in psychology or social work (70.9%); others had advanced training in affiliated disciplines (e.g. education and childcare; 29.1%). The group facilitators had on average 10.2 years of experience in the child and youth mental health field. Approximately 54.8% of the group facilitators had run an in-person *Connect* group prior to *eConnect*; the remaining facilitators were newly trained and were running *eConnect* group under supervision. Before undertaking *eConnect*, the group facilitators were moderately to extremely familiar (62.9%) or slightly to somewhat familiar (30.6%) with videoconferencing prior to program; only 6.5% were not familiar with this format.

To support the broad implementation of *eConnect* across communities, individualized training was provided to tech support staff to ensure the smooth delivery of the program regardless of their prior experience and skill level with technology. Of the 26 tech facilitators who supported the delivery of *eConnect*, 24 (92.3%) consented to participate

in the study and completed questionnaires at T2 (75.0% female; 20.8% male; 4.2% agender;  $M_{age} = 41.5$ ; 87.5% white; 4.2% Indigenous; 4.2% Asian; 4.2% Black). On average, the tech facilitators who participated in this study practiced in the child and youth mental health field for 11.4 years. Half of the tech facilitators had run a *Connect* group prior to supporting the *eConnect* group. They were largely moderately to extremely familiar (58.3%) or slightly to somewhat familiar (33.3%) with videoconferencing prior to program; only 8.3% were not familiar with this format.

## Measures

### Parent reports

Except for questionnaires evaluating parents' experiences of virtual service delivery, parent self-report measures mirrored those used in previous evaluations of *Connect*, ensuring consistency in program evaluation across delivery modalities. Measures of parent, youth and family functioning were completed pre- and post-treatment; measures of parents' experiences of virtual service delivery were completed only at post-treatment.

**Brief Child and Family Phone Interview (BCFPI).** The BCFPI is a 36-item standardized self-report measure that assesses internalizing and externalizing problems among children and adolescents referred for mental health services (Cunningham et al., 2000). Externalizing problem 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 problem 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"). The BCFPI also includes 6 items that assess parental depressed mood (e.g. "you felt depressed"). The internal consistency of the subscales was good in the current sample at T1 (ADHD:  $\alpha = 0.85$ ; ODD:  $\alpha = 0.88$ ; CD:  $\alpha = 0.71$ ; SAD:  $\alpha = 0.88$ ; GAD:  $\alpha = 0.90$ ; MDD:  $\alpha = 0.92$ ; Parental mood:  $\alpha = 0.85$ ) and T2 (ADHD:  $\alpha = 0.87$ ; ODD:  $\alpha = 0.90$ ; CD:  $\alpha = 0.78$ ; SAD:  $\alpha = 0.87$ ; GAD:  $\alpha = 0.86$ ; MDD:  $\alpha = 0.90$ ; Parental mood:  $\alpha = 0.88$ ). T-scores were used in the current study.

**Caregiver Strain Questionnaire (CGSQ).** The CGSQ is a 21-item self-report measure that assesses perceived strain experienced by parents of youth with mental health problems (Brannan et al., 1997). The three subscales had acceptable to good internal consistency in the current sample objective strain (e.g. missing work, financial strain; T1:  $\alpha = 0.93$ ; T2:  $\alpha = 0.93$ ), subjective externalizing strain (e.g. anger, embarrassment; T1:  $\alpha = 0.75$ ; T2:  $\alpha = 0.69$ ), and subjective internalizing strain (e.g. anxiety, fatigue; T1:  $\alpha = 0.89$ ; T2:  $\alpha = 0.88$ ).

**Revised Conflict Tactic Scale (CTS2).** The CTS2 is a 44-item self-report measure that is widely used to assess violence and aggression within relationships (Straus et al., 1996). Two subscales from this measure were adapted to measure aggression from youth to parent and from parent to youth, including physical aggression (7 items; e.g. "slapped;") Youth to parent T1:  $\alpha = 0.90$ , T2:  $\alpha = 0.92$ ; Parent to youth T1:  $\alpha = 0.61$ , T2:  $\alpha = 0.87$ ) and psychological aggression (9 items; e.g. "said something to spite;") Youth to parent T1:  $\alpha =$

0.91, T2:  $\alpha = 0.90$ ; Parent to youth T1:  $\alpha = 0.72$ , T2:  $\alpha = 0.84$ ). A total aggression score was calculated as the mean of the two subscale scores.

**Adolescent Attachment Anxiety and Avoidance Inventory (AAAAI).** The AAAAI is a 16-item self-report measure, adapted from the Experiences in Close Relationships (ECR) scale (Brennan et al., 1998), that measures the quality of youth's attachment to their primary caregivers as rated by the caregivers (Moretti & Obsuth, 2009; Moretti et al., 2015). The two subscales had good internal consistency: attachment anxiety (T1:  $\alpha = 0.84$ , T2:  $\alpha = 0.84$ ; e.g. "my child needs a lot of reassurance that they are loved by me") and attachment avoidance (T1:  $\alpha = 0.94$ , T2:  $\alpha = 0.94$ ; e.g. "whenever we get close, my child pulls back from me").

**Technical Challenge Questionnaire – Parent Version (TCQ-P).** TCQ-P is a 7-item self-report measure (Bao, 2022) created to assess the level of technical challenges that parents experienced in *eConnect* groups (1 item; i.e. how often the parent experienced technical challenges) and the impact these challenges had on their ability and motivation to participate in group (6 items; e.g. "ability to participate in the conversations").

**Videoconferencing Experience Questionnaire – Parent Version (VEQ-P).** Adapted from the Telehealth Usability Questionnaire (TUQ; Parmanto et al., 2016), VEQ-P is a 11-item self-report measure designed to assess the online aspect of parents' experiences in *eConnect* groups. Two subscales were previously identified using factor analysis (Bao, 2022): ease of use (ease of using and learning to use the videoconferencing platform; 3 items; e.g. "it is simple to use the videoconferencing platform;"  $\alpha = 0.87$ ) and quality of experience (parents' satisfaction with the platform's interface and experience; 2 items; e.g. "I like using the videoconferencing platform;"  $\alpha = 0.73$ ). The possible range for each subscale is 1–7 (1: highly negative experience, 7: highly positive experience).

**Parental Program Acceptability Questionnaire (PPAQ).** Adapted from the Satisfaction and Future Use subscale of the TUQ (Parmanto et al., 2016), the PPAQ is a 5-item self-report questionnaire designed to measure parent-reported acceptability of *eConnect*. One 3-item subscale was previously identified via factor analysis (Bao, 2022), measuring parents' satisfaction with *eConnect* (e.g. "overall, I am satisfied with the *eConnect* program;"  $\alpha = 0.87$ ; possible range: 1–7, 1: high dissatisfaction, 7: high satisfaction).

### Facilitator reports

Measures of facilitators' experience with online program delivery and their perceptions of program sustainability were administered post treatment only.

**Technical Challenge Questionnaire – Facilitator Version (TCQ-F).** TCQ-F is a 6-item self-report measure (Bao, 2022) created to assess the level of technical challenges that facilitators experienced in *eConnect* groups (1 item i.e. how often the facilitator experienced technical challenges) and the impact of these challenges on their ability to facilitate the group (5 items; e.g. "communicate with others in the group").



***Videoconferencing Experience Questionnaire – Facilitator Version (VEQ-F).*** Adapted from the Telehealth Usability Questionnaire (TUQ; Parmanto et al., 2016), VEQ-F is a 12-item self-report measure designed to assess the online aspect of facilitators' experiences during their *eConnect* groups. Two subscales were previously identified via factor analysis (Bao, 2022): ease of use (ease of using the videoconferencing platform; 3 items; e.g. "it is easy to learn to use the videoconferencing platform;"  $\alpha = 0.79$ ) and quality of experience (quality of communication experience on the platform; 3 items; e.g. "I feel that I am able to express myself effectively on the videoconferencing platform;"  $\alpha = 0.84$ ). The possible range for each subscale is 1–7 (1: highly negative experience; 7: highly positive experience).

***Service Provider Program Acceptability Questionnaire (SPPAQ).*** Adapted from the Acceptability subscale from the Usage Rating Profile – Intervention Revised (URP-IR; Chafouleas et al., 2011) and the Beliefs about Consequences subscale from the DIBQ (Huijg et al., 2014), the SPPAQ is a 15-item self-report measure designed to measure the acceptability of *eConnect* within the context of the facilitators' own agencies. Two subscales were previously identified via factor analysis (Bao, 2022): attitude (facilitator attitude towards *eConnect*; 2 items; e.g. "It is worthwhile for my organization to implement the *eConnect* program;"  $\alpha = 0.86$ ) and outcome expectancies (facilitator expectations regarding the outcomes of implementing *eConnect* on a personal, agency, and community level; 4 items; e.g. "The implementation of the *eConnect* program will be appreciated by families;"  $\alpha = 0.86$ ). The possible range for each subscale is 1–7 (1: highly negative perceptions; 7: highly positive perceptions).

***Program Sustainability Questionnaire (PSQ).*** Adapted from the Program Sustainability Assessment Tool (PSAT; Luke et al., 2014), the PSQ is an 8-item self-report questionnaire designed to assess factors that could contribute to the sustainability of the *eConnect* program within the context of facilitators' agencies in the Canadian context. One 4-item sustainability subscale was previously identified via factor analysis (Bao, 2022; e.g. "Our community and community partners have a vested interest in the success of the *eConnect* program;"  $\alpha = 0.80$ ; possible range: 1–7; 1: lack of sustainability; 7: high sustainability), measuring key factors critical to program sustainability, including funding availability, interest from community, organizational support, and clarity regarding program goals.

### ***Statistical analyses***

Intent-to-treat analyses were completed using data from all parents who completed T1 or T2 questionnaires analyses even if the parent did not complete the program. For treatment outcome measures administered at T1 and T2, pre-post-group 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) with robust standard errors was used to account for missing data. All models were "just identified" (meaning the number of observed parameters was equal to the number of estimated parameters with degrees of freedom = 0), and thus, 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 (Cohen, 1988). Model invariance was examined across parent gender, but no significant differences were found, and thus the results reported are based on the combined maternal ( $N = 171$ ; 90.0%) and paternal reports ( $N = 91$ ; 10.0%).

To avoid dependency in the facilitator data, only data from facilitators' first *eConnect* group was reported, reflecting their experiences in 37 of the 42 groups included in this study.

## Results

### Parent report: pre-post-treatment changes

#### Changes in youth functioning

As shown in Table 1, based on parent reports, there was a moderate size and significant reduction in youth internalizing problems from pre- to post-treatment ( $\beta = -8.19$ ,  $SE = 0.88$ ,  $p = 0.000$ ,  $d = 0.75$ ). Small to moderate effect size reductions were evident on each internalizing mental health subscale (MDD:  $\beta = -8.26$ ,  $SE = 1.18$ ,  $p = 0.000$ ,  $d = 0.56$ ; SAD:  $\beta = -5.74$ ,  $SE = 0.89$ ),  $p = 0.000$ ,  $d = 0.52$ ; GAD:  $\beta = -5.65$ ,  $SE = 0.97$ ,  $p = 0.000$ ,  $d = 0.46$ ).

Similarly, there was a moderate size and significant reduction in youth externalizing problems from pre- to post-treatment ( $\beta = -5.24$ ,  $SE = 0.79$ ,  $p = 0.000$ ,  $d = 0.54$ ). Small to moderate effect size reductions were evident on each externalizing mental health

**Table 1.** Descriptive statistics of treatment outcomes.

Outcomes	Timepoint	Mean	SD	Minimum	Maximum	N
Internalizing problems	T1	69.93	15.62	38.43	108.85	178
	T2	62.07	14.94	36.42	103.43	160
SAD	T1	60.43	17.02	40.18	111.38	178
	T2	55.25	15.18	40.18	99.74	160
GAD	T1	64.82	16.35	35.88	92.47	178
	T2	59.37	14.54	35.88	92.47	160
MDD	T1	72.53	18.14	41.31	104.63	178
	T2	64.33	17.11	41.31	104.63	159
Externalizing problems	T1	71.67	12.23	41.50	103.46	179
	T2	66.68	13.35	37.22	111.22	160
ADHD	T1	70.83	11.73	38.98	87.75	179
	T2	67.35	12.67	40.21	87.75	160
ODD	T1	69.34	12.40	36.09	88.89	179
	T2	64.09	13.72	37.61	88.89	160
CD	T1	60.27	22.66	44.90	180.60	180
	T2	56.34	23.40	44.90	226.56	160
Objective strain	T1	2.47	1.03	1.00	5.00	177
	T2	2.04	0.90	1.00	5.00	159
Subjective externalized strain	T1	2.09	0.83	1.00	5.00	177
	T2	1.95	0.73	1.00	4.25	159
Subjective internalized strain	T1	3.43	1.01	1.00	5.00	177
	T2	3.06	1.04	1.00	5.00	159
Youth to parent aggression	T1	1.62	0.53	1.00	3.43	178
	T2	1.42	0.46	1.00	2.97	159
Parent to youth aggression	T1	1.20	0.18	1.00	1.95	178
	T2	1.16	0.24	1.00	2.58	159
Youth attachment anxiety	T1	3.00	1.16	1.00	5.86	179
	T2	2.87	1.17	1.00	6.57	161
Youth attachment avoidance	T1	3.18	1.48	1.00	7.00	179
	T2	2.97	1.37	1.00	7.00	161

subscale (ODD:  $\beta = -5.56$ ,  $SE = 0.82$ ,  $p = 0.000$ ,  $d = 0.54$ ; ADHD:  $\beta = -3.25$ ,  $SE = 0.85$ ,  $p = 0.000$ ,  $d = 0.30$ ; CD:  $\beta = -4.80$ ,  $SE = 2.12$ ,  $p = 0.023$ ,  $d = 0.19$ ).

We also found small effect size reductions in parent reports of youth attachment anxiety and attachment avoidance from pre- to post-treatment (Anxiety:  $\beta = -0.18$ ,  $SE = 0.07$ ,  $p = 0.012$ ,  $d = 0.20$ ; Avoidance:  $\beta = -0.25$ ,  $SE = 0.07$ ,  $p = 0.001$ ,  $d = 0.27$ ).

### *Changes in parental mental health*

Parents' level of objective strain (e.g. missing work, financial strain) showed a moderate size and significant reduction from pre- to post-treatment,  $\beta = -0.46$ ,  $SE = 0.07$ ,  $p = 0.000$ ,  $d = 0.55$ . Subjective strains also showed small but significant drop: Internalized (e.g. worry, guilt):  $\beta = -0.41$ ,  $SE = 0.07$ ,  $p = 0.000$ ,  $d = 0.46$ ; Externalized (e.g. anger, embarrassment):  $\beta = -0.18$ ,  $SE = 0.05$ ,  $p = 0.000$ ,  $d = 0.29$ . However, unlike prior evaluations of *Connect* delivered in person pre-pandemic, parents' depressed mood did not change significantly from T1 to T2 in *eConnect* groups delivered during the pandemic ( $\beta = -1.71$ ,  $SE = 1.28$ ,  $p = 0.181$ ,  $d = 0.11$ ).

### *Changes in parent-child interactions*

We found that aggression between parents and youth significantly declined from pre- to post-treatment. Specifically, parents reported a moderate effect size reduction in their child's combined physical and psychological aggression directed toward them ( $\beta = -0.23$ ,  $SE = 0.04$ ,  $p = 0.000$ ,  $d = 0.53$ ) and a small effect size reduction in parents' aggression toward their child ( $\beta = -0.05$ ,  $SE = 0.02$ ,  $p = 0.017$ ,  $d = 0.20$ ).

### *Parents' experiences with virtual program delivery*

Parents ( $N = 164$ ; 86.3% of the full sample) who reported on their experiences during their *eConnect* group indicated that they were moderately to extremely familiar (57.3%) or slightly to somewhat familiar (25.6%) with videoconferencing prior to completing the group; only 17.1% indicated no prior experience. Almost all parents (99.4%) never, rarely, or sometimes experienced technical challenges during group. Of those who experienced technical challenges, most indicated that this had no or limited impact on their attendance (82.6%) and verbal participation in group sessions (86.0%). On average parents found the videoconferencing platform to be very easy to learn and to use ( $M = 6.27$ ;  $SD = 0.92$ ) and had a positive experience using the platform ( $M = 5.85$ ;  $SD = 1.16$ ).

Parent attendance in *eConnect* groups was high: on average parents attended 7.5 out of 9 sessions and 87.4% completed the group (6 of 9 or more sessions attended). Parents who completed the group did not differ significantly on demographics or T1 treatment outcome measures from non-completers.

### *Parent report: program acceptability*

Parents were highly satisfied with the program and would recommend it to other parents ( $M = 6.37$ ,  $SD = 0.77$ ), and 80.5% indicated that *eConnect* met a service need of theirs not adequately met previously.

### **Program facilitators' experiences with virtual program delivery**

All group facilitators reported that they never, rarely, or sometimes experienced technical challenges during group. Of those who experienced some level of technical challenges, the majority indicated it had no or limited impact on their facilitation process (content delivery: 88.7%; communication: 86.8%; monitor responses: 75.5%; focus on group: 84.9%). On average, group facilitators indicated that the videoconferencing platform was easy to use ( $M = 5.74$ ,  $SD = 0.81$ ) and their experience facilitating the group online was generally positive ( $M = 4.99$ ,  $SD = 1.30$ ). Similarly, all tech facilitators reported that they never, rarely, or sometimes experienced technical challenges during group, and that the videoconferencing platform was easy to use ( $M = 5.68$ ,  $SD = 0.95$ ).

### **Group facilitator report: program acceptability and sustainability**

Group facilitators were highly positive about *eConnect* ( $M = 6.25$ ,  $SD = 0.97$ ) and had high expectations regarding the positive impact that it can have for themselves, their agencies and community ( $M = 6.13$ ,  $SD = 0.83$ ). They also generally felt positive regarding factors key to the sustainability of *eConnect* within their agency in the future ( $M = 5.21$ ,  $SD = 1.20$ ).

## **Discussion**

The COVID-19 pandemic highlighted the longstanding gap between the mental health needs of youth and their families and the accessibility of high-quality evidence-based treatments. It also highlighted the urgent need for program developers and mental health practitioners to embrace the online service delivery modality. In response to this need, we rapidly created *eConnect* for online delivery, working together with an experienced international team of experts in *Connect* to ensure the retention of all program components and the focus of the program on promoting parental reflective function through real-time use of role-plays, reflection exercises and guided group discussions.

Like other attachment-based interventions for younger children that have been adapted for online delivery during the pandemic (Gray et al., 2022; Roben et al., 2021; Schein et al., 2022), we were able to successfully adapt *Connect* for an online delivery format with fidelity. The results of this study provide encouraging evidence that parents completing *eConnect* experienced highly similar pre- to post-treatment changes as those completing in-person *Connect*. From pre- to post-treatment, parents reported significant reductions in their children's externalizing and internalizing problems, as well as their children's attachment anxiety and avoidance. The effect sizes appear to be comparable to those reported in previously published results for in-person *Connect* groups. Specifically, the medium effect size reduction in youth externalizing problems in the current study ( $d = 0.54$ ) was in keeping with the range of effect sizes in previous evaluations for in-person *Connect* ( $d = 0.37$  to  $0.68$ ; Barone et al., 2020, 2021; Moretti & Obsuth, 2009; Moretti et al., 2015; Osman, Flacking, et al., 2017). The medium effect size reduction in youth internalizing problems ( $d = 0.75$ ) appears to be larger but comparable to the range of effect sizes reported in prior in-person *Connect* studies ( $d = 0.16$  to  $0.63$ ). The small effect size reductions in youth attachment avoidance ( $d = 0.27$ ) and anxiety ( $d = 0.20$ ) appear to be relatively similar to what were previously reported ( $d = 0.22$  for attachment avoidance

and  $d = 0.09$  for attachment anxiety; Moretti et al., 2015), although they appear to be lower than the control versus treatment group differences reported by Barone et al. (2020;  $d = 0.35$ – $0.79$  for attachment avoidance and  $d = 0.56$  to  $0.88$  for attachment anxiety).

In other cases, the effects sizes we observed appear to be somewhat smaller than shown in prior research. For example, although the medium effect size reduction in child's aggression toward parents in the current study ( $d = 0.53$ ) was similar to previously reported findings ( $0.74$ ; Moretti & Obsuth, 2009), the small effect size reduction in parents' aggression toward their children ( $d = 0.20$ ) differed from the large effect size decrease noted in prior research ( $d = 0.94$ , Moretti & Obsuth, 2009). Similarly, although parents reported small to medium effect size reductions in caregiver strain, including parenting-related stressor such as missing work and financial strain (objective strain,  $d = 0.55$ ), feelings of worry and guilt (subjective internalized strain,  $d = 0.46$ ), and anger and embarrassment (subjective externalized strain,  $d = 0.29$ ), effect sizes previously reported for in-person *Connect* were within the medium to large effect size range ( $d = 0.93$ ,  $0.98$ , and  $0.70$  respectively; Moretti & Obsuth, 2009). Additionally, parents in the current study did not report a significant reduction in depressed mood ( $d = .11$ ), while small effect size decreases were noted in prior evaluations of in-person *Connect* ( $d = 0.21$ – $0.33$ ; Högström et al., 2017; Stattin et al., 2015).

In sum, while the effects we report for youth functioning are generally comparable to previous evaluations of in-person *Connect*, effect sizes for parent functioning were smaller and were not significant for depressed mood, despite parents reporting a high level of satisfaction with the program. One explanation for these findings is that parents may not have benefited as substantially from *eConnect* due to the prolonged and stressful effects of COVID-19 at the time in which this study was conducted. This may have capped their potential improvements during the ten weeks of the program. One evidence for this hypothesis is that at pre-treatment, a significant portion of parents in the present study reported that the pandemic and pandemic-related public health guidelines contributed to their caregiving strain (55.8%) and aggressive behaviours towards their children (33.5%). Future research comparing in-person and online *Connect* groups ran concurrently in post-pandemic conditions is thus warranted. Given that the changes in parent functioning was less robust, it is unclear how comparable the longer-term outcomes of *eConnect* delivered during the pandemic will be to current research showing significant long-term effects of in-person *Connect* (Högström et al., 2017). As such, follow-up studies are needed to investigate the long-term effects of these *eConnect* groups.

Given the preliminary nature of the present study, there are a few more limitations to this study's design and sample that could be addressed in future research. First, the effect size comparisons presented in the present study between *eConnect* and in-person *Connect* are preliminary. They are better viewed as observations to be further investigated rather than a formal evaluation of *eConnect* vs. in-person *Connect*. Randomized controlled trials beyond the pandemic, comparing outcomes from *eConnect*, in-person *Connect*, and a control group could help to evaluate the true effectiveness of *eConnect*. Furthermore, even though youth reports were not within the scope of this pilot study, 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 measures could also offer a more nuanced perspective on the effect of the program on parents and youth, complementing the self-reported quantitative measures. Finally, we would like to

acknowledge that the sample of the present study is 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 experienced by ethnically diverse populations (Chiu et al., 2018; Poitras et al., 2022). Fortunately, *eConnect* has been implemented with diverse populations, including South Africa (Haffejee & Theron, 2022), Mexico (Gallegos-Guajardo et al., 2022), and with refugee parents in Sweden who came from Afghanistan, Somalia, and Syria (Osman & Skutin, 2022). Preliminary findings from these studies have been promising.

Our work has intentionally focused on evaluating factors that promote or hinder the implementation and uptake of mental health interventions. Without accessibility and strong uptake, treatment programs will have limited impact at a population level. Our results are promising in this regard. Parents who attended *eConnect* groups generally had a positive experience with the online format. Many commented that the accessibility of the online program made it easier for them to attend group, and it is notable that 87.4% of the parents completed the program versus a completion rate of 77% to 84% previously reported for in-person *Connect* groups (Moretti & Obsuth, 2009; Moretti et al., 2015). Parents reported high satisfaction with their experience and indicated that they would recommend the program to other parents. Similarly, facilitators who delivered the program had a positive experience with the online format and the program overall. They also had positive expectations regarding the impact that *eConnect* could have for their communities as well as the future sustainability of the program within their agencies. These results suggest that *eConnect* strongly appeals to practitioners and could have strong uptake even beyond the pandemic. As we exit the COVID-19 pandemic, further studies are needed to evaluate the uptake and sustainability of *eConnect* as agencies and family readjust to new societal norms.

Despite the confounding pandemic factor, the results of this study support the viability of implementing attachment-based, process-focused group interventions online. The accessibility of the online format could afford mental health agencies the ability to provide some much-needed services to more families in the community, allowing those who are geographically isolated or are bound by competing responsibilities or limited resources to participate in the program. This format could also help to bring specialized group-based programs to populations with unique challenges and needs, as individuals who are geographically dispersed could come together online to participate in the program.

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## Disclosure statement

As the developer of the *Connect* Attachment Programs, Marlene Moretti may benefit from positive reports of the intervention. As a result, she maintained an arm's length distance from direct recruitment and consent of participants, data collection and execution of data analysis.

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